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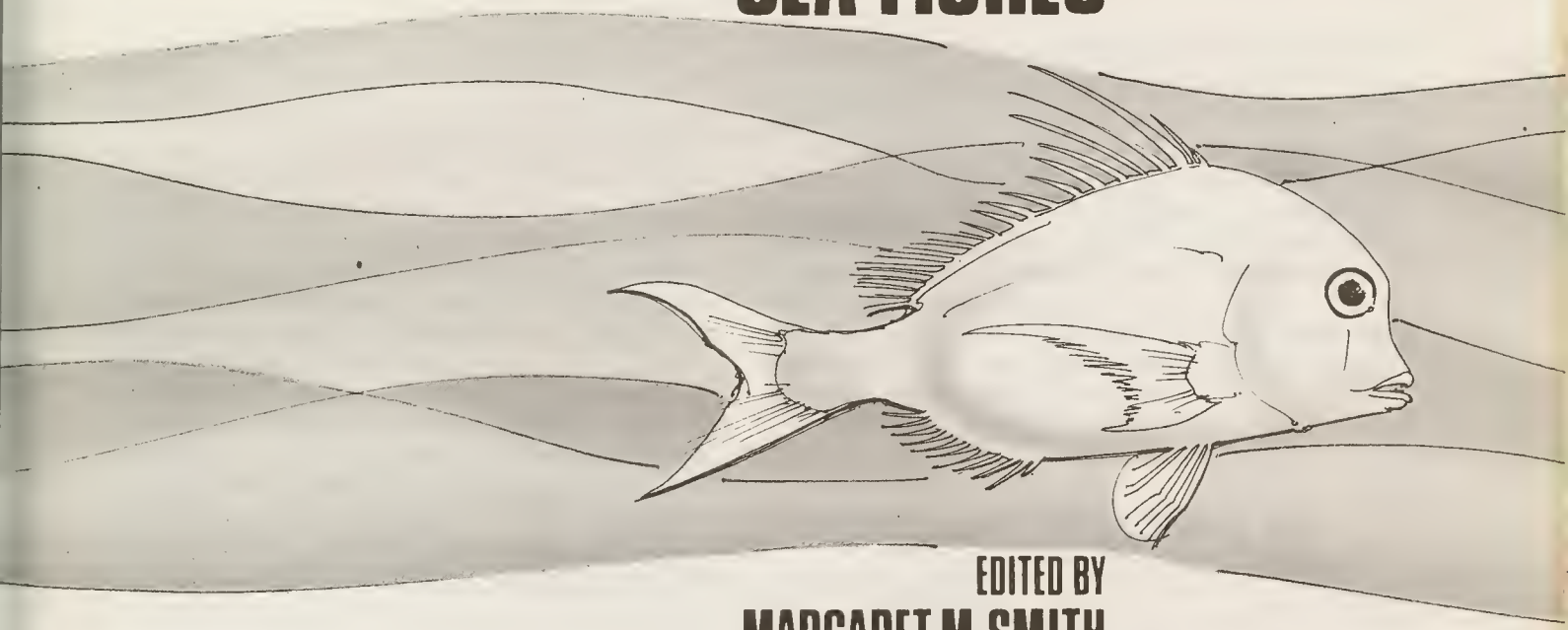

EDITED BY
MARGARET M SMITH
AND
PHILLIP C HEEMSTRA

To Karsten with best regards,
Phil Heemstra
19 August 1987

M

Dedicated to J.L.B. Smith
who loved angling and devoted his life
to the study of fishes.

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The forerunner to this book, *The Sea Fishes of Southern Africa*
by J.L.B. Smith, was first published in 1949.
Revised editions appeared in 1953, 1965 and 1977.

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Foreword

Dr. D. S. Henderson,
Chairman of the J.L.B. Smith Institute of Ichthyology and Vice Chancellor of Rhodes University

This book is a unique, international collaborative effort of 76 scientists, representing 15 countries. Several skilled artists and photographers have also contributed to the numerous and beautiful illustrations. Research done in South Africa was supported by the Council for Scientific and Industrial Research. Work on the book at the J.L.B. Smith Institute was also funded by the Department of National Education and The Trustees of the Sea Fishes of Southern Africa Book Fund. Expenses of visits by ichthyologists from overseas were defrayed by a grant from the John S. Schlesinger Foundation.

Although this book is an impressive contribution to the zoology of southern Africa, few people will realise the enormous amount of work that has gone into it. Prof. Margaret M. Smith has laboured for thirty years: first, to build the foundation of the largest fish collection in Africa and the comprehensive, superbly organised library necessary for the research; second, to lead the project that produced the book; and third, to participate in the actual research, writing, editing, production of most of the illustrations, and arranging all of the colour plates for the book. For the past eight years, she has been assisted in the research, writing and editing of the book by Dr. P. C. Heemstra.

It is essential for the proper management of the marine fish resources of southern Africa that we know what species we are dealing with. This book will greatly facilitate the identification of our fishes. It will thus be of vital importance to the understanding and wise use of our tremendously diverse and valuable fish fauna.

We are proud of the affiliation of the J.L.B. Smith Institute with Rhodes University and happy to see the successful completion of this long-awaited work.

Derek S. Henderson

Dr. D. S. Henderson,
Chairman of the Institute and
Vice-Chancellor of Rhodes University

J. P. de Wit,
Deputy President, CSIR

When J. L. B. Smith's monumental book *The Sea Fishes of Southern Africa* was first published in 1949, the first printing was sold out within three weeks. Due in large measure to the excellent and numerous illustrations (mostly by Margaret Smith), the book has been extremely popular in South Africa and also much in demand overseas. It has become an international ichthyological "classic" and is well known in museums and marine laboratories all over the world. In 1953 and 1961, J. L. B. Smith added a few additional species in appendices at the end of the book. Since 1961, many new species and new records of fishes have been discovered in the seas off southern Africa. Also, recent ichthyological research has considerably altered the classification of marine fishes. It thus became apparent that the *Sea Fishes* book was in need of a thorough revision.

Prof. Margaret Smith and Dr P. C. Heemstra began work on the revision in 1978. In view of the specialisation that has taken place in ichthyology (as in science generally), it was considered advisable to enlist the assistance of other ichthyologists who are experts on the various families of marine fishes represented in the seas of southern Africa. This team effort has produced a uniquely authoritative and comprehensive book on the marine fishes of southern Africa. To all of the many collaborators, we owe a debt of gratitude for their unstinting efforts to provide the latest and best fruits of their ichthyological research.

With this book, on which she laboured for over 15 years, Margaret Smith has produced not only a worthy tribute to her late husband's great achievements, but also a lasting testimonial to her own dedication to the fulfilment of his ideals.

J. P. de Wit

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Throughout the years the public, including the angling fraternity, naturalists, divers and school children, have sent in numerous specimens and contributed much useful information. Several persons have made a special effort to collect fishes for us. In some cases these specimens have represented new species or new records for southern Africa. We are especially grateful to A. R. Thorpe, Dave Bickell, Rudy van der Elst, Malcolm Smale, Alan Connell, Colin Buxton, Dennis King, Len Jones, Alf Johnson, Elizabeth Tarr, Rob Tarr, Brian Trow, Hennie Kok, Wouter Holleman, Anton Bok, Tom Hecht, Robin Stobbs, Mike Bruton and Lynneth Beckley. We also thank the East London and Port Elizabeth Museums and the Oceanographic Research Institute in Durban for their efforts in sending specimens. We are indebted to P. A. Hulley and S. X. Kannemeyer for their prompt loans of material from the South African Museum and for providing data on various fishes in their collection.

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Systematic contents

Taxon	Common name	Author	Page
Superclass Agnatha (Cyclostomata)			
Class Pteraspidomorphi			
Order Myxiniformes			
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Class Chondrichthyes			
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Family No. 47. Nettastomatidae	*witch eels*	P. H. J. Castle	190
Family No. 48. Serrivomeridae	*sawtooth eels*	P. H. J. Castle	191
Family No. 49. Derichthyidae	*longneck eels*	P. H. J. Castle	191
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Order Notacanthiformes			
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Family No. 53. Halosauridae	*halosaurs*	K. Sulak	196
Infradivision Clupeomorpha			
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Family No. 55. Engraulidae	*anchovies*	P. J. P. Whitehead & T. Wongratana	204
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Family No. 58. Chanidae	*milkfish*	M. M. Smith	209
Order Siluriformes			
Family No. 59. Ariidae	*sea catfishes*	W. R. Taylor	211
Family No. 60. Plotosidae	*eel catfishes*	J. R. Gomon	213
Order Salmoniformes			
Suborder Argentinoidei			
Family No. 61. Argentinidae	*argentines*	D. M. Cohen	215
Family No. 62. Bathylagidae	*deepsea smelts*	D. M. Cohen	216
Family No. 63. Opisthoproctidae	*barreleyes*	P. C. Heemstra	216
Family No. 64. Alepocephalidae	*slickheads*	D. F. Markle	218
Family No. 65. Platytroctidae	*tubeshoulders*	T. Matsui & R. H. Rosenblatt	223
Family No. 66. Leptochilichthyidae	*leptochilichthyids*	D. F. Markle	225
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Family No. 68. Chauliodontidae	*viperfishes*	R. H. Gibbs, Jr.	230
Family No. 69. Astronesthidae	*snaggletooths*	R. H. Gibbs, Jr.	231
Family No. 70. Idiacanthidae	*sawtail fishes*	P. A. Hulley	234
Family No. 71. Malacosteidae	*loosejaws*	R. H. Goodyear & R. H. Gibbs, Jr.	235
Family No. 72. Melanostomiidae	*scaleless dragonfishes*	R. H. Gibbs, Jr.	236
Family No. 73. Photichthyidae	*lightfishes*	S. Schaefer, R. K. Johnson & J. Badcock	243
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Family No. 79. Synodontidae	*lizardfishes*	R. F. Cressey	270
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Family No. 81. Paralepididae	*barracudinas*	A. Post	274
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Family No. 102. Antennariidae	*anglers*	T. W. Pietsch	366
Family No. 103. Chaunacidae	*coffinfishes*	M. M. Smith	369
Family No. 104. Ogcocephalidae	*seabats*	M. G. Bradbury	370
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Family No. 106. Oneirodidae	*oneirodids*	T. W. Pietsch	375
Family No. 107. Melanocetidae	*devil-anglers*	T. W. Pietsch	375
Family No. 108. Himantolophidae	*footballfish*	T. W. Pietsch	376
Family No. 109. Diceratiidae	*horned anglers*	T. W. Pietsch	376
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Order Atheriniformes			
Family No. 111. Atherinidae	*silversides*	W. Ivantsoff	381
Family No. 112. Notocheiridae	*surf sprites*	W. Ivantsoff	384
Order Beloniformes			
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Family No. 114. Scomberesocidae	*sauries*	M. M. Smith	387
Family No. 115. Hemiramphidae	*halfbeaks*	B. B. Collette	388
Family No. 116. Exocoetidae	*flyingfishes*	P. C. Heemstra & N. V. Parin	391
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Family No. 117. Lampridae	*opahs*	P. C. Heemstra	398
Family No. 118. Veliferidae	*velifers*	P. C. Heemstra	398
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Family No. 122. Regalecidae	*oarfishes*	P. C. Heemstra	403
Family No. 123. Stylephoridae	*tube-eye*	P. A. Hulley	404
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Family No. 130. Diretmidae	*diretmids*	A. Post	414
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Family No. 141. Zeniontidae	*zeniontids*	P. C. Heemstra	441
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Family No. 143. Aulostomidae	*trumpetfishes*	P. C. Heemstra	444
Family No. 144. Fistulariidae	*flutemouths*	P. C. Heemstra	444
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Family No. 146. Solenostomidae	*ghost pipefishes*	R. A. Fritzsche	459

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Order Scorpaeniformes			
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Family No. 150. Tetrarogidae	*waspfishes*	S. Poss	479
Family No. 151. Aploactinidae	*velvetfishes*	S. Poss	479
Family No. 152. Congiopodidae	*horsefishes*	S. Poss	480
Family No. 153. Caracanthidae	*coral crouchers*	W. N. Eschmeyer	481
Family No. 154. Bembridae	*deepwater flatheads*	L. W. Knapp	481
Family No. 155. Platycephalidae	*flatheads*	L. W. Knapp	482
Family No. 156. Hoplichthyidae	*spiny flatheads*	M. M. Smith	486
Family No. 157. Triglidae	*gurnards*	P. C. Heemstra	486
Family No. 158. Peristediidae	*armoured gurnards*	P. C. Heemstra	489
Family No. 159. Dactylopteridae	*helmet gurnards*	W. N. Eschmeyer	490
Family No. 160. Psychrolutidae	*fatheads*	J. S. Nelson	491
Family No. 161. Liparididae	*snailfishes*	D. L. Stein	492
Order Perciformes			
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Family No. 163. Ambassidae	*glassies*	P. C. Heemstra & T. J. Martin	507
Family No. 164. Kuhliidae	*flagtails*	M. M. Smith	508
Family No. 165. Polyprionidae	*wreckfishes*	P. C. Heemstra	509
Family No. 166. Serranidae	*rockcods & seabasses*	P. C. Heemstra & J. E. Randall	509
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Family No. 168. Callanthiidae	*goldies*	P. C. Heemstra & W. D. Anderson, Jr.	538
Family No. 169. Pseudochromidae	*dottybacks*	M. M. Smith	539
Family No. 170. Acanthoclinidae	*spiny basslets*	M. M. Smith	541
Family No. 171. Pseudogrammidae	*podges*	M. M. Smith	541
Family No. 172. Plesiopidae	*longfins*	P. C. Heemstra	542
Family No. 173. Teraponidae	*thornfishes*	P. C. Heemstra	543
Family No. 174. Priacanthidae	*bigeyes*	P. C. Heemstra	544
Family No. 175. Apogonidae	*cardinal fishes*	O. Gon	546
Family No. 176. Acropomatidae	*acropomatids*	P. C. Heemstra	561
Family No. 177. Scombropidae	*gnomefishes*	P. C. Heemstra	563
Family No. 178. Pomatomidae	*elf*	M. M. Smith & J. L. B. Smith	564
Family No. 179. Haemulidae	*rubberlips & grunters*	M. M. Smith & R. J. McKay	564
Family No. 180. Dinopercidae	*cavebass*	P. C. Heemstra	571
Family No. 181. Lutjanidae	*snappers*	W. D. Anderson, Jr.	572
Family No. 182. Caesionidae	*fusiliers*	M. M. Smith	579
Family No. 183. Sparidae	*seabreams*	J. L. B. Smith & M. M. Smith	580
Family No. 184. Centracanthidae	*picarels*	P. C. Heemstra	594
Family No. 185. Lethrinidae	*emperors*	M. M. Smith	595
Family No. 186. Nemipteridae	*butterfly breams & spinecheeks*	B. C. Russell	600
Family No. 187. Coracinidae	*galjoens*	M. M. Smith	601
Family No. 188. Parascorpididae	*jutjaw fish*	P. C. Heemstra	602
Family No. 189. Kyphosidae	*sea chubs*	M. M. Smith	603
Family No. 190. Scorpididae	*stonebreams*	M. M. Smith	604
Family No. 191. Scatophagidae	*scatties*	P. C. Heemstra	604
Family No. 192. Ephippidae	*batfishes*	M. M. Smith	605
Family No. 193. Monodactylidae	*moonies*	P. C. Heemstra	607
Family No. 194. Gerreidae	*pursemouths*	D. J. Woodland	608
Family No. 195. Drepanidae	*sicklefishes*	M. M. Smith	609
Family No. 196. Mullidae	*goatfishes*	A. Ben-Tuvia	610
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Family No. 198. Sillaginidae	*sillagos*	R. J. McKay	615
Family No. 199. Sciaenidae	*kobs*	P. C. Heemstra	616
Family No. 200. Menidae	*moonfish*	M. M. Smith	619
Family No. 201. Leiognathidae	*soapies*	M. M. Smith	620
Family No. 202. Lobotidae	*tripletail*	P. C. Heemstra	621
Family No. 203. Pentacerotidae	*armourheads*	P. C. Heemstra	622
Family No. 204. Pomacanthidae	*angelfishes*	M. M. Smith & P. C. Heemstra	623

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Family No. 205. Chaetodontidae	*butterflyfishes*	P. C. Heemstra	627
Family No. 206. Oplegnathidae	*knifejaws*	P. C. Heemstra	632
Family No. 207. Bramidae	*pomfrets*	M. M. Smith	633
Family No. 208. Caristiidae	*manefishes*	P. C. Heemstra	636
Family No. 209. Emmelichthyidae	*rovers*	P. C. Heemstra	637
Family No. 210. Carangidae	*kingfishes*	W. F. Smith-Vaniz	638
Family No. 211. Coryphaenidae	*dolphinfish*	M. M. Smith	661
Family No. 212. Rachycentridae	*cobia*	M. M. Smith	661
Family No. 213. Echeneidae	*remoras*	P. C. Heemstra	662
Family No. 214. Cirrhitidae	*hawkfishes*	J. E. Randall	664
Family No. 215. Cheilodactylidae	*fingerfins*	M. M. Smith	667
Family No. 216. Pempheridae	*sweepers*	P. C. Heemstra	668
Family No. 217. Bathyclupeidae	*bathyclupeids*	P. C. Heemstra	669
Family No. 218. Cichlidae	*cichlids*	P. C. Heemstra	670
Family No. 219. Pomacentridae	*damselfishes*	G. R. Allen	670
Family No. 220. Labridae	*wrasses*	J. E. Randall	683
Family No. 221. Scaridae	*parrotfishes*	J. E. Randall	706
Family No. 222. Mugilidae	*mullets*	M. M. Smith & J. L. B. Smith	714
Family No. 223. Polynemidae	*threadfins*	M. M. Smith	720
Family No. 224. Sphyraenidae	*barracudas*	D. P. de Sylva & F. Williams	721
Family No. 225. Opistognathidae	*jawfishes*	W. F. Smith-Vaniz	726
Family No. 226. Cepolidae	*bandfishes*	W. F. Smith-Vaniz	727
Family No. 227. Congrogadidae	*snakelets*	R. Winterbottom	729
Family No. 228. Chiasmodontidae	*swallowers*	R. K. Johnson & M. J. Keene	731
Family No. 229. Champsodontidae	*gapers*	P. C. Heemstra	734
Family No. 230. Uranoscopidae	*stargazers*	P. C. Heemstra	735
Family No. 231. Trichonotidae	*sand divers*	P. C. Heemstra	736
Family No. 232. Creediidae	*sand burrowers*	J. S. Nelson	736
Family No. 233. Percophidae	*duckbills*	P. C. Heemstra & J. S. Nelson	737
Family No. 234. Mugiloididae	*sandsmelts*	P. C. Heemstra	739
Family No. 235. Blenniidae	*blennies*	V. G. Springer	742
Family No. 236. Tripterygiidae	*threefin blennies*	W. Holleman	755
Family No. 237. Clinidae	*klipfishes*	M. M. Smith	758
Family No. 238. Ammodytidae	*sandlances*	P. C. Heemstra	769
Family No. 239. Callionymidae	*dragonets*	R. Fricke	770
Family No. 240. Gobiidae	*gobies*	D. F. Hoese	774
Family No. 241. Eleotridae	*sleepers*	D. F. Hoese	807
Family No. 242. Kraemeriidae	*sand darts*	D. F. Hoese	811
Family No. 243. Acanthuridae	*surgeonfishes & unicornfishes*	J. E. Randall	811
Family No. 244. Zanclidae	*Moorish idol*	P. C. Heemstra & M. M. Smith	823
Family No. 245. Siganidae	*rabbitfishes*	D. J. Woodland	824
Family No. 246. Scombrolabracidae	*black mackerel*	I. Nakamura	825
Family No. 247. Gempylidae	*snake mackerels*	I. Nakamura	825
Family No. 248. Trichiuridae	*frostfishes*	I. Nakamura	829
Family No. 249. Scombridae	*tunas, mackerels & bonitos*	B. B. Collette	831
Family No. 250. Luvaridae	*louvars*	P. C. Heemstra	838
Family No. 251. Xiphiidae	*swordfishes*	P. C. Heemstra	839
Family No. 252. Istiophoridae	*sailfish, spearfishes & marlins*	P. C. Heemstra	839
Suborder Stromateoidei			
Family No. 253. Amarsipidae	*amarsipids*	R. L. Haedrich	842
Family No. 254. Stromateidae	*ruffs*	R. L. Haedrich	842
Family No. 255. Nomeidae	*driftfishes*	R. L. Haedrich	846
Family No. 256. Tetragonuridae	*squaretails*	R. L. Haedrich	851
Order Pleuronectiformes			
Suborder Psettodoidei			
Family No. 257. Psettodidae	*adalahs*	P. C. Heemstra	853
Suborder Pleuronectoidei			
Family No. 258. Citharidae	*largescale flounders*	P. C. Heemstra	853
Family No. 259. Bothidae	*lefteye flounders*	D. A. Hensley	854

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Family No. 260. Pleuronectidae	*righteye flounders*	P. C. Heemstra	863
Suborder Soleoidei			
Family No. 261. Cynoglossidae	*tonguefishes*	P. C. Heemstra	865
Family No. 262. Soleidae	*soles*	P. C. Heemstra & O. Gon	868
Order Tetraodontiformes			
Suborder Balistoidei			
Family No. 263. Balistidae	*triggerfishes*	M. M. Smith & P. C. Heemstra	876
Family No. 264. Monacanthidae	*filefishes*	J. B. Hutchins	882
Family No. 265. Triacanthodidae	*spikefishes*	J. C. Tyler	887
Family No. 266. Ostraciidae	*boxfishes*	M. M. Smith	890
Suborder Tetraodontoidei			
Family No. 267. Triodontidae	*threetooth puffer*	M. M. Smith	894
Family No. 268. Tetraodontidae	*blaasops*	M. M. Smith & P. C. Heemstra	894
Family No. 269. Diodontidae	*burrfishes & porcupinefishes*	J. M. Leis	903
Family No. 270. Molidae	*ocean sunfishes*	P. C. Heemstra	907

Introduction

The primary purpose of this book is to provide a means to identify the more than 2 200 species of fishes that are known or likely to occur in the seas off southern Africa. This region is bounded by the latitudes of 20° and 40°S and the longitudes of 10° and 40°E. On our west coast, the 20°S latitude is about midway between Walvis Bay and the Cunene River, which is the northern boundary of Namibia (South-West Africa); the 20°S latitude intersects the east coast just south of Beira, Mozambique. The marine fish fauna of southern Africa is still not thoroughly known, and new species or new records for our area are being discovered every year. We have included, therefore, many "extralimital" species that are known from just outside our boundaries and are considered likely to bè found in our area.

Another goal of this book is to present a guide to the literature of the marine fishes of southern Africa. We thus include for each species the original species description reference, synonyms described from our area, and other important taxonomic or biological references. For many commercially important species or fishes of interest to anglers, we have added information on life history, size and capture.

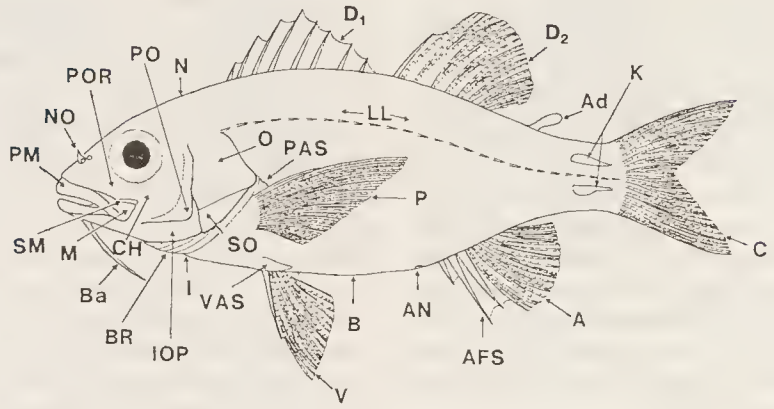
Fishes are the most abundant, diverse and poorly known group of vertebrate animals. In the second (1984) edition of his excellent book *Fishes of the World,* Joseph Nelson estimates that there are some 21 723 species of living (i.e. not extinct) fishes. This represents about half of all the known vertebrate species. Newly discovered fish species are much more common than are new species in other vertebrate groups, and the number of living fish species may eventually approach 28 000. Fishes have colonised every aquatic habitat on earth, from lakes, rivers, caves and hot (44 °C) freshwater pools to polar seas (−2 °C), tropical reefs and the deepest ocean bottoms.

With some 2 200 species, the southern African fish fauna comprises about 15 per cent of the total number of marine fish species in the world. The richness of our fauna is mainly due to the variety of habitats in our area: coral reefs, estuaries, sandy beaches, mud flats, rocky shores, kelp beds and ocean depths exceeding 5 000 metres. Another important factor in the diversity of our fish fauna is that southern Africa is the meeting place of three great oceans and is thus the recipient of species from each of these three separate faunas. The largest contribution, about half of our total number of species, is from the vast tropical Indo-Pacific fauna. A few species, some three to four per cent of our total, are of Atlantic origin (e.g. *Trigla lyra, Serranus cabrilla* and *Lithognathus mormyrus*). Less than one per cent of our species are members of a temperate southern ocean fauna that occurs at South Africa, Australia, New Zealand and South America (e.g. *Thyrsites atun, Genypterus capensis, Cyttus traversi, Chelidonichthys kumu* and *Emmelichthys nitidus*). The second largest component of our fauna (some 29 per cent) comprises deep-sea species, many of which are found worldwide in the oceans of the southern hemisphere. About 13 per cent of our species are endemics, (known only from southern Africa). This relatively high level of endemism is primarily due to only five families: Clinidae (38 endemics), Gobiidae (28 endemics), Sparidae (25 endemics), Scyliorhinidae (11 endemics) and Batrachoididae (7 endemics). The remainder of our fauna (some four per cent) comprises cosmopolitan shallow-water (littoral and epipelagic) species (e.g. the elf, *Pomatomus saltatrix,* and the dolphinfish, *Coryphaena hippurus*).

Another indication of the great diversity of our fish fauna is revealed by the ratio of the number of families represented in our area, 270 (including the Anguillidae but not the Cichlidae) to the total number of marine fish families, 325. This ratio of 83 per cent of the world's marine fish families is much greater than the 60 per cent of the Philippines or the 68 per cent of Australia. Only Japan, with about 86 per cent, has more marine fish families than we have represented in our area.

Anatomy of fishes

EXTERNAL FEATURES OF A "TYPICAL" FISH (TELEOST)



A	anal fin
Ad	adipose fin
AFS	anal fin spine
AN	anus (vent)
B	belly
BA	barbel
BR	branchiostegal rays
C	caudal (tail) fin
CH	cheek
D_1	first dorsal fin (generally spinous)
D_2	second dorsal fin (generally with single spine in front of soft-rays)
I	isthmus
IOP	interopercle
K	keels on caudal peduncle
LL	lateral line
M	maxilla (plural: maxillae)
N	nape
NO	nostrils (nares)
O	opercle
P	pectoral fin
PAS	axillary scale of pectoral fin
PM	premaxilla
PO	preopercle
POR	preorbital (lachrymal)
SM	supramaxilla
SO	subopercle
V	pelvic (ventral) fin
VAS	axillary scale of pelvic fin

NOTES

The dorsal, caudal and anal fins are called the **median fins,** as they lie in the median (middle) vertical plane of the fish. In some fishes, the spinous dorsal fin is joined to the soft-rayed fin to form a single dorsal fin. The pectoral and pelvic fins are known as the **paired fins,** because there are two (left and right fins) of each. The **distal** part of a fin is the outer (marginal) part; the **proximal** or basal part of a fin is that portion nearest the body. The **adipose fin** is a short, fleshy, median fin situated on the caudal peduncle.

The **nostrils** of most fishes are paired, with a posterior and anterior nostril on each side of the snout, but a few fishes (e.g. pomacentrids, cichlids, trichiurids) have only a single nostril on each side.

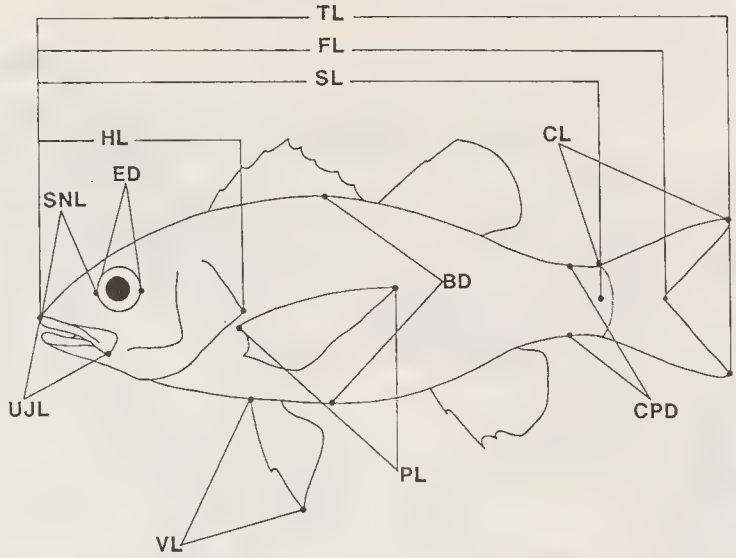
In most fishes the **branchiostegal rays** (which are connected by and support the branchiostegal or **gill membranes**) are readily apparent, especially if the gill covers are lifted. In some families the gill membranes are joined posteriorly to the isthmus or the sides of the chest, and the gill openings are more or less restricted. In blennies and some other groups, the gill membranes of the left and right sides may be widely joined to each other and free of the isthmus, thus forming a free fold over the isthmus.

The **operculum** (plural: opercula) or gill cover comprises four bones: the opercle, subopercle, preopercle and interopercle.

The **upper jaw** comprises (usually) two bones: the premaxilla and maxilla. In some fishes, there is a separate little bone, the **supramaxilla,** attached to the upper rear edge of the maxilla.

Fin spines differ from the **soft-rays** as follows: spines are unpaired, unbranched, non-segmented fin rays that are located in the anterior part of the median fins or at the leading edge of the ventral (or pelvic) fins. Soft-rays are segmented, bilaterally paired (i.e. comprising left and right halves that are more or less fused to form a single ray) fin

MEASUREMENTS OF A "TYPICAL" FISH

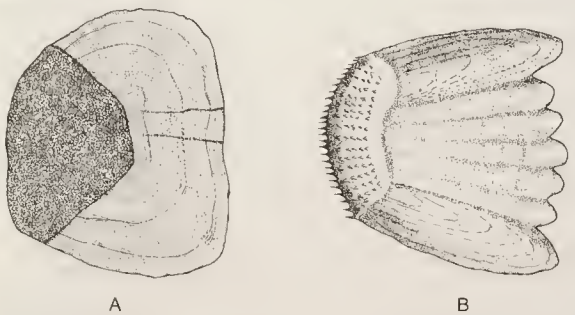


BD body depth
CL caudal fin length
CPD caudal peduncle depth
ED eye orbit diameter
FL fork length
HL head length
PL pectoral fin length
SL standard length (snout to base of caudal fin)
SNL snout length
TL total length
UJL upper jaw length
VL pelvic (ventral) fin length

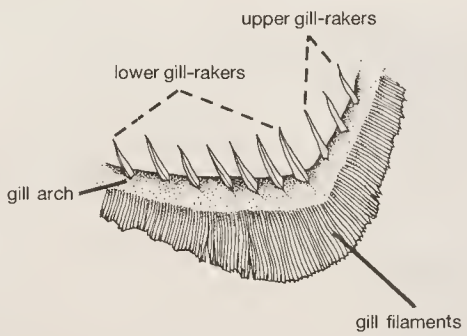
rays. Fin spines are usually stiff and have a sharply pointed tip, but some fishes (e.g. blennies) have soft, flexible spines. Soft-rays, as the name implies, are generally soft (flexible), always segmented (articulated) and, in most fishes, branched. The cross-striations (articulations) of the soft-rays are best seen if the fin is held up to a light.

The scales of most fishes are either **cycloid** or **ctenoid.** Cycloid scales are smooth, but the rear margin of ctenoid scales is provided with small, tooth-like prickles (called **ctenii**) which give ctenoid scales their rough texture when the fish is stroked from the tail towards the head. In some kingfishes (Family No. 210: Carangidae) the posterior lateral-line scales are modified to form **scutes:** thick, bony scales with a median ridge ending posteriorly in a sharp spine. Most clupeid fishes (pilchards, sardines, etc.) and some trachichthyid and zeid fishes (Families Nos. 127 and 128) have scutes along the ventral midline of the belly.

The gills of fishes bear numerous soft **gill filaments** along their outer (posterior) edge. The bright red colour of the gill filaments of a fresh fish is from the abundant blood capillaries in each filament. The gills absorb oxygen from the water and release carbon dioxide from the fish's respiration. On the inner (anterior) edge of the first gill arch are the **gill-rakers.** These gill-rakers may be long, slender and numerous, as in the plankton-feeding fishes whose gill-rakers form a sieve to filter out their microscopic food from the water passing through the gills. Most fishes have a few gill-rakers, but some lack them completely. When counting the gill-rakers always count those on the first arch unless otherwise stated, and the raker in the angle of the gill arch is counted with the lower rakers (see illustration).



A. Cycloid scale from right side of fish. B. Ctenoid scale from right side of fish.



Gill arch from left side of fish. Gill-raker counts = 3+7, i.e. 3 on the upper limb and 7 on the lower limb.

SKULL OF A BONY FISH (TELEOST)

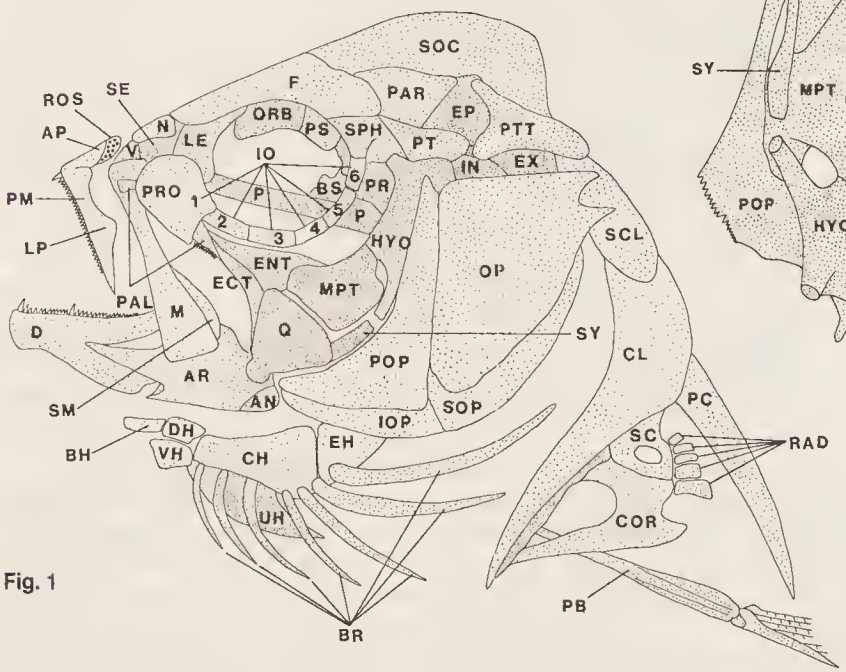


Fig. 1

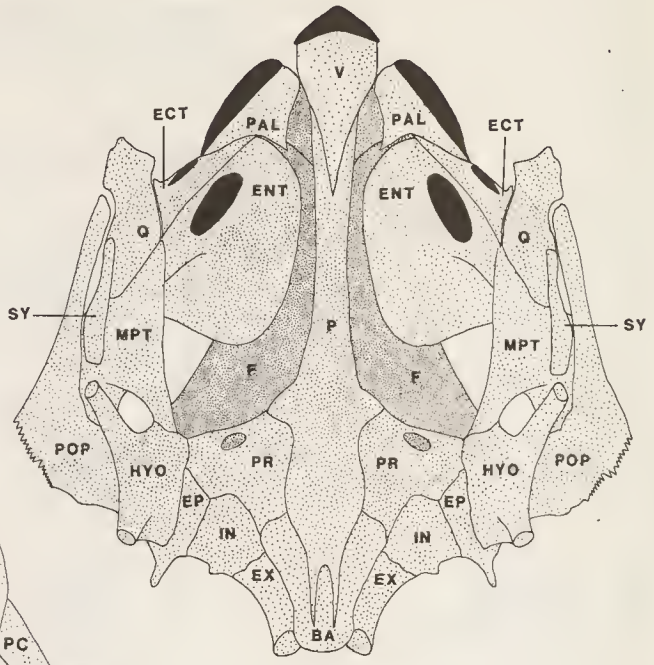


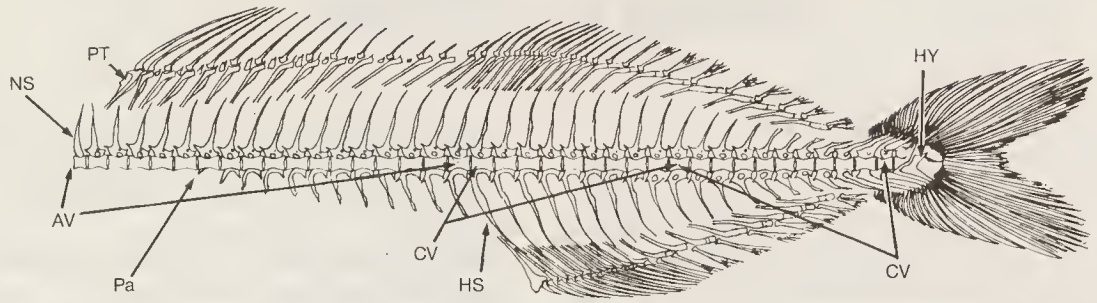
Fig. 2

Fig. 1 Lateral view of a bony fish skull and pectoral fin skeleton based on a percoid fish. Non-percoid fishes may lack some of the bones shown here, or they may have a few additional bones.

Fig. 2 Ventral view of fish skull with lower jaw, gills, opercles, subopercles, and interopercles removed. Black areas are tooth patches.

AN	angular (retroarticular)
AP	ascending process of premaxilla
AR	articular (angulo-articular)
BA	basioccipital
BH	basihyal (glossohyal)
BR	branchiostegal rays
BS	basisphenoid
CER	ceratohyal
CL	cleithrum
COR	coracoid
D	dentary
DH	dorsal hypohyal
ECT	ectopterygoid
EH	epihyal
ENT	endopterygoid
EP	epioccipital
EX	exoccipital
F	frontal
HYO	hyomandibula
IN	intercalar (opisthotic)
IO	infraorbitals (1-6)
IOP	interopercle
LE	lateral ethmoid (prefrontal)
LP	lateral process of premaxilla
M	maxilla
MPT	metapterygoid
N	nasal
OP	opercle
ORB	orbitosphenoid
P	parasphenoid
PAL	palatine
PAR	parietal
PB	pelvic bone
PC	postcleithrum
PM	premaxilla
POP	preopercle
PRO	preorbital (lacrimal, lachrymal)
PR	prootic
PS	pterosphenoid
PT	pterotic
PTT	posttemporal
Q	quadrate
RAD	radial
ROS	rostral cartilage
SC	scapula
SCL	supracleithrum
SE	supraethmoid
SM	supramaxilla
SOC	supraoccipital
SOP	subopercle
SPH	sphenotic
SY	symplectic
UH	urohyal
V	vomer
VH	ventral hypohyal

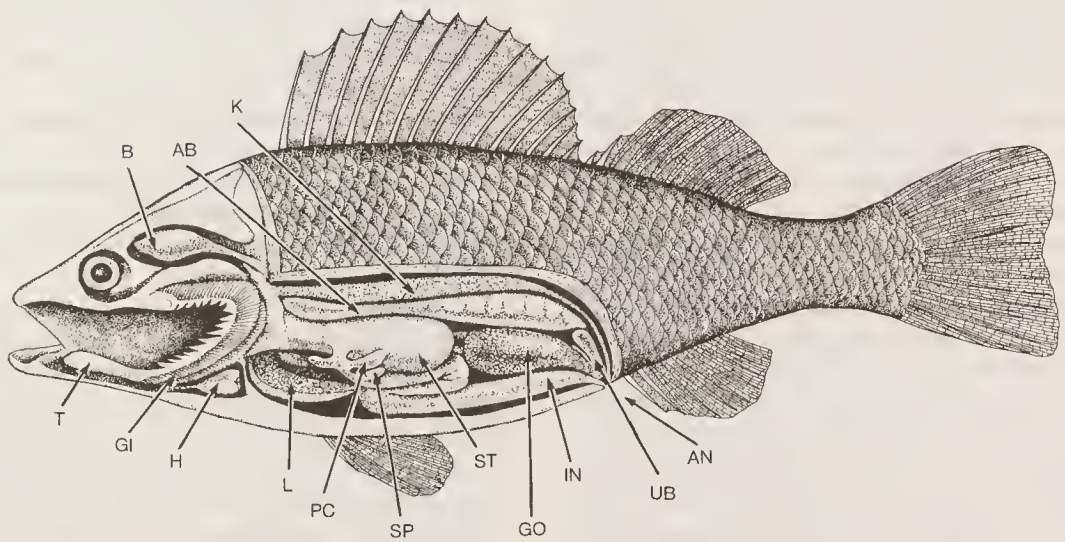
BONY SKELETON OF A YOUNG TUNA



(Redrawn after Potthoff, 1974)

AV	abdominal vertebrae	HY	hypural	Pa	parapophysis
CV	caudal vertebrae	NS	neural spine	PT	pterygiophore or interneural
HS	haemal spine				

INTERNAL ORGANS OF A FISH (COMPOSITE)



AN	anus	H	heart	SP	spleen
AB	airbladder (swimbladder)	IN	intestine	ST	stomach
B	brain	K	kidney	T	tongue
GI	gills	L	liver	UB	urinary bladder
GO	gonad	PC	pyloric caeca		

Biology of fishes

Zones of the sea and their fishes

Consider that the oceans cover three-quarters of the earth's surface and that fishes occupy every livable habitat in the sea. Add in the freshwater fishes, which occur wherever lakes and rivers are found, and one could fairly say that fishes dominate the earth.

The **intertidal** or **littoral** zone of the marine environment is delimited by the tide marks of low and high water. On shores with a large tidal range, the littoral zone is broad and provides a distinct habitat characterised by wide fluctuations in temperature and salinity. In southern Africa, the blennies, gobies and clinids are the most common littoral fishes. These small fishes are usually well camouflaged to blend in with the algae-covered rocks of this region. Juveniles of larger sublittoral fishes are often found in tide pools, which thus serve as "nursery areas" providing food and shelter for these vulnerable young.

Beyond the littoral region, the ocean is divided into **benthic** and **pelagic** realms. The benthic habitat is populated by fishes that live on or near the bottom. These fishes are often specially modified for life on the bottom. The flattened (depressed) body of the skates and benthic rays is adapted for resting on the substrate or swimming close over the bottom to search for food. Likewise the compressed bodies of the flounders and soles make it easy for these fishes to hide on (or in) the sandy or muddy sediments they prefer. Most benthic fishes are sedentary fishes camouflaged to blend in with the substrate. Some even bury themselves or burrow in the sediments. Clingfishes have their pelvic fins modified to form a sucking disc which they use to attach themselves to rocks – a useful anchor in a rocky surf zone.

The shallowest part of the benthic realm is the **sublittoral** or **continental shelf** zone, extending from the littoral zone out to a depth of 200 metres. The continental shelf zone is characterised by high productivity and consequently dense populations of fishes. Typical species of this sublittoral zone are the rockcods (Serranidae), gurnards (Triglidae), kob (Sciaenidae), stingrays (Dasyatidae), catsharks (Scyliorhinidae), flounders (Pleuronectidae and Bothidae), soles (Soleidae), tonguefishes (Cynoglossidae), lizardfishes (Synodontidae), klipfishes (Clinidae) and gobies.

Beyond 200 metres, the bottom usually drops more steeply, and this region, from 200 to 2 000 metres, is known as the **continental slope** or **upper bathyal** zone. In this dark cold region, all of the food comes, ultimately, from above. As might be expected, there are fewer fishes in this zone than in the sublittoral zone. Typical inhabitants of the continental slope are the rat-tails (Macrouridae), chlorophthalmids, notacanthids, halosaurs, chimaeras, skates, bythitids and morids.

The benthic habitat from 2 000 to 4 000 metres is termed the **continental rise** or **lower bathyal** zone. Here we find tripodfishes (*Bathypterois* spp.) resting on their elongated pelvic and caudal fin rays, macrourids, bythitids, liparidids, halosaurs and notacanthids. Again, there are fewer fishes on the continental rise than on the slope region above. Food is scarce in this zone and comprises mainly invertebrates. About half of the species here lack a swimbladder. The species that actually rest on the bottom can do without the buoyancy of a swimbladder and thereby save energy. At a depth of 4 000 metres, the gas in the swimbladder is under a pressure of 400 atmospheres; gas secretion at this tremendous pressure requires considerable energy.

Below 4 000 metres, the continental rise merges with the **abyssal plain,** ranging in depth from 4 000 to 6 000 metres. Abyssal fishes are less numerous than those of the continental rise and include macrourids, ophidiids, halosaurs, tripodfishes, liparidids and zoarcids.

The **hadal** zone, extending from 6 000 metres to the bottom of the deepest trenches (ca. 10 300 metres), has been difficult to sample, but it certainly contains very few fishes. The ophidiid *Holcomycteronus profundissimus* and liparidid *Careproctus amblystomopsis* are known from depths greater than 7 000 metres.

The **pelagic** realm is divided into a **neritic** zone over the continental shelf and an **oceanic** zone beyond the continental shelf. The neritic zone is the most productive of all the marine habitats. The well-lit waters and plentiful nutrients from rivers and upwelling areas result in an enormous production of algae, sea grasses and phytoplankton. This abundance of plant life supports a huge neritic community of fishes and other animals. Consequently, much of the world's fishery resources are harvested from this rich zone. Typical neritic fishes are the snappers (Lutjanidae), kingfishes (Carangidae), sardines and pilchards (Clupeidae), anchovies (Engraulidae), mackerels (Scombridae), seabreams (Sparidae), elf (*Pomatomus saltatrix*), geelbek (*Atractoscion aequidens*) and the galjoen (*Coracinus capensis*).

The **epipelagic** region, extending from the surface to about 200 metres, is the uppermost of the four main divisions of the oceanic zone. Although it receives plenty of sunshine, the epipelagic zone is (with a few localised exceptions) generally much less productive than the neritic zone.

The exceptionally productive areas of the epipelagic zone are the nutrient-rich upwelling areas that occur in certain regions along the western coasts of Africa (off Namibia and the western Cape Province) and the Americas (off California and Peru). These upwelling areas produce vast blooms of phytoplankton which support enormous populations of zooplankton and plankton-feeding fishes and their predators (including man). Typical epipelagic fishes are the tunas (Scombridae), marlin and sailfish (Istiophoridae), dolphinfish (*Coryphaena hippurus*), flyingfishes (Exocoetidae), blue shark (*Prionace glauca*), mako (*Isurus oxyrinchus*), and the whale shark (*Rhincodon typus*). At night the epipelagic zone is visited by vertically migrating fishes from deeper waters (e.g. *Astronesthes, Chauliodus, Stomias* and various myctophids). These nocturnal visitors are termed **nyctoepipelagic** fishes.

The **mesopelagic** region extends from the epipelagic region to a depth of 1 000 metres. About 850 of the 1 250 or so oceanic species of pelagic fishes live in this region. Mesopelagic fishes are generally small (few exceed 30 cm in length) with large eyes and well-developed light organs. Many species move up to the epipelagic region at night in order to feed on the more abundant zooplankton of the surface waters. Typical mesopelagic fishes are the lanternfishes (Myctophidae, comprising some 250 species), stomiiforms and barracudinas (Paralepididae).

The **bathypelagic** region, from 1 000 to 4 000 metres, is inhabited by fewer (about 150) species of fishes. This reduction in numbers of species (as well as individuals) indicates the reduction in food with depth. The scarcity of food here is further emphasised by the reduction in certain organ systems of bathypelagic fishes. The skeletal and muscular systems are greatly reduced, and the decrease in density achieved by the reduction of these heavy tissues allows the loss of the swimbladder. Situated below the reach of sunlight, the bathypelagic zone is lit only by the bioluminescence of the animals that live here; consequently, most species have greatly reduced eyes. The lateral-line system is, however, well developed in bathypelagic fishes. With small populations scattered over a vast area, finding a mate may be difficult. The olfactory organs in males of many bathypelagic species are greatly enlarged, presumably as an adaptation for tracking the scent of females in this sparsely populated environment. In some species of ceratioid anglerfishes the attraction of the males is carried one step further. Once a juvenile male finds a female (which is much larger than he is), he attaches to the female with his mouth, becoming a sexual parasite permanently fixed to his mate. Typical bathypelagic fishes (in addition to the ceratioids, which represent about two-thirds of the fauna) are the cyemid, derichthyid, serrivomerid and saccopharyngoid eels, and the whalefishes (cetomimids).

The **abyssopelagic** region, extending from 4 000 metres to the bottom of the ocean, is the deepest and most barren of the four main divisions of the oceanic zone. Because of the difficulties of sampling this zone, the fauna of this vast abyss is very poorly known. But we do know that the fishes here are very few and far between. Abyssopelagic fishes include the halosaurs, macrourids, stephanoberycids (*Acanthochaenus lutkenii*) and alepocephalids.

Estuaries are habitats that overlap the littoral and sublittoral zones. This environment is characterised by considerable fluctuations in temperature, salinity and turbidity. Estuaries are relatively productive regions and serve a valuable function as "nursery areas" for the young of many sublittoral species. Some fishes spend their whole lives in estuaries (e.g. Sand goby, *Psammogobius knysnaensis,* Knysna seahorse, *Hippocampus capensis,* and *Monodactylus falciformis*); others are common in estuaries, but often found in the ocean too (e.g. mullet (mugilids), kob, sea catfish, gobies, klipvissies (clinids) and leervis (*Lichia amia*)).

Senses

VISION

Fishes show a tremendous diversity in the development of their eyes. The major difference in the fish's eye, compared to the eye of non-aquatic vertebrates, is that the lens is spherical, whereas most vertebrates have a "lens-shaped" (i.e. oval in cross-section) lens. In the human eye (and also in the eye of most other vertebrates) focusing is accomplished by the initial refraction of light rays by the cornea and by muscles that flatten the elastic lens. The cornea of fishes is optically non-functional, as it has the same refractive index as water, and focusing is done by moving the lens back and forth in the eye.

Generally fishes are long-sighted, especially in their lateral field of vision, but the greatest visual acuity is in the forward field of view, because it is the posterior part of the retina that has the greatest density of visual cells.

As in other vertebrates, the visual cells in the fish retina are of two types: "rods" and "cones". Fishes living in depths of 500 - 1 000 m usually have large eyes and mostly rods in their retina, as this type of cell is the most sensitive to low light levels. In the deepest parts of the sea (below about 2 000 m), many of the fishes have tiny vestigial eyes. In these stygian depths, the absence of sunlight and rarity of bioluminescent fishes would render vision an extravagance that could be dispensed with. Likewise, in some freshwater fishes that live in caves and underground rivers, the eyes are atrophied or completely absent.

Fishes of the well-lit epipelagic and near-shore waters have a retina that is rich in cone cells, indicating not only acuity of vision, but also the ability to distinguish various colours. One need only see the fish fauna of a coral reef to

realise that the beautifully coloured parrotfishes, wrasses, angelfishes, etc. are not likely to have evolved their intricately coloured patterns just for the appreciation of some land animal. For most fishes, vision is important in finding their food, as well as in avoiding their predators, but in those species that have males and females with strikingly different colour patterns (as in the sexually dimorphic parrotfishes, wrasses, etc.) colour vision must also be important in mate recognition.

The field of view is quite large for those fishes with eyes in the usual position, on the sides of their head, and many species can rotate their eyes independently like a chameleon. *Periophthalmus,* the mud skipper, is a goby that spends most of its time out of the water climbing about the roots of mangrove trees. It can see quite well in air, as anyone who has tried to catch one of these elusive little fishes will attest. It has protruding periscope-like eyes, which it can retract and roll around in the eye socket to moisten, erecting them again to scan the area for predators or possible prey. With its movable eyes on top of its head, the mud skipper has a 360° field of vision.

If a sole is blinded it loses the ability to blend with its surroundings, hence the light rays that enter the eyes are important to it.

Anglers know only too well that if you can see a fish, the fish can see you, and the best catches are generally made when the water is not too clear.

HEARING AND LATERAL-LINE SENSE

The density of water is about 1 000 times greater than that of air; consequently, water is much less compressible than air. These two features, greater density and resistance to compression, greatly affect the production and transmission of sound. In air, sound travels relatively slowly as a periodic form of compression waves. In water, sound travels about five times faster and usually via particle displacements as well as compression waves. The particle displacement form of sound energy is strongest at close range to the sound source, hence termed the *near-field* effect; whereas the compression waves extend farther from the sound source and are thus known as the *far-field* effect.

Fishes detect sounds with lateral-line receptors and their ears. The sensory organs (termed "hair cells" or "neuromasts") of the lateral line and the ears are very similar in structure. But the lateral-line neuromasts, being mechanoreceptors more-or-less directly exposed to the water surrounding the fish, are especially sensitive to the particle displacement (near-field) form of sound energy. Experiments have confirmed that the lateral-line receptors are sensitive only to low frequency sounds (10-200 Hz), which have a greater near-field component. The swimming sounds produced by the motion of fishes or other animals through the water are primarily of low frequency, and the lateral-line is thus "well designed" (so to speak) to detect movements of nearby animals. The lateral-line neuromasts are usually found in small perforated tubes running just under the skin of the head and/or along the midlateral part of the body (hence "lateral line").

The ability to detect the motion of other animals is useful to both predators and prey, and especially at night or in the deep sea where sunlight may be nonexistent. The greatly elongated lateral line of some midwater fishes (e.g. trichiurids, trachipterids, *Stylephorus* and *Radiicephalus*) is presumably very efficient at detecting any movements in their vicinity. Although the lateral line is absent from the body of most clupeid fishes, the well-developed lateralis canals of the head are important for the schooling behaviour of these fishes.

The ears of fishes are convoluted fluid-filled organs (labyrinths) enclosed in bony chambers (otic capsules) on either side of the skull. The upper part of each labyrinth consists of three curved membranous tubes (semicircular canals) that join a central chamber called the utriculus. Two of the semicircular canals lie in vertical planes approximately at right angles to each other; the third canal is located in the horizontal plane. Movements of the head result in displacements of the fluid (endolymph) in the semicircular canals and utriculus; these fluid displacements cause deformation of the sensory hair cells on the inner wall of the labyrinth. Stimulation of these hair cells will send nervous impulses to the brain to be read as information on the movement and orientation of the fish. Perception of gravity appears to be primarily accomplished by the utriculus.

The lower part of the labyrinth comprises two adjoining chambers, the sacculus and lagena, each with a dense calcareous otolith ("ear bone"). The utriculus (which also contains an otolith) is usually joined to the sacculus, but in some gobies the upper and lower parts of the labyrinth are completely separate. The ears of fishes are sensitive to sounds of a wide range in frequency, but the hair cells, being located within the otic capsules of the skull, are primarily sensitive to the compression wave (far-field) form of sound energy. This pressure wave is either transmitted directly through the tissues of the skull to the ear, or, in the case of fishes with a connection between the swimbladder and the ears, the sound wave induces vibrations of the gas-filled swimbladder, and these vibrations are conveyed directly to the ears. Fishes with a connection between the swimbladder and the ears are especially sensitive to high-frequency sounds (up to 7 kHz). At the labyrinth the sound wave vibrations are transmitted to the endolymph and otoliths, and the vibrations of the otoliths stimulate the hair cells with which they are in contact.

TOUCH

Although fishes apparently lack the specialised touch receptors of birds and mammals, they are able to register touch sensations by means of a net of free nerve endings in the skin. The barbels of catfishes (Families Nos. 59 & 60) and goatfishes (Family No. 196) are equipped with taste buds as well as numerous free nerve endings. These barbels probably function as taste and touch receptors when the fish is foraging for prey. The enlarged free pectoral rays of gurnards (Family No. 157), fingerfins (Family No. 215) and hawkfishes (Family No. 214) are likely to serve the same functions.

SMELL

The sense of smell is well developed in most fishes. The olfactory organs are round to oval plates of folded sensory epithelium located in nasal capsules on either side of the snout. Sharks (and most other elasmobranchs) have a keen sense of smell, as indicated by their well-developed olfactory organs and the large area of their brain that is concerned with olfaction. It is well known that sharks will approach a bait from downstream, following the odour trail to its source. Pacific salmon rely on the unique odours of their spawning stream to return home after months or years at sea; if their nostrils are plugged, they are unable to find their home stream.

TASTE

The taste receptors of fishes are not restricted to the mouth; they are also found on the lips, barbels and certain modified fin rays, and even scattered over the head and body. (See above paragraph on the sense of touch.) Sharks are greatly repelled by the taste of the Moses sole, *Pardachirus marmoratus* (No. 262.9), which secretes a milky toxin from pores at the base of its dorsal and anal fin rays. The soapfishes (Family No. 167, Grammistidae) also secrete a toxin from glands in their skin. The name "soapfishes" alludes to the thick slimy mucus that covers the skin in these fishes. If a predator tries to eat a soapfish, the bitter-tasting mucus will cause the predator to spit out the soapfish, which is usually not seriously injured. Predators soon learn to recognise and avoid soapfishes.

ELECTRICAL DETECTION

Sharks, rays and some bony fishes (e.g. marine catfishes of the genus *Plotosus*) have electroreceptors sensitive to the minute electric fields generated by all living animals. These receptors, called "ampullary organs" (or, in the case of elasmobranchs, "ampullae of Lorenzini" after the man who first described them), are located mainly on the front of the head in sharks. Each ampulla is a slender, flask-shaped organ with a long canal leading to a pore at the surface of the skin. The ampullary organs can detect the minute electric fields caused by breathing prey buried in the substrate, and experiments have confirmed that benthic sharks and rays use this electrosensory ability to find their food. It has also been hypothesised that fishes might use their electroreceptors to detect the electric fields produced as the fish swims through the magnetic field of the earth, and this sensory input could thus be of use in navigation.

PAIN

Do fishes feel pain? J. L. B. Smith discussed this question some twenty years ago, and we cannot improve on his cogent essay: "There is widespread interest in the matter of pain in fishes, which stems largely from a queer antagonism directed against anglers. Many non-anglers would like to stop all angling because they say it is cruel. They write sentimentally about a poor frightened fish fighting in pain and terror for its life, with a cruel hook causing intense pain in the sensitive tissues of the mouth. Facts do not support that. When a hooked fish breaks loose during its struggles on a line, one would expect it immediately to get as far away as possible from the scene of its supposed agony. Again and again however, proof to the contrary is forthcoming, for the supposedly terrified fish, instead of getting away, quite often soon after takes another bait in the same place, and the astonished angler finds his first hook stuck fast in its mouth. There is no doubt of this; it has been recorded times without number. Almost every angler has his own special way of mounting his hooks and can recognise his trace and hook immediately. It sometimes happens, to the discomfiture of an angler, who, having had his fish break loose, describes to his companions the monster he has lost. Quite often another angler nearby soon catches a quite ordinary fish and presents it to the fellow who had just lost it with unquestionably his own hook and trace in its mouth!

"It is also plain that fishes do not necessarily learn to fear baited hooks attached to a line, for fishes which have one or more hooks in their mouths are often caught. I once caught a large kabeljou (kob) with six hooks of different sizes in its mouth; most were rusted, one was quite new.

"Sharks are notoriously indifferent to wounds, presumably feeling little or no pain. When a dead whale floating at the surface was being cut up, sharks often came to feed and the men working on the carcass often hit the sharks with their sharp spades, inflicting terrible gashes. Despite their wounds, the sharks did not seem to be in any pain or distress for they went right on tearing at the whale as if nothing had happened. An extreme case shows this even more forcibly, and horribly: some sailors on a ship at anchor caught a big shark, cut it open, tore out the insides and threw the animal overboard. They then baited the hook with the insides of the shark, threw it out again, and the very shark from which

they had torn them came and swallowed that hook baited with its own insides.

"Many anglers use live bait, that is they throw out a live small fish impaled on a hook to attract fishes like the leervis, which feed chiefly on smaller fish which they chase and catch and swallow alive. I have had numerous letters condemning the use of live bait, which many people consider bestial cruelty and feel should be stopped.

"While sympathising with that view, one must realise that millions of big fishes are continually eating smaller fishes alive. An angler was fishing for leervis using a live stumpnose as bait. As usual it was hooked through the back, and cast out alive. Not long afterwards there was a strongish pull on the line, but no run, and the angler reeled in. The live bait was still there, still live, and he was about to throw it out again when he noticed what looked like a thread protruding from its mouth. Investigating, he found that the thread was a feeler of a fair sized prawn that was in the mouth of his live bait fish; the prawn was alive and still kicking. So this stumpnose, with a big hook pushed through its back, so far from being in agony and fear, had felt so little that it had pursued and captured a live prawn. Its sudden spurt in chase of the prawn had been the disturbance felt by the angler on his line.

"Non-anglers often rail against the cruelty of anglers on the grounds that when they pull fish out on shore they often leave the poor creatures thrashing about in agony on the beach. This is, however, not the case at all. Whether a fish is in or out of the water it can move its muscles and body in only one way. That live fish on the beach is not in agony at all; it is only making the same movements as it would if it were swimming in the water, i.e. rapid flexing of the body, which on land causes it to jump and thrash about.

"If you feel sentimental about fishes, stop and realise that while man has changed life on the land, in the water he has no influence; life is as primitive as it has always been. The law is, 'eat or be eaten'. For every fish caught by an angler, millions die a death which by sentimental human standards is cruel and violent. They are swallowed alive, torn to pieces, chopped in half, or eaten alive bit-by-bit while held struggling vainly in tentacles, and there is nothing whatever that the whole of mankind can do about it.

"It is interesting to note that even 'land animals' feel little pain when in the sea. It is well known that people attacked by sharks, even when badly mutilated, feel no pain at the time. A man may have his leg bitten off and not know it has happened until he sees the blood. It is true that sometimes even on land, shock may inhibit pain from mutilation, for a time; the real pain comes only later. However, it is a common experience that after working about rocks or reefs underwater, it is only when you come out of the water that you discover cuts and lacerations which, had they happened on land, would have hurt but of which you were quite unaware under the water. This is possibly also because small or moderate wounds do not bleed until you come out of the water. Under water, the pressure of the water seals small severed or damaged surface blood vessels and so prevents bleeding. It cannot overcome the blood pressure in a human artery, but it does close even severed arteries in fishes whose blood pressure is less. That is one of the reasons why fishes can survive terrible wounds.

"It is curious that venoms and toxins produced by sea creatures that are deadly to land animals appear to have no effect on fishes. One may cite the case of the venomous serrated spines of the sea-barbel, a stab from which causes terrible agony, sometimes death in man. As has been shown, large fishes have been found with broken barbel spines embedded in their mouths, which plainly had not affected the fishes nor caused them to stop eating barbels . . . One can therefore deduce that if fishes feel any sensation of pain, it almost certainly does not distress them in any way. This is borne out by the numerous examples cited above of their indifference to wounds and damage that in higher animals would certainly result in severe pain and probably death as well."

When a lobotomy has been performed on a human being (i.e. the nerves to the frontal lobes of the brain are cut) he can feel pain but is not distressed by it. Pain of sorts must be felt by an animal to make it realise that something injurious is happening. Therefore it seems logical that having no frontal lobes to its primitive brain, a fish is not likely to be distressed by any pain it feels.

Reproduction and development

The great diversity of fishes is shown in their varied modes of reproduction. There are two main types of reproduction: **viviparity** and **oviparity**. Most fishes are oviparous, which means they produce eggs that develop and hatch outside the body of the female. Fertilisation generally takes place externally, and the oviparous species are the most fecund of all animals. A single codfish (*Gadus morhua*) of the North Atlantic Ocean is said to produce some 9 million eggs per year; a 25 kg specimen of another gadid, the ling (*Molva molva*), was estimated to have over 28 million eggs in its ovaries. Both of these species, like most of the marine teleosts, produce tiny buoyant eggs that are released by the millions and fertilised in the mass spawnings of these schooling species. Tropical species generally spawn more than once a year and usually in small groups or in pairs. The small pelagic eggs float near the surface and take only a day or two to hatch. Soon after hatching, the rapidly growing larvae have exhausted their small yolk supply and must begin feeding. In tropical waters, the larvae will spend about 8 weeks drifting in the surface waters and feeding on the plankton. In temperate seas, the larval stage may last 4 or 5 months (12 months or more for the eel, *Anguilla*).

These long-lived pelagic larvae are often carried far from their place of origin and are thus excellent means of dispersal for shallow-water fishes.

Some oviparous species produce non-buoyant (demersal) eggs, which are larger than pelagic eggs and are generally attached to the substrate. Many species that have demersal eggs also guard their eggs until they hatch (e.g. damselfishes, Family Pomacentridae, and triggerfishes, Family Balistidae). A further adaptation for protecting the eggs is some type of "incubation". The male seahorse has a pouch on his belly in which he keeps the eggs until they hatch; he then releases the baby seahorses (seacolts?) from his pouch by bending his body and apparently pushing the juveniles out with contractions of his abdominal muscles. Once released, the little seahorses must fend for themselves. Sea catfishes (Ariidae) and cardinal fishes (Apogonidae) practise oral incubation, in which the male keeps the eggs in his mouth until they hatch. In marine fishes, it is generally the males that do the mouth brooding, but in the freshwater cichlids that practise oral incubation, it is the females that carry the eggs and young fry in their mouths.

Fishes that hatch from demersal eggs are bigger than most larvae that hatch from pelagic eggs, and their larval stage is correspondingly briefer (sometimes even nonexistent). In chondrichthyans (chimaeras, sharks, rays, etc.) the hatchlings are miniature copies of the adult, and the eggs that produce these well-developed juveniles are quite large – the egg-case of the whale shark measures 30 × 15 cm!

Although most oviparous fishes fertilise their eggs after they have been released from the body of the female, a few bony fishes and all chondrichthyans fertilise their eggs inside the female. Internal fertilisation is usually accomplished with special copulatory structures called "intromittent organs", but some species (e.g. the coelacanth, *Latimeria*) manage internal fertilisation without intromittent organs. In bony fishes, the intromittent organ is usually called a penis; in chondrichthyans, the male has paired intromittent organs (misnamed "claspers") that are modified parts of the pelvic fin skeleton.

Many teleosts and most elasmobranchs are viviparous, which means that they give birth to active, free-swimming young. Species that provide their embryos with no extra nourishment (other than their original yolk supply) are called **ovoviviparous** (e.g. the spiny dogfishes, *Squalus,* the whitespotted smooth-hound, *Mustelus palumbes*, and the coelacanth). The developing embryo of most viviparous elasmobranchs is provided with some nourishment from the mother in addition to its original yolk supply. Carcharhinoid sharks (e.g. *Carcharhinus* spp., *Mustelus mustelus,* and the hammerheads) have a yolk-sac – placental connection between the foetus and the oviduct (uterus) of the mother. This placental source of nutrients develops during the later months of the gestation period after the initial yolk supply is exhausted. In some species, the shark foetus is nourished by feeding on eggs and smaller siblings that may be found in the oviduct. These **oviphagous** or cannibalistic sharks (e.g. the ragged-tooth, *Eugomphodus taurus*) give birth to only one or two large pups (one per uterus) at a time. In this oviphagous foetal nourishment scheme, the ovary enlarges and functions as a kind of "milk" gland, sending little packets of yolk into each uterus to feed the developing foetus.

Hermaphroditism, the occurrence of both sexes in the same individual, is normal and common in many bony fishes. Functional hermaphroditism may be of either the **synchronous** or the **successive** (sequential) types. The gonads of a synchronous hermaphrodite produce ripe ova and sperm at the same time. Although synchronous hermaphrodites are capable of fertilising their own eggs, this does not usually occur, at least not in the species where spawning has been observed. The synchronous serranids that have been studied (*Serranus* and *Hypoplectrus* spp.) spawn in pairs and take turns fertilising each other's eggs.

Successive hermaphrodites change sex, beginning the reproductive period of their lives either as females (**protogynous**), and after a few years or spawning periods they change to males; or they begin as males (**protandrous**) and then change to females.

Although hermaphroditism is rare in freshwater fishes, it is common in marine fishes, especially in mesopelagic and coral-reef species. Most of the mesopelagic hermaphrodites are of the synchronous type (e.g. Alepisauridae, Paralepididae, Notosudidae, Evermannellidae, etc.). Many coral-reef fishes are successive hermaphrodites (e.g. Labridae, Scaridae, Serranidae, Sparidae, Lethrinidae, Polynemidae, etc.).

An interesting reproductive pattern has evolved in the sexually dichromatic serranid fish *Anthias squamipinnis.* Each small area of the reefs where this species occurs has a little school or colony of *Anthias* comprising a few (sometimes only one or two) large, distinctively coloured males, several smaller adult females and numerous juveniles coloured like the females. Each male spawns with several females in a harem-like fashion. If a male is removed from the group, the dominant (largest) female changes sex and colour pattern to take the place of the missing male. This sex and colour pattern change occurs within a few days, but if another male is introduced into the colony before the dominant female has completed her sex change, she returns to her female role and livery.

Growth and age determination in fishes

The growth of fishes, like that of other cold-blooded animals, is dependent on the temperature of their environment. The availability of food is, of course, the other main

factor influencing fish growth. In fishes of temperate waters, age determination is relatively easy, because of the annual variation of faster growth in the summer and slower growth in the winter. These annual growth variations are recorded in the form of growth marks (called annuli) on the bones and scales of fishes (much like the growth rings visible on a tree stump). For fishes of tropical waters or those in the deep sea, the temperature of the water (hence growth) is constant all year round; consequently, these fishes may be very difficult to age.

The "ear bones" (otoliths) of fishes are often used in age determination, as they usually show the annuli better than other bones or scales do. In long-lived species, the accurate determination of age for fish older than 10 or 20 years is complicated, because growth is much slower in mature fish than it is in juveniles. After maturity the annuli are more crowded together and difficult to count. For these older fish, it may be necessary to weigh or section the otolith to determine the growth increments. The ratio of radioactive isotopes of lead and radium in the otolith has been used to confirm age determinations from sectioned otoliths of rockfish (a North Pacific scorpaenid fish); these studies found that this cold-water species may attain an age of 80 years! Not bad for a fish that grows to only 46 cm.

Generally the larger fish species will live longer than the smaller ones, provided that the large species is also a slow grower. The dolphinfish (*Coryphaena hippurus*), which attains a length of 2 metres, is an exceptionally fast-growing species; it is mature at an age of one year, when it is 55 cm fork length, and it probably does not live more than 4 years. The enormous tunas and billfishes are also very fast growing and apparently do not live much past the age of 15. Tagging studies of sharks have confirmed an age of at least 25 years for some species.

Shapes, sizes, swimming and speed

Fishes exhibit a tremendous variety of shapes: compressed (flattened from side to side) as in butterflyfish and moonies; elongate, like snoek and cutlassfish; robust and streamlined, as in tunas; depressed (flattened from back-to-belly) like monk and stingrays; spherical as in porcupine fish, or box-shaped, e.g. boxfish. The triangular boxfish (*Tetrosomus concatenatus*) is triangular in cross-section. The ocean sunfish (*Mola mola*) looks like a truncate disc or the front end of a fish that has been chopped in two (hence the name "head-fish" by which it is sometimes known).

The largest fish in the world is the whale shark, which is known to attain a length of at least 12 m and perhaps as much as 18 m. Like the blue whale, which grows considerably larger, the whale shark also feeds on plankton. The smallest fish in the world is probably *Trimmatom nanus,* a tiny goby recently described by Winterbottom and Emery (1981). This species, which has mature females at 8 mm SL, is at present known only from Chagos Archipelago in the western Indian Ocean.

Most fishes swim by movements of the body, tail (caudal peduncle) and caudal fin. In the fastest fishes (tunas and other scombrids), the body flexes hardly at all, and the caudal fin provides all of the thrust. In eels and some other elongate fishes, the whole body is flexed in an undulatory wave that passes from head to tail, and this backward-moving wave drives the eel forward. The majority of fishes fall in between these two extremes: their bodies are more flexible than tunas, but less flexible than eels.

Scombrids have several anatomical adaptations that contribute to their remarkable swimming abilities. The stiff, deeply lunate caudal fin is "designed" for rapid movements and least drag. A speeding tuna can drive its caudal fin at the incredible rate of 10 beats/second! The massive body muscles are connected to tendons that run along the narrow peduncle (which acts as a pulley) to attach at the base of the caudal fin rays. Horizontal keels on the peduncle strengthen it and are thought to reduce turbulence from the rapid lateral movements as the tail beats back and forth. The body is very streamlined, with grooves and recesses to receive the first dorsal and pectoral fins when they are folded back to reduce drag. The sustained high-speed swimming characteristic of scombrid fishes requires a high metabolic rate, which means a high oxygen consumption. The gills of scombrids have a much greater surface area and are therefore much more efficient at extracting oxygen than are the gills of non-scombrid fishes.

Another adaptation for an increased metabolic rate is the warm-bodiedness of the advanced scombrids (bonitos and tunas). Unlike the typical "cold-blooded" fishes, the tunas and the lamnid sharks (mako, porbeagle and great white sharks) are able to maintain their inner muscular temperature at several degrees above their ambient water temperature. In tunas, the blood leaving the body muscles passes through a special network of capillaries that function as a countercurrent heat exchanger to transfer the metabolic heat generated by the muscles to the cold blood running into the muscles. The swimming muscles are thus able to operate at the higher temperatures necessary for the higher metabolic rate required for sustained high-speed swimming. Of all fishes the bluefin tunas have the most efficient heat exchangers, and they are the scombrids that penetrate farthest into cold waters, often occurring along the coasts of Norway and Alaska and from 40° to 50°S latitudes.

There are other fast-swimming fishes, besides the scombrids: kingfishes (*Carangidae*), dolphinfish (*Coryphaena*), marlins and sailfishes (*Istiophoridae*) and the lamnid sharks. All of these speedy fishes have stiff, lunate caudal fins and narrow peduncles. This type of caudal fin is the

most efficient for fast cruising. A broad truncate or rounded caudal fin, as in rockcods (*Epinephelus*) or kob (Sciaenidae), is better for the sudden fast acceleration required of a lurking predator.

Many fishes use their pectoral fins for propulsion. Labrids, scarids, pomacentrids, and the oceanic opahs (*Lampris*) cruise by flapping their pectorals like wings. In the opahs, the pectoral fins are rather short and stiff, and the muscles that operate these fins are enormous. The opahs use their pectorals to "fly" through the water like penguins flapping their wings. Although labrids and scarids depend on their pectorals for cruising, they also use their caudal fin when they are in a hurry. Stingrays and most other batoids employ undulatory waves of their broad pectorals for propulsion and appear to fly effortlessly through the water. Electric rays, guitarfishes and the sawfish use their tail and caudal fin for swimming.

In the ocean sunfishes (Molidae), the stiff paddle-like dorsal and anal fins are the primary means of propulsion. In tetraodontoids (pufferfishes, porcupinefish and boxfish), the short-based dorsal and anal fins as well as the pectorals are used for slow swimming. But unlike the sunfishes, which lack a tail and caudal fin, the tetraodontoids can use their caudal fin when they want to swim faster. Fishes with long-based dorsal and anal fins (triggerfish, filefish, etc.) use them for slow swimming by means of undulatory waves passed from the anterior end to the posterior end of the fin.

Accurate measurements of the speed of the fastest fishes are difficult to make. The cruising speed of scombrids is in the order of 2-10 km/h, but their burst swimming speed, which they use when chasing prey or fleeing from predators, is much faster. A wahoo (*Acanthocybium*) was timed at 77 km/h for a 5 second period of burst swimming, and a yellowfin tuna did 74 km/h for a 5 second period. The billfishes (marlins, sailfish, swordfish, etc.) are also very fast swimmers, and they are supposed to rival the tunas at their top speeds.

Coloration and bioluminescence

Fishes living in the well-lit epipelagic region of the sea are countershaded (dark above and silvery below) to disguise their shape and blend in with the featureless background illumination of open waters. Viewed from above, their dark greenish blue backs match the colour of the deep ocean that we, creatures of the air, are familiar with. Seen from below, these fishes look like silvery streaks against a silvery mirror. Below 300 - 400 m, the fishes are mostly uniform black; a few are bright red, but appear black in their natural environment because the red component of sunlight is filtered out in the first 10 m of water.

In the neritic zone, the pelagic fishes are generally silvery and countershaded (e.g. the kingfishes, sardines and mackerels), but the more sedentary sublittoral fishes are often coloured in a variety of hues and patterns. The many beautiful coral-reef fishes are among the most colourful of all animals. The silvery iridescent colours of fishes are due to special cells in the skin or scales. These cells, called iridophores, contain crystals of guanine arranged in layers which reflect several colours of light depending on the angle of the incoming light and position of the observer.

The other (non-iridescent) colours of fishes are produced by chromatophores. These cells contain various pigments, and each chromatophore bears only one kind of pigment. The chromatophore is typically irregular in shape, with numerous branching processes extending outwards from the centre. The pigment granules can be moved within the chromatophore: when the pigment is dispersed throughout the cell, the colour is intensified; when the granules are concentrated in the centre of the cell, the colour is diminished. The skin of fishes may contain several different chromatophores (red, yellow, black, etc.) and it is the alternate contraction and expansion of the pigment in the various chromatophores that produces the changes in colour pattern.

Rapid colour changes are under nervous control. For example, a dark galjoen swimming over dark rocks can change immediately to a pale colour when it swims into a light sandy area. The immediate contraction of the melanophores is responsible for this quick change. Fishes often have a night colour pattern that is quite different from their daytime coloration, and a fish under stress may display its night pattern during the day. A white-barred damselfish that we collected at Inhaca looked vaguely familiar; when kept in an acquarium, it changed to its daytime livery and was then recognised as a common black-barred species.

Long-term colour changes, such as the transition from juvenile to adult patterns, are effected by increases or decreases in the number of various chromatophores. This type of colour change is under hormonal control, as is that of sexually dimorphic fishes, which change their colours when they change their sex or become mature. Fishes that remain a long time in one type of habitat are coloured to match that habitat. In the Tsitsikama rivers, with their dark rocks and dark water, the fishes are generally quite dark, and fishes kept in a well-lit aquarium often become pale.

Some fishes are incredibly well camouflaged. Flatfishes often match the pattern and colour of the substrate so well that they are almost impossible to see unless they move. The venomous stonefish looks just like a lump of coral rock covered with algae, and is a real hazard to waders who might tread on it. Klipvissies (Clinidae) are coloured to match the seaweed in which they live.

Disruptive coloration is exhibited by many coral-reef fishes. Bold black bars or stripes break up the general outline of the fish, and irregular patches of contrasting colour or tones distract the eye from the overall shape of the fish.

When a boldly patterned fish is swimming over the complicated, multicoloured background of a coral reef, the fish is difficult to recognise and hard to follow.

Another type of disruptive coloration is the eye stripe, a black band or bar on the head that passes across the eye and makes it less obvious. Some butterflyfishes not only have a black eye stripe, but they also have a false eye spot or conspicuous ocellus at the rear end of the dorsal fin. This false eye spot is supposed to deflect the attack of a predator to a less vulnerable part of the fish.

Another function that colour patterns may serve is that of species (or sex) recognition. Sexual dichromatism seems to be most highly developed in the hermaphroditic species (e.g. parrotfishes, wrasses and some angelfishes). This conspicuous difference in males and females is obviously important in the reproductive behaviour of these species. Some fishes exhibit sexual dichromatism only when they are about to spawn.

Species recognition is important not only for mating, but also for territorial fishes and for those fishes that want to "advertise" their presence to others. The cleaner wrasse, *Labroides dimidiatus,* picks parasites from other fishes and is thus generally welcomed by reef fishes which benefit from its grooming. The cleaner wrasse has a conspicuous pattern of bright blue with a broad horizontal black band from the snout to the caudal fin. The cleaner occupies a particular area (territory) of the reef, above which it swims in a distinctive, jerky up-and-down fashion. Fishes recognise the cleaner and come to its cleaning station to be picked over for their parasites. The cleaner wrasse is protected from predation by being recognised as a cleaner, and another unrelated species has capitalised on its good reputation. The false cleaner (*Aspidontus taeniatus*) is a blenny that mimics the cleaner wrasse; it has the same blue and black-banded colour pattern, and it swims in the same jerky fashion. The false cleaner is, however, not welcomed by other fishes; if allowed to approach another fish, it will bite off a piece of fin or skin from the body of the unsuspecting host. As long as the mimic is relatively rare (compared to the model), it is afforded some safety from predation and can successfully practise its game of deception.

Bioluminescence, the ability to produce light, is better developed in fishes than in any other group of animals. At least 45 families of marine fishes have luminous species, but for some reason (biochemical?) no freshwater fishes are luminous. Most of the luminous fishes are found in the deep sea at depths of 300 - 1 000 m, but there are some luminous shallow-water species, too (e.g. the pineapple fish, *Monocentrus*, and the apogonid *Siphamia*).

Most luminous fishes produce substances that react chemically to produce light without heat. This reaction takes place in light organs (photophores) and is under nervous control. Some species rely on symbiotic luminous bacteria for their light. These bacterial light organs glow continuously, and the light can be turned off only by covering or occluding the light organ in some way. In the flashlight fish (*Anomalops*), the large bacterial light organ under the eye is "turned off" by rotating it down into a black-pigmented pocket under the eye.

The structure of the photopores may be complex, with a lens to focus the light and a reflector to direct the beam through the lens. Some fishes (e.g. *Malacosteus*) have large headlight photophores that emit red light. Most deep-sea fishes are unable to see red light, but *Malacosteus* has the retinal pigment necessary to perceive red light and is thus able to illuminate its prey with light that the prey cannot detect. It seems that fishes have anticipated the development of the infrared night vision devices that were invented for use by military forces.

Bioluminescence in fishes serves a variety of functions. Light organs may be used as lures on the end of barbels or fishing rods. Some fish have bright headlight organs, which could be used to search for prey. Many midwater species have numerous ventrally directed light organs, which may be used to match the faint downwelling light from the surface and thus obscure their silhouette. And probably all light organs serve the additional function of species recognition signals.

Respiration

The gills of fishes are equivalent to the lungs of other vertebrates. The bright red colour of the gills of a live fish indicates the abundant blood supply and the thin walls of the gill lamellae, which are the actual sites of gas exchange. In the lamellae, the blood is separated from the water flowing through the gills by a very thin membrane; oxygen diffuses from the water into the blood, and carbon dioxide moves from the blood into the water across this thin membrane. Another adaptation to facilitate oxygen uptake by the gills is the countercurrent system of blood flow in the lamellae, where the flow of blood in the lamellae is opposite to the water flow across the lamellae.

Fast-swimming fishes like scombrids have a high metabolic rate and increased oxygen consumption, compared with more sluggish fishes like catsharks or anglerfishes. The gills of the more active fishes are "designed" for greater efficiency in the uptake of oxygen: the lamellar walls are thinner and the number of lamellae is greatly increased, providing a much greater surface area for diffusion.

The water current for gill ventilation is provided either by the "branchial pump" or by simple "ram ventilation". In the latter method, the fish simply swims with its mouth open, and the water flow through the mouth and gills is accomplished by the movement of the fish through the water. This method of ram ventilation is used by fast-swimming fish and by most plankton feeders (which swim about with

the mouth open anyway). The branchial pump method is used by sedentary species to force water through the gills. By alternately expanding and contracting the mouth and gill cavities, water is sucked into the mouth and pushed through the gills. The operation of this branchial pump can be seen in fish in an aquarium as they expand and contract their opercula.

Since water contains only about three per cent of the oxygen in an equivalent volume of air, it is not surprising that some fishes have developed means for aerial respiration. Air breathing is best developed in freshwater fishes like the lungfishes, which have developed lungs as well as gills. There are a few marine fishes that use aerial respiration to supplement the oxygen gained from water respiration. In freshwater eels (*Anguilla*), about 10 per cent of the oxygen uptake is normally through the skin, but if the eel is in air some 66 per cent of its oxygen is taken in through the skin and the rest is brought in through the gills. The mudskipper (*Periophthalmus*) is also able to live for long periods in air, and it acquires oxygen in the same way as the eel. Some species of mullet (Mugilidae) frequently jump out of the water. In warm stagnant water, which contains little dissolved oxygen, mullet jump more frequently than they do in well-oxygenated habitats. The mullet apparently jump out of the water to take in air, which is then kept in bubbles in a chamber above the gills. These air bubbles provide an additional source of oxygen in stagnant water.

Osmoregulation

The physiological process by which the salt concentration of blood and other tissues is maintained within the limits necessary to sustain life is called osmoregulation. In marine bony fishes, the salt concentration of the blood and tissues is less than that of sea water, thus they lose water by diffusion through the gills and skin. To make up for this loss of water, bony fishes drink sea water and absorb the water (along with salt ions which they do not need) through the gut. The unwanted ions are excreted via the gills, urine and faeces.

The salt content of cartilaginous fishes (Chondrichthyes) is only slightly higher than that of teleosts, but due mainly to the high concentration of urea in the blood, there is no tendency to lose water through the gills or skin. Cartilaginous fishes (and the coelacanth, which also uses urea to osmoregulate) are somehow able to tolerate concentrations of urea in their blood that would be fatal to most other animals. Influx of ions is countered by excretion of ions via the gills, urine and rectal gland. The rectal gland appears to be unique to the coelacanth and chondrichthyes; it accounts for most of the Na^+Cl^- excreted by these fishes.

Some elasmobranchs have adapted to life in fresh water. In these species, the concentration of urea and salts is much reduced compared to their levels in a marine environment. The freshwater stingrays of South America (*Potamotrygon* spp.) cannot retain urea in their blood, and they will die if placed in sea water. The Zambezi shark (*Carcharhinus leucus*), however, often occurs in rivers; juveniles are known from Malawi and the Kruger National Park!

Euryhaline fishes, like the Zambezi shark, are able to tolerate wide fluctuations in salinity. The estuarine fish fauna comprises euryhaline species like moonies (*Monodactylus*), mullet (Mugilidae) and kob (*Argyrosomus*). Stenohaline species canot tolerate changes in salinity and are thus confined either to fresh water or to sea water. Most estuarine fishes are euryhaline marine species, but a notable exception is the freshwater cichlid *Oreochromis mossambicus*, which is able to tolerate estuarine salinities.

In hagfishes, the salt concentration of the blood is similar to that of sea water, and hagfishes cannot tolerate even half-strength sea water. Some lampreys live in marine environments, although they must return to fresh water to breed. Lampreys regulate their ionic concentrations in a manner similar to that of teleosts.

Temperature

With a few notable exceptions, fishes are "cold-blooded" (poikilothermous) animals, which means that their body temperature is dependent on the temperature of the surrounding water. Except for certain oceanic fishes that often move through the thermocline, fishes cannot tolerate rapid changes of more than a few degrees Celsius. When an east wind blows along our southern coast, it causes upwelling of cold bottom water; this influx of cold water in the nearshore environment often kills fishes or makes them very lethargic.

Some large, fast-swimming fishes (tunas, marlins and lamnid sharks) are able to maintain their body temperatures above the ambient water temperature. See the section on "Swimming" (p. 12) for a discussion on these warm-bodied fishes.

Some Arctic and Antarctic fishes have an organic "antifreeze" compound in their blood to prevent its freezing in the −1° to −2 °C temperatures of their environment. Deep-sea fishes can obviously live in low temperatures, for the water of the bathypelagic region is between 2° and 4 °C. At the other extreme is the African freshwater cichlid, which can live in hot springs of 40 °C.

Swimbladder, buoyancy and sound production

Most fishes have a gas-filled swimbladder in the upper part of their abdominal cavity. In some primitive fishes (e.g. lungfishes and the freshwater bowfins of North America) the swimbladder is connected to the oesophagus and functions as an accessory respiratory organ. Although some marine fishes retain the duct from the swimbladder to the

gut, the swimbladder functions mainly to provide buoyancy.

In the spiny-ray fishes, the swimbladder has no connection with the gut, and any change in the amount of gas in the swimbladder is a slow process of secretion or resorption. If the fish is pulled rapidly to the surface from a depth of 20 m or more, the gas in the swimbladder cannot be adjusted to the sudden decrease in external pressure. The result is the gross expansion of the gas and therefore of the swimbladder, such that it may rupture or push the everted stomach into the mouth. Anglers know that if they hook a large rockcod in deep water and can bring it halfway up to the surface, the battle is won, as the expanding gas in the swimbladder makes it very difficult for the fish to swim back down to the bottom.

To get around the problem of rapid gas expansion with sudden changes in depth, fishes have either replaced the gas-filled swimbladder with a partly or wholly fat-filled swimbladder, or they have lost their swimbladder completely. In many species of lanternfishes (Myctophidae), the swimbladder gas is progressively replaced with lipids (fatty oils that are less dense than sea water) as the fish ages. The swimbladder of the coelacanth (*Latimeria*) is completely filled with lipid (mainly low-density wax esters), and the body muscles are also rich in wax esters. The oilfish (*Ruvettus*) is notorious for the purgative properties of its flesh, which is due to the abundance of wax esters in the body muscles. *Latimeria* and *Ruvettus* have thus evolved a similar solution to the problem of buoyancy in their up-and-down world. These two quite unrelated species occupy the same habitat at the Comores, and they apparently make considerable depth changes in their search for the same prey.

Sharks (and other chondrichthyes) lack a swimbladder, but they also produce large amounts of lipid to provide buoyancy. The lipid is stored in the liver as oil (mainly squalene, a very low-density oil that incidentally also makes an excellent lubricant for fine machinery). The livers of some sharks are enormous – up to 25 per cent of the total weight!

The swimbladder is used by some fishes to produce or amplify sounds. By contracting muscles attached to the gas-filled swimbladder, vibrations are produced that can be heard as growls, grunts, hoots and drumming noises. The muscles are either wholly attached to the swimbladder (intrinsic muscles) or attached by one end to the swimbladder and by the other to the skull, vertebral column or ribs (extrinsic muscles). Toadfishes (Batrachoididae) have a well-developed swimbladder with large intrinsic muscles. The North American oyster toadfish (*Opsanus tau*) is known for its repertoire of loud hoots, grunts, yelps and boat-whistle sounds. These noises are used in courtship and in defence of territory. The cave bass (*Dinoperca petersi*) has a large, thick-walled swimbladder that is almost completely enveloped by three pairs of intrinsic muscles. Divers familiar with this species report that it is often seen at the entrance to its cave and makes a loud drumming noise when approached.

Migrations

Migrations are regular mass movements of animals from one place to another, usually for purposes of breeding or feeding. Many mesopelagic fishes (e.g. myctophids) undertake vertical migrations of several hundred metres every evening in order to feed on the abundant plankton in the epipelagic region. By feeding at night in the surface waters, they are safe from birds and other predators that hunt their prey visually. At dawn, the myctophids return to depths of 100 - 1 000 m.

The elf (*Pomatomus saltatrix*) migrates from Natal to the southern Cape coast during the late summer months to feed, and returns to Natal waters to breed from September to December. This species also occurs along the Atlantic coast of the U.S. and on the south coast of Australia where it is well known as a migratory fish.

The freshwater eels (*Anguilla*) that live in the rivers of our south and east coasts must return to the open ocean to spawn. The transparent larvae (leptocephali) drift south in the Mozambique current from somewhere near Madagascar. When they enter freshwater, they turn into the worm-like little elvers that ascend the rivers, even wriggling up dam walls. Females go farther inland than males do, and the eels stay and grow in freshwater for about 14 years. When they are ready to return to the sea for breeding, they stop eating, their eyes enlarge, and their dark skin becomes silvery. They apparently migrate to some place near Madagascar to spawn, but once they leave the rivers they are never seen again. The European eel (*Anguilla anguilla* Linnaeus, 1758) traverses more than 3 000 km of the Atlantic Ocean to breed in the Sargasso Sea south of Bermuda. It takes two or three years for the leptocephali to reach the European rivers where they will feed and grow for some years until it is time for them to set off on their own breeding migration.

Fishes that return to the sea to spawn, like the freshwater eels, are called **catadromous.** Our freshwater mullet (*Myxus capensis*) is a catadromous species that spends most of its life in the fresh waters of our rivers, but returns to the sea to spawn. Unlike the elvers of the freshwater eels, the young of *Myxus* cannot get past dam walls, and this species is therefore becoming increasingly restricted in its available habitat.

Anadromous fishes, which return from the sea to spawn in freshwater, do not occur in southern Africa, but they are well known in the northern hemisphere. Some species of Pacific salmon return to the same stream from which they emigrated years earlier. Biologists have used this attraction to their birthplace to breed large salmon, by taking the ova

from the largest females and fertilising them with sperm from the largest males. The fingerlings that result are released and will return after a few years in the ocean to the same stream. By using only the largest of the returning fishes for breeding each year, the average size of the species is slowly increased.

Exactly how the salmon find their way back to the river where they were spawned is not known, but once they are there, it is their sense of smell (despite pollution of the rivers) that enables them to return to the very spot where they were spawned. If the salmon's nostrils are plugged, the fish is unable to locate its birthplace.

The annual migration of our pilchard (*Sardinops ocellatus*) to Natal waters, known as the Sardine Run, is probably a feeding migration. The pilchard schools appear to be following the abundant plankton which occurs in the countercurrent flowing northward along our east coast in the winter.

Dangers of the sea

For a full discussion and treatment, consult *Sea & Shore Dangers: Their Recognition, Avoidance and Treatment* by M. M. Smith. It is available from the J. L. B. Smith Institute of Ichthyology, Private Bag 1015, Grahamstown 6140. No one who visits the sea should be without this little book.

Tips for anglers

1. When fishing in a new place, watch the sea for some time before clambering onto the rocks. Note the drift of the current and decide where you will come back to the shore if you are washed off, and do not swim against but with or across the current.
2. Never turn your back on the sea, for large waves can rise up and wash you off the rocks. Also be careful about jumping down to release your line on rocks near the sea.
3. Be careful when casting if other folks are around. A swinging hook and sinker can be dangerous.
4. To remove a deeply embedded hook from a person, tie a string onto the bend of the hook, press the hook downwards and tweak it out with a quick pull on the string.
5. Never leave baited hooks lying around. Animals may be tempted to eat the bait. Cats that eat only tinned sardines will readily take a baited hook, and so will seagulls.

Shark attacks. Shark attack is the most feared danger of the sea, although there are far more drownings than attacks by sharks. Fortunately most of our beaches are manned by lifesavers who have been trained not only to save those in danger of drowning, but also to treat shark attack victims.

Treatment of a shark attack victim

1. It is most important to stop the bleeding and keep the victim breathing. Apply artificial respiration if breathing stops.
2. Place victim on the beach out of reach of the waves and *parallel* to the sea (not head downwards). Raise his legs to promote blood flow to the brain.
3. Send for medical help immediately.
4. Serum, plasma or blood must be administered intravenously as soon as possible; record pulse and blood pressure at frequent intervals.
5. Do not move the patient for 30 minutes to avoid the fatal secondary shock.
6. Give no alcoholic or other drink, but water may be used to wet the patient's lips.
7. Reassure the victim and keep him calm.

Barracudas, moray eels and other supposedly vicious fishes are very unlikely to bite a swimmer or diver. Attacks by unprovoked barracudas in clear water are unknown. In murky water, a barracuda may mistake the flash of a watch or bracelet for its prey. Also, speared fish will attract barracudas and morays, and spearing large barracudas or morays is asking for trouble. A large moray has extremely powerful jaws, and when he bites he hangs on until the end (yours or his). It is usually necessary to cut the muscle at the angle of the jaw to open the moray's jaws. Anglers are sometimes bitten by large fishes that are still alive when pulled into the boat.

Treatment. Minor bites: clean the wound, apply antiseptic and bandage. Deep or extensive wounds: stop the bleeding and seek the aid of a doctor.

The **hagfish** is not a snake or an eel; it has a round, sucking mouth and no jaws (see Family No. 1). The mucus from the body, however, prevents any fish from approaching, and anglers discard any fishing tackle the hagfish touches.

A **true snake,** the Indo-Pacific bicoloured sea snake *Pelamis platurus* (Linnaeus), does however frequent our coast from the Cape eastwards. It is *not* an eel, but an air-breathing front-fanged venomous snake and is easily recognised by the flat paddle-like tail with black blotches on a yellow or greyish background (see Pl. 8, fig. X). The body is black above and abruptly yellow or dirty white below. Sea snakes are related to the cobras, and their venom is even more deadly. Fortunately their fangs are small, and many bites do not result in the injection of venom. Although sea-snake bites are often painless, they may be fatal if sufficient venom has been injected. Symptoms of painful muscle movements, paralysis of the legs and drooping eyelids usually develop within one hour of the bite. The victim should lie down and avoid all exertion. A pressure bandage, as tight as for a sprained ankle, should be wrapped around the bitten limb, which should also be splinted to prevent movement and spread of venom. Carry the patient immediately to the nearest doctor or hospital for treatment. If possible, kill the snake in question and take it to the physician for identification.

The snake is completely pelagic and produces its young alive in the sea, but as the sea gets colder south of Natal, the snakes are less able to swim against currents or waves and a number are thrown up, fortunately moribund and often damaged, on the beaches or into tide pools from East London westwards. Every child should be taught to recognise this creature and avoid playing with it and thus being bitten.

Cone shells are molluscs with a sting causing pain similar to that of a bee sting, or paralysis and death due to cardiac failure. They inject their venom through an incredibly small hollow tooth charged with venom and held by the proboscis like a tiny spear. They use this venom normally to paralyse their prey. Beware of collecting these shells and if you do pick the shell up, do so by the back (larger part) of the shell.

Octopus. Large active prey are subdued by the octopus with venom produced by the salivary glands and introduced through bites of the beak-like jaws. Although there is a small species in Australia that can deliver a fatal bite, the bites of the South African species apparently give only a slight burning pain and the small double puncture wounds are difficult to heal.

Stabs. Most stabs by fish spines are painful, but some fishes have toxic mucus or venom on their spines. Among these with venomous spines are the stingrays, Family No. 30; catfishes, Families Nos. 59 and 60; rabbitfishes, Family No. 245; and the scorpionfishes, stonefishes, turkeyfishes and firefishes, Family No. 149.

For all fish spine stabs immerse the wound in water as hot as can be borne by the victim. Fortunately venoms produced by creatures living in the sea are destroyed by temperatures in excess of those of any ocean, but less than that able to be borne by man. No one has yet tried the hot water treatment on a sea-snake bite, but it is probable that this venom is similar to that of land snakes from which it evolved, and is far more heat stable, probably up to 100 °C and well beyond the tolerance of man's tissues.

Stingrays (Family No. 30). Stabs from the "sting" on the tail occur when the fish is pinned down and can whip the tail forward to drive the serrated spine into the victim's foot, ankle or leg. If you suspect stingrays may be lying on the bottom, shuffle your feet along without picking them up. A touch of your foot on the side of the fish will make it swim off, as it is a timid creature and only uses its spines for defence.

Catfishes (Families Nos. 59 and 60) are often referred to by the Afrikaans common name "barbels". Three hidden serrated fin spines (one in front of the dorsal fin and one in front of each pectoral fin) can be erected to form a triangle formidable to any predator. These spines have a venomous mucus that enters the wound made by lacerations of the serrated spine.

Rabbitfishes (Family No. 245) occur in increasing numbers from Natal northwards. They have a venomous mucus on the fin spines which causes pain similar to that of a bad bee sting.

Surgeon and **unicorn fishes** (Family No. 243) have an anticoagulant on the spines on the caudal peduncle. Wounds by these fishes are not painful, but bleed profusely. These fishes occur from Natal northward.

Scorpionfishes (Family No. 149) become more plentiful from the Transkei northward, although deepwater forms occur in the Atlantic and one is known to reach Natal. The scorpionfishes all have venom on their dorsal fin spines. The turkeyfishes (genus *Pterois,* Nos. 149.7, 149.8, 149.9, 149.10, 149.11) occur as far south as Algoa Bay, and are beautiful, fearless and slow swimming. As a result, they invite being caught in pools by children, but one stab from their venomous spines and considerable pain and fall in blood pressure results. Turkeyfishes may actually attack by swimming towards the intruder with dorsal spines erect and ready to stab him. This is the only fish known to attack with its venomous spines; all others seem to use their spines only for defence.

The stab of the **false stonefish** (*Scorpaenopsis diabolus,* No. 149.31) gives intense pain for about 1 - 3 hours (unless treated). This fish is probably responsible for various reports that the stonefish is a much maligned creature whose stab is not as bad as stated!

The **true stonefish** (*Synanceja verrucosa,* No. 149.46) is known from Durban northward and is an ever-present hazard as stabs from the fin spines can be fatal. The 13

spines on the back have a large venom sac on each side. This is the most venomous fish in the sea, and, due to its thick warty skin and sedentary habits, it is easily mistaken for a lump of coral rock. When tramped on, the skin surrounding the spines presses the venom sacs and the venom is injected by means of the needle-sharp syringe-like spines.

Stings. Here **bluebottles,** or **Portugese-man-of-war,** and **jellyfishes** are the main culprits. For both, use meat tenderiser on the weal (and stinging tentacles if still attached) and wash in with water (sea water will suffice). The meat tenderiser, being an enzyme that breaks down protein, not only denatures the venom in the victim but also destroys the venom in the stinging cells that have not discharged. *Do not use alcohol (spirits) of any kind* for it merely discharges the remaining stinging cells into the victim. Vinegar is sometimes used but while it destroys the undischarged cells, it apparently has no effect on the venom already in the victim. The meat tenderiser attacks both, and the pain disappears immediately.

It has been suggested that ice applied to the weals (if the meat tenderiser was not used) and an antihistamine injection assists in healing. Many people take a small tin of meat tenderiser with them and have found the application of this simple remedy 100 per cent effective, not only with sea animal stings, but with bee and hornet stings. It makes sense!

Poisonous creatures. The difference between venom and poison is: **venom** is a toxin introduced into the muscle and bloodstream by a wound (bite or sting), causing pain and, in some cases, death; **poison** is a toxin that is eaten causing stomach or intestinal cramps, nausea, vomiting, and, in some cases, death.

Southern Africa is fortunate in that it is a subcontinent where ciguatera poisoning is not known. This poisoning results from eating fish normally considered wholesome but which have become poisonous due to their feeding on certain toxic dinoflagellates or on animals that have fed on these toxic micro-organisms. It is known in the Seychelles and Mauritius, and is very common in the Pacific islands. The only group of fishes in our area that should not be eaten are those belonging to the Order Tetraodontiformes (Families Nos. 263 to 270). Eating blaasops (Family Tetraodontidae, No. 268) often can be fatal. In Port Elizabeth, practically a whole family was wiped out by eating one of these fish picked up on the beach. Though the poison is normally not in the muscles but in the skin and viscera, it is unwise to eat any of the fish. Despite the various precautions taken in northern Mozambique, where the Macua people eat these fish, people still die from eating blaasops!

The **liver** of the red steenbras, and probably tunas and some sharks, should be avoided because, like the livers of the seal and the polar bear, they have a very high vitamin A content. Eating the livers results in hypervitaminosis, and the poisoning due to excess vitamin A causes considerable nausea, stomach cramps and loss of skin and hair. It is stated that it can be fatal, but there is not an authenticated case of death in our area.

The effect of fishing

Records kept meticulously by the Natal North Coast Angling Club for a number of years showed conclusively that fewer and smaller elf (*Pomatomus saltatrix*) were being caught in their fortnightly competitions. The anglers realised that the elf were in need of protection, and asked for some sort of control on the catching of these fish. A commission of inquiry called the Smith Committee was appointed in 1980 to look into the matter. The Committee recommended that catching of elf be prohibited during their breeding season from September to November; that during the rest of the year there should be a daily bag limit of four fish per angler, and that the sale of elf be completely prohibited. Thanks to the strict enforcement of regulations based on the Smith Committee's recommendations, more large elf are now being caught, and the populations along our entire coast have increased.

Protection like the elf regulations is necessary for many of our angling fishes. Scientists are monitoring the catches and investigating the biology of a number of our angling species. Some sort of bag limit is necessary to stop the decline in the populations of angling fishes in our area. It may also be beneficial to establish marine reserves along our coast where fishes can live and breed in relative safety. Breeding populations in these areas where fishing is prohibited may be able to produce sufficient young to repopulate the exploited areas.

Commercial fishes are also in need of protection – witness the marked decline in the catches of many of our commercial species in the past few years. Enforcement of laws to protect commercially important fishes is not easy, particularly when foreign vessels may be exploiting the same stocks caught by our South African fishermen.

Common names

In earlier times along South Africa's 3 000 km coastline were numerous isolated communities. Interested in angling and pursuing fishing on a small scale, the inhabitants gave names to the fishes they caught. First, in 1652, came the Dutch settlers who gave names of well-known European fishes to the similar fishes that they found at the Cape. Names like "steenbras", "kabeljou", "snoek", etc. are derived from these. Malay slaves and freemen from the East brought their names with them, and many were manufactured or adapted as the need arose. The Afrikaans names for the Cape fishes are relatively uniform. Only as the distance increases from the Cape (e.g. at Knysna, Plettenberg Bay and Port Elizabeth) do alternative names for the same species occur.

Many English names started in the Eastern Cape Province, and there are different names for the same fish at towns or holiday resorts sometimes not 50 km apart. It is therefore not unusual to find one English name in use at the Cape, another at Knysna, and another at Port Elizabeth differing from that at East London. The Transkeians use yet another name, and finally Natal has a name quite different from all the rest. In fact there is one fish in the original *Sea Fishes of Southern Africa* that has 14 different names!

The indigenous peoples of South Africa contributed practically no names to the fishes, as only the early Strandlopers were fish eaters and we know nothing of their language. The Nguni peoples migrating down from the north were pastoralists and agriculturalists, not fishermen. The Pondo, Xhosa, Tembu and Fingo peoples that reached the Transkei originally kept out of sight and sound of the sea. Only the outcasts existed in this coastal strip. Some tribes considered fish flesh akin to snake flesh, and by custom and taboo most tribes were prohibited from eating it. This is a tradition which fortunately is fast disappearing.

Three-quarters of a century ago all the different common names produced little confusion. Groups were too isolated. Then the country's communications improved. In 1949 J. L. B. Smith collected all the common names he could and published them in his *Sea Fishes of Southern Africa,* each, with its locality, carefully attached to the description and figure of the fish so named. He argued that in this way confusion would be avoided and, by referring to the illustration, everyone would be able to ascertain exactly which fish was being discussed. While going a long way to unravel the confusion, the original *Sea Fishes of Southern Africa* did not resolve it, mainly because of man's inherent laziness and carelessness and the fact that the *Sea Fishes,* weighing nearly 3 kg, could hardly be tucked into a fishing bag.

Today the necessity of standardised common names of our fishes is recognised by all sections of the community, including the angling fraternity. As early as 1959, L. P. D. Gertenbach in his unpublished Ph.D thesis on "Marine fishery industries and commerce of the Union of South Africa and South West Africa" wrote:

> The fish-producers, fish-traders, fish-consumers, legislators, inspectors, managers of factories, depots, transport firms, exporters, housewives, etc., all have an interest in a clear, unambiguous labelling of fishery products. The realities of the modern world-economy demand the standardization of the English and Afrikaans common names of at least that hundred or so species of economic significance.

Nowadays, with good roads, air travel and more leisure, South Africa has not only shrunk, but is no longer isolated at the tip of a continent. A man can fish off Angola one day and in Durban waters the next. Big game anglers come from all over the world. Fleets of many nations fish the fringe of our territorial waters, and endemic fishes such as South African hake, snoek, kingklip, etc. can be seen daily on Japanese, Russian, Spanish and other markets.

Commerce, law and sport need common (vernacular) names for fishes for legal terminology and for general use. Substitutes for scientific names are essential for the increasing number of inland aquaria, for popular and scientific writing in encyclopedias, dictionaries, popular and scientific magazines, newspaper reports and record lists. It has been shown that common names carefully chosen can be more stable than scientific names, as witness the list given by Gilchrist (1902) wherein almost all the scientific names are obsolete but the common names are just the same today. Even as far back as 1682, Claudius, one of the early travellers to South Africa, labelled his illustrations of Cape fishes with names such as "sonvis" and "knorhaan" that are still in use for those same species today.

To avoid confusion, no fish must have more than one official common name in English and one in Afrikaans. That particular name must refer only to that fish and no other. A list of the common and scientific names of the fishes of southern Africa was produced in the J. L. B. Smith Institute of Ichthyology's Special Publication No. 14 (Smith, 1975), and it is followed almost entirely here. In several cases, especially for widely distributed commercially important species, we have adopted the internationally accepted English names used by the U.N. Food and Agricultural

Organisation. As explained to anglers, anyone is entitled to use a pet name in conversation, for a child or anything else, but when it comes to publication or clarification, one legal name should be available and used. It is hoped that the common names in this book will be used in all these cases.

Scientific nomenclature and classification

For every described species of fish, there is only one *valid* scientific name. The scientific name comprises two Latin (or Latinised) words, which together make a unique species name that can be used only for that particular species. The species *Epinephelus guaza,* our common yellowbelly rockcod (Family Serranidae), was described and named by the famous Swedish biologist Carl von Linné (Linnaeus) in 1758. The *International Code of Zoological Nomenclature* stipulates that the starting point for zoological names is the tenth edition of Linnaeus's catalogue of animals, called *Systema Naturae,* which is assigned the publication date of January 1, 1758. Names published before 1758 are not allowed, unless they have been published in a valid description after 1758. Some species have been given two or more scientific names, in which event the oldest name is usually considered the valid name, and the later (more recently published) name (or names) are regarded as junior synonyms.

The first term in the species name is the name of the *genus* to which that species is now assigned in the present classification used in this book. Thus, the species *Epinephelus guaza* (Linnaeus, 1758) is here put in the genus *Epinephelus.* It was originally described by Linnaeus in the genus *Labrus,* and we indicate that the species is now assigned to a genus other than its original one by placing the author's name in parentheses. Citation of the author's name and date of publication with the species name is optional, but they should be given at least once in every publication that uses the scientific name.

The genus (if not monotypic) comprises two or more closely related species; in our area, we have 35 species of *Epinephelus.* The classification that is based on the inferred evolutionary (phylogenetic) relationships of *Epinephelus guaza* and other fishes comprises a hierarchy of taxa (singular taxon) or categories, with each higher category being more inclusive than the one below.

Additional categories, such as subgenus or subspecies, are also sometimes used. Note that the genus name is spelt with a capital letter, but the first letter of the species name (even if based on a proper noun) is not capitalised.

The part of the classification that contains *Epinephelus guaza* is as follows:

CATEGORY	TAXON	COMMON NAME
Superclass	Gnathostomata	jawed fishes
Class	Osteichthyes	bony fishes
Subclass	Actinopterygii	rayfin fishes
Subdivision	Teleostei	modern bony fishes
Infradivision	Euteleostei	higher teleosts
Superorder	Acanthopterygii	spiny-rayed fishes
Order	Perciformes	perciforms
Suborder	Percoidei	percoids
Family	Serranidae	serranids
Subfamily	Epinephelinae	rockcods
Genus	*Epinephelus*	rockcods
Species	*Epinephelus guaza*	yellowbelly rockcod

The definition (limits) of the taxa are subject to modification in the light of new discoveries regarding the relationships of the various species, and also because there is a more or less subjective element in most taxonomic decisions. For example, some workers recognise *Cephalopholis* only as a subgenus of *Epinephelus,* whereas we consider it a valid genus. The differences between related genera may be slight or quite distinct, but the subjective element comes into the evaluation of these differences.

Zoological nomenclature is a system of Latin (or "Latinised") names and is, therefore, governed by the rules of Latin grammar. If the second term in a species name is an adjective, it must agree in gender with the genus name that it modifies. Consequently, if a species is transferred to another genus, its ending may have to change to agree in gender with its new genus. For example, the adjective *maculatus, -a, -um* will have the "*-us*" ending if the genus name is masculine (*Helicolenus maculatus*), the "*-a*" ending for a feminine genus (*Chascanopsetta maculata*), and the "*-um*" ending for a neuter genus (*Pristipoma maculatum*).

To keep track of the various names that have been applied (correctly or incorrectly) to a particular species, we

give a list of references and synonyms based on the literature pertinent to our area. This list, called a synonymy, will serve not only as a guide to the literature on each species, but also as an index to the taxonomy of each species. The synonymies and references given in this book are limited to (1) the primary synonyms described from our area, (2) major taxonomic revisions, and (3) South African literature subsequent to 1960. References to southern African fishes published before 1960 can be traced through the 1961 edition of J. L. B. Smith's book *The Sea Fishes of Southern Africa*, which is entered in our synonymies as "Smith, **SFSA No. _____**", which denotes the species number used in that book. A sample of a synonymy used in the present book, with a few additional notes of explanation, is as follows:

Cheimerius nufar
(Valenciennes, 1830)

Dentex nufar Valenciennes, *in* Cuv. & Val., 1830: 240 (Red Sea). *Dentex variabilis* Valenciennes, *in* Cuv. & Val., 1830: 241 (Red Sea). *Dentex miles* Gilchrist & Thompson, 1908: 155 (Natal). *Dentex albus* Gilchrist & Thompson, 1914: 128, Fig. 1 (Natal). *Dentex filosus (non* Valenciennes): Barnard, 1927: 715. *Dentex rupestris (non* Valenciennes): Fowler, 1925: 240. *Cheimerius nufar:* Smith, 1938: 292*; **SFSA No. 740*;** Smith & Smith, 1966: 58*; van der Elst, 1981: 306*.

Explanation: *Cheimerius nufar* is the valid name for the species first described by Valenciennes on page 240 in the work co-authored by Cuvier and Valenciennes and published in 1830; the specimen on which Valenciennes based his description was collected in the Red Sea. *Dentex variabilis,* which Valenciennes considered a different species and described on the next page of the same book, is here regarded as the same species as *D. nufar. Dentex miles* and *Dentex albus,* both described by Gilchrist and Thompson from specimens collected along the coast of Natal, are also here regarded as synonyms of *D. nufar. Dentex filosus* and *D. rupestris* are not synonyms of *nufar;* they are either valid species or junior synonyms of other species. Barnard and Fowler have both misidentified the fishes they had, as both prove to be *C. nufar.* "*Cheimerius nufar:* Smith, 1938: 292*; **SFSA No. 740***" indicates that Smith refers to the species under this name in his publication of 1938 (page 292 with an illustration, indicated by the asterisk) and in the *Sea Fishes* book the species is No. 740. "Smith & Smith, 1966: 58*" and "van der Elst, 1981: 306*" refer to publications subsequent to the *Sea Fishes,* both of which have illustrations (*).

Oceanography of the Southern African region

by F. A. Shillington

In order to understand the habitat and distribution of the fishes of southern Africa, it is important to outline the physical oceanography of this region.

MARINE GEOLOGY AND BOTTOM TOPOGRAPHY

It is now believed that about 200 million years ago, there existed a supercontinent known as Gondwanaland, comprising Africa, South America, Australia, India and Antarctica (Fig. 1). About 180 million years ago this continent broke into a western and eastern half, leading eventually to the formation of the Indian Ocean. About 50 million years later (130 million years ago), on the west, South America started drifting away from Africa to form the South Atlantic Ocean.

The manner in which the continents drifted apart has had a great deal of influence on the resulting continental shelf structure. For example, the continental slope between Durban and Port Elizabeth drops from 200 m to 1 000 m extremely rapidly, because this region resulted from shear stress as the Falkland Plateau moved away from the eastern South African coast. On the other hand, the west coast region shows a more gently sloping edge because of tension faulting.

The edge of the east coast shelf is close to the coastline (see Fig. 2), being only 12.5 km wide in some places (e.g. Port St. Johns), and slopes steeply from the edge (at about 200 m below mean sea level) down to the abyssal plain at 4 000 m. The narrow continental shelf on the east coast affects the path of the Agulhas Current. Near Durban, however, the shelf widens to some 45 km, and the effect of the Tugela River can be seen in the form of an undersea delta comprising land-derived sediments. There are a number of underwater canyons incised in the shelf between St. Lucia and Lake Sibaya, where the shelf is extremely narrow (4 km). Recently, large undersea sand dunes have been ob-

Fig. 1 The changing position of the continents according to the theory of sea floor spreading (a) about 225 million years ago (b) 150 - 200 million years ago (c) 80 - 120 million years ago.

served in water depths greater than 50 m on the continental shelf between Lake Sibaya and Port Elizabeth. They can have heights of up to 8 m and wavelengths of 200 m (as seen off Port Alfred). Some of these dunes are apparently moving southwards, but near Durban they are moving northwards with the inshore countercurrent. A study of the bottom sediments can give information about the dynamics of the currents that formed them.

South and west of Knysna is a large, flat, submerged plain, known as the Agulhas Bank. The slope here is only about 1:1 000 and the distance from the shore to the 200 m isobath can be as much as 300 km. Sea level has shown fluctuations on the long geological time scale, and at some stages the mean sea level was considerably lower than at present. A tidal range of two metres at a time of depressed sea level would have meant that the intertidal zone on the Agulhas Bank would have been some two kilometres wide.

On the west coast, the continental shelf is wider (30 - 180 km) and tends to be deeper at the shelf break (300 - 400 m). The west and south continental shelf areas are of great economic importance, as it is here that the major fishing as well as the search for oil and other minerals (e.g. diamonds) takes place.

In regions deeper than 1 000 m, one can see (Fig. 2) that there is a variety of structural types. There are large flat areas (known as abyssal plains) and high "mountainous" regions at the middle of the ocean (mid-oceanic ridges). In some places, there are ridges that lead out to the mid-oceanic ridge (e.g. the Walvis and the Mozambique Ridges). In addition to these features, there are also isolated pinnacles (called seamounts) that rise thousands of metres above the abyssal plain. Some 1 000 km WNW of Cape Town is the Vema Seamount, which rises from a depth of 5 000 m to within 50 m of the sea surface. For comparison, its base would extend from Cape Town to Cape Point and it would be nearly 5 times higher than Table Mountain. The top, slowly eroded by centuries of wave action, is relatively flat. In 1965 the Vema Seamount was found to be a crayfish haven, but such was the exploitation that by 1978 divers could find not a single crayfish! There were, however, still abundant yellowtail and wreckfish.

CURRENTS IN SOUTH AFRICAN WATERS

To understand the major current systems prevailing in our waters, we must first discuss the large-scale oceanic circulation. We may classify three main types of current systems. (a) Density driven currents, where the indirect effect of the wind on the surface of the ocean is to set up different density levels within the ocean and so give rise to large-scale currents (e.g. western boundary currents like the Agulhas Current). (b) Directly wind-forced or wind-driven current systems, where the surface waters respond to direct coupling of the air-sea interface (e.g. the upwelling system). (c) Oscillatory currents, which are generated by wave-related phenomena (e.g. tidal currents resulting from gravitational forces of the sun and moon).

Above the south Atlantic ocean the surface winds blow *towards* the west near the equator (southeast trades) and *towards* the east at about 40°S latitude (westerlies), as a result of the differential solar heating of the earth's atmosphere. We thus find a general anticlockwise (anticyclonic) surface wind circulation around the so-called semi-permanent Atlantic high-pressure air cell. This wind causes a stress on the sea surface and indirectly results in surface currents rotating in the same anticlockwise sense. However, due to the earth's curvature and rotation (giving rise to Coriolis forces) the large-scale currents have an east-west asymmetry. This general argument applies to all major ocean current systems.

In the Indian Ocean the deep, fast-flowing, narrow Agulhas Current is one of the strongest in the world, comparable to either the Gulf Stream, Brazil or Kuroshio currents. High speeds are found in the Agulhas Current, the maximum measured being 13 km/h and average values about 4-7 km/h. The Agulhas Current is generally uninflu-

SOUTHEAST ATLANTIC AND SOUTHWEST INDIAN OCEANS

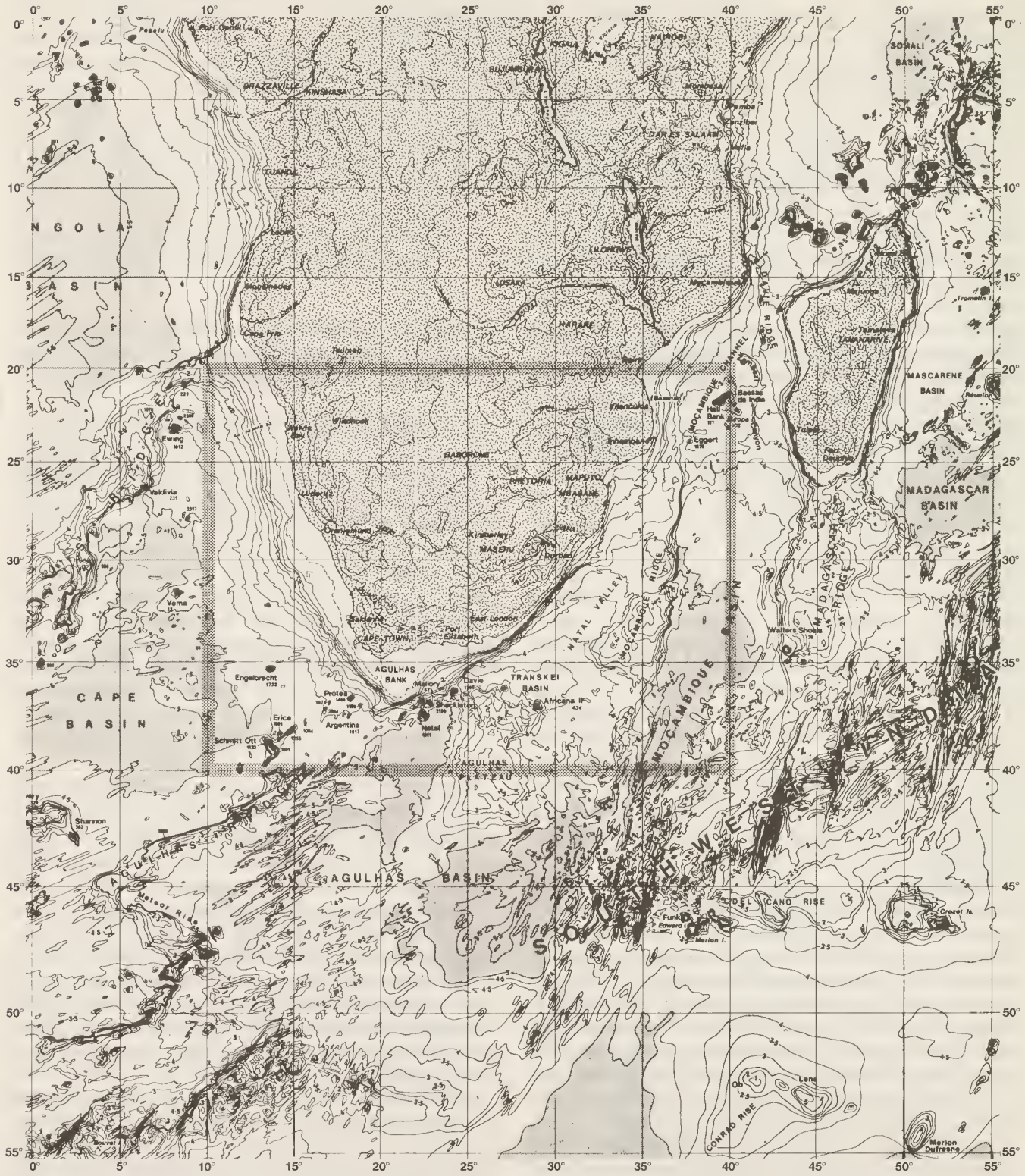


Fig. 2 Detailed bathymetry around South Africa (from the map compiled by Lesley Shackleton, Institute of Oceanography, University of Cape Town, 1982). The southern African region is outlined.

enced by local winds, but severely controlled by bottom topography. For example, the inner boundary of the current is usually found approximately above the 200 m depth contour and thus close to the shore in places. As the Agulhas Current flows south and west of Port Elizabeth, a portion of it tends to leave the coast and turn back eastwards in a U-turn known as a retroflection. Only small amounts of warm, high-salinity Agulhas water round the Cape and possibly proceed up the west coast. After the U-turn, some of the Agulhas Current flows eastwards just north of the Subtropical Convergence zone, and executes a number of north- and southward meanders, largely due to the changing depth of the sea in this area. The main inputs to the Agulhas Current are the Mozambique Current (flowing southwards from the Mozambique Channel) and the East Madagascar Current, which join just north of Durban. Because the Agulhas Current originates in warm tropical regions and is low in nutrients and oxygen, it does not support as much fish life as does the Benguela Current system. There is, however, a greater diversity of species in these warm east-coast waters.

The large-scale circulation in the Indian Ocean is important to marine biologists wishing to understand the drift of larvae of various marine species. Drift cards and drifting buoys indicate that it takes about two years for a complete circulation of the Indian Ocean surface water from Durban past Port Elizabeth and around towards western Australia. Recently, a lifeboat left to the mercy of the currents near Port Elizabeth arrived 15 months later on an Australian beach. A similar circuit was executed by one of the satellite-tracked free-drifting buoys. However, if the water parcel were to be caught up in the Agulhas Return Current, it would be recycled to Durban in a few months. Countercurrents can also develop inshore of the Agulhas Current and so transport animals northwards, as happens during the Natal sardine run.

The cold, sluggish, nutrient-rich Benguela Current off the western coast of southern African has normal surface speeds of only 0.15 m/s or about 15 km per day. This eastern (Atlantic) boundary current differs from the Agulhas Current in that local winds, blowing equatorwards, have a considerable effect on the upper coastal waters. The net effect at a coastal boundary of these southerly and southeasterly winds, coupled with the earth's rotational effect (Coriolis acceleration), is to drive the surface and upper waters offshore. Colder water from intermediate depths wells up vertically to adjust the sea level at the coast, replacing the warm surface water. These deep waters are rich in nitrate and phosphate nutrients, and the areas of upwelling often support massive blooms of phytoplankton. These blooms start the biological food chain with zooplankton feeding on the phytoplankton, and pelagic filter-feeding fish preying on the zooplankton. Blooms of phytoplankton can sometimes be seen as brown murky water in the surf zone, especially off the Cape south coast, and occasionally as red water (when there is a little wind or wave activity).

Off the Cape Peninsula the cold upwelled surface water forms medium-sized plumes in summer, with extremely sharp temperature increases at the oceanic boundary some 16-30 km offshore. Often warm-water species of fish like tuna feed at the open ocean cold/warm-water interface. Cold surface temperatures (as low as 9° or 10 °C) of the west Cape coastal waters are found soon after severe southeasterly or southerly winds. As these winds are at their strongest in summer, the coldest surface waters are found in this region at that time. In winter, the prevailing north-westerly wind causes downwelling and warmer surface water (15° - 16 °C) moves inshore. However, off Namibia the prevailing southeasterly winds are steadier in winter than in summer, resulting in a regular upwelling of cold, nutrient-rich water during winter. This, together with the wide continental shelf, is partly responsible for the extremely rich fishing grounds off the west coast of southern Africa.

The West Wind Drift or Antarctic Circumpolar Current, a slow-moving, deep current, flowing from west to east around the Antarctic continent, is caused by the atmospheric circulation at these high latitudes. Although this area is seldom visited by the average fisherman, it may well become an important fishing ground if the vast stocks of Antarctic krill (*Euphausia superba*) become a major protein source.

North of Durban southwards to Port Elizabeth we can define coastal currents as those that occur between the inner edge of the Agulhas Current and the coastline. There is a region of high shear between the fast-flowing Agulhas Current and the coastline, and clockwise eddies are generated here, occasionally giving rise to north-setting currents close to the shore. There is also considerable onshore-offshore water movement. This effect is well pronounced near Durban, where there is a widening of the continental shelf.

South of Durban and particularly off the Transkei coast, the continental shelf is narrow and the coastal currents 5-10 km offshore are almost exclusively south-going, with high speeds that can be a danger to ships and boats. There have been numerous reports of high waves off the east coast. Wave heights as large as 20 m can occur when gale-force southwesterly winds drive huge seas against the south-flowing Agulhas Current.

The region from Port Elizabeth to Cape Agulhas, where the Agulhas Current slowly leaves the coast, is one of large variability. Since the Agulhas Current steers away from the coastline and follows the edge of the Agulhas Bank, the water movements on the Agulhas Bank are less affected by the Agulhas Current than areas close to shore such as near East London. Consequently, currents on the Agulhas Bank tend to be much slower (about 0.5 m/s) and are affected by the wind and tidal forces. Wind-driven currents can generally attain a speed of about 2 per cent of the windspeed, thus a 50 knot wind might drive a current at about 1 knot.

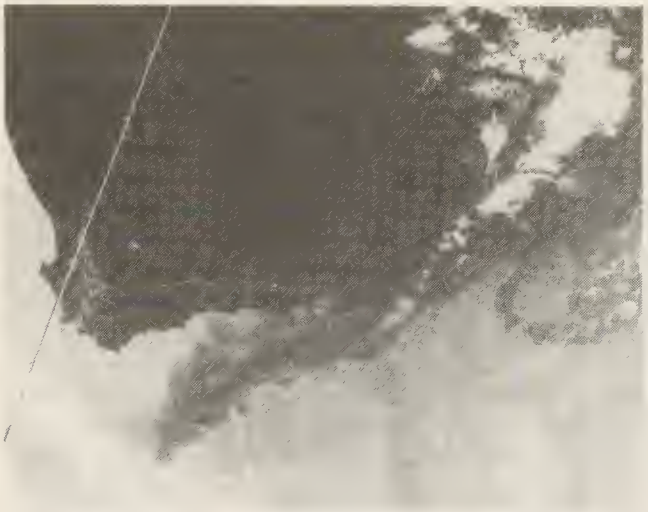


Fig. 3 A NOAA 5 satellite infrared photograph of the coastal waters around southern Africa. Light shades represent cold surface temperatures, while dark shades represent warm surface temperatures. White areas are clouds. The line is due to an imaging problem (courtesy Richard Legeckis, NOAA, 1976).

Cape Agulhas to Cape Columbine has prevailing easterly to southeasterly winds in summer and northwesterly winds in winter. The prevailing SE winds, in the presence of capes and embayments on the coastline, give rise to divergence of the surface flow and hence vertical water motion causing the well-known cold, upwelled nutrient-rich water. In addition there are complexities of water circulation, as for example in False Bay, where the currents in the Bay appear to be highly variable and break up into clockwise and anticlockwise circulations depending on the direction of the wind.

The region north of Cape Town is dominated by wind-driven currents which align themselves roughly parallel to the shore. Thus there are north-setting currents when the southeaster blows, and south-setting currents when the northwester blows. Complications in the current regime are experienced when the direction and speed of the wind change sharply from west to east during the passage of a storm. The coastal currents in the region from Cape Columbine to the Orange River and beyond need further investigation but are generally north-setting, with some reversals when wind direction changes.

Rip currents are found in the region close to shore and under the influence of the surf. Generally, wave-induced currents oscillate backwards and forwards as the wave passes, but as the wave moves into shallower water, there is a mass transport of water shorewards. This transport is usually even along the crest of the wave, and the water that is driven onto the beach returns (often obliquely) seawards in narrow offshore "rip currents" often spaced some 80-500 m apart. One can observe these quite easily from the shore, as the wave disturbed by the rip current often exhibits a plume of foam seawards. If an angler or swimmer should be swept out to sea in such a rip current, he should swim parallel to the shore for a short distance to get out of the rip current. The surf will then slowly but steadily propel the victim shorewards again.

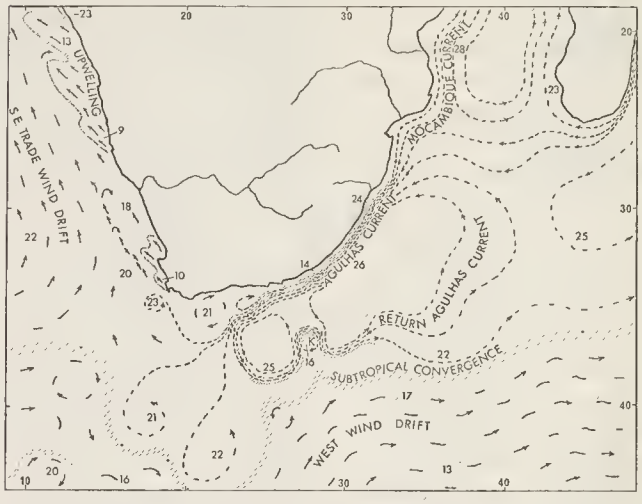


Fig. 4 Schematic diagram of the ocean currents around southern Africa together with surface temperatures (after N.D. Bang, 1973).

SEA TEMPERATURES AND SALINITIES

Sea surface temperatures measured during March 1969 in the core of the Agulhas Current, off Port Elizabeth, were 26 °C; however, closer inshore the temperatures were only 16 °C. The Agulhas Current shows up extremely well on the satellite thermal infrared picture taken by NOAA as a large-scale feature (see Fig. 3). From Fig. 5 it can be seen that surface temperatures of 24 °C persist as far as 40°S latitude in the retroflection area.

Surface temperatures on the west coast show a high degree of variability, depending on the local prevailing winds. Even when there is strong upwelling off the Cape Peninsula and the inshore surface temperatures are as low as 10 °C, 80-100 km offshore the surface temperatures are 20 °C. Thus, east coast waters are not always warm and west coast waters not always cold (see also Fig. 5, where temperatures less than 15 °C occur between East London and Port Elizabeth). In winter, temperatures in Table Bay have been measured at 16 °C. Farther up the west coast, upwelling is more seasonal, and temperatures are not as low as off the Cape Peninsula. Here, summer surface temperatures are about 13 °C in the upwelling regions.

At about 42°S is a zone called the Subtropical Convergence (Fig. 4); here the surface temperature of the sea drops sharply from about 18° to 10° - 11 °C. Noteworthy are the large meridional (north-south) meanders of the Convergence Zone, particularly prominent being the southward intrusion of warm Agulhas water in the retroflection area.

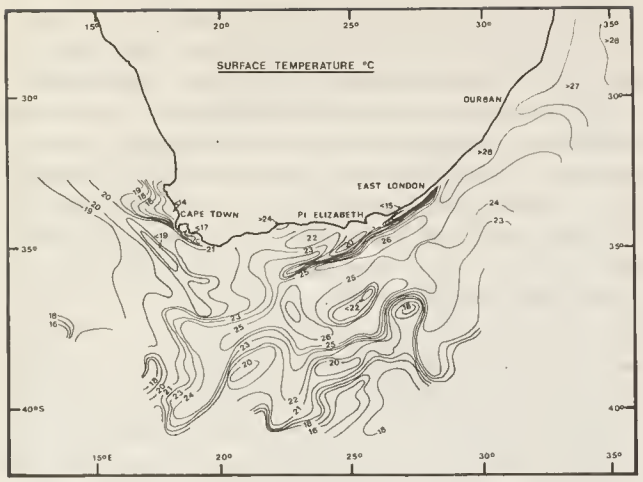


Fig. 5 Surface temperatures measured during a three ship cruise, March 1969 (after N.D. Bang, 1970).

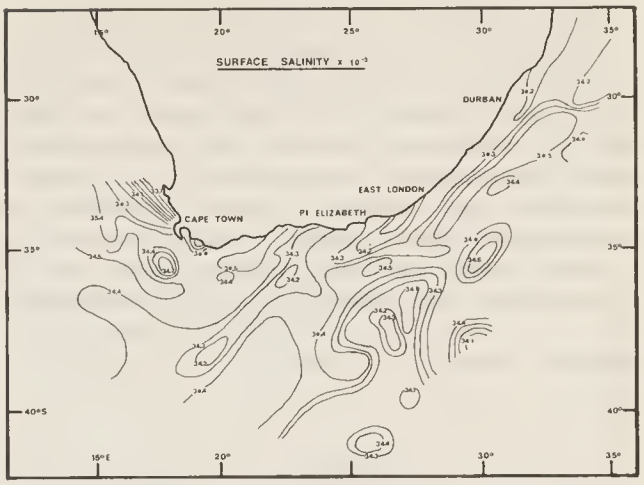


Fig. 6 Surface salinity measured during March 1969 (after T.F.W. Harris et al., 1977).

Surface salinity. Average salinities of the ocean are approximately 3.5 g dissolved salts in 100 g solution. This is generally expressed as 35 parts per thousand ($35‰$ or 35×10^{-3}) concentration. Salinity of the ocean surface water changes according to the amount of precipitation and evaporation. River inputs in southern Africa have a small local effect on salinity and are not significant in changing oceanic values. Generally, because of increased evaporation, salinities are higher in the tropics. The density of seawater, which is dependent on temperature and salinity, will indicate how adjacent water masses will interact. For example, the colder water south of the Subtropical Convergence region will be denser than the warmer water to the north and will flow northwards under the lighter water. It is in fact the upwelling of this colder water, mixed with surface water, that one finds off the west coast. A general picture of the surface salinities is given in Fig. 6.

SURFACE WAVES

Most of the waves that anglers and small boat enthusiasts know are generated by the wind acting on the sea surface. Although these waves have been studied by man for at least a hundred years, some of their features are still an enigma.

When a gust of wind blows over a pool of still water, ripples are evident at the surface almost immediately. Over a larger area, such as a dam or reservoir, the waves furthest downwind are the largest. In other words, the larger the area over which the wind blows, the bigger the wave height measured from crest to trough will be, for a given wind speed. The wavelength (the distance between successive wave crests) also depends on this area or "fetch", as it is called, and the strength of the wind. So the higher the wind velocity, the longer the fetch, and the longer the time that the wind blows, the larger the waves will be in both height and wavelength.

Another aspect of waves apparent to most people is that of a choppy, foamy sea with numerous "white horses" during a severe storm. This can be compared to the smooth gentle swell that may be present even in the absence of local wind. In the former case the waves are being actively generated, while in the latter the swell is "running" out of the storm area and is decaying in height. So it is possible for a large swell to arrive from a distant storm with no local wind – a phenomenon common off the Cape coast, where the generating storms are often hundreds of miles away. If the time between successive waves (the period of the waves), either as they lap onto the beach or as they pass a fixed point, is of the order of five to ten seconds, it is probable that the waves are being generated by a local storm, and if the period is greater than ten seconds, then the waves are more likely to have come from a distant storm. The period between waves also depends on the wind speed in the storm.

As the wave enters shallower water, its speed and wavelength decrease, and its height increases. The period between waves remains constant. The speed is now dependent on the water depth and the wave height (i.e. if the water depth is less than the wavelength divided by twenty). If there are irregularities on the sea bottom, such as ridges or depressions, these features will now either focus or defocus the wave energy at the shoreline. This phenomenon is known as wave refraction by the bottom topography, and is generally only significant in water depths of less than 20 m. The effect can cause parts of the coastline to be extremely dangerous to the shore angler if the wave energy is concentrated at a particular area. There are many such examples, a good one being the area near the Steenbras River Mouth (near Gordon's Bay in False Bay) where the waves can be focused by a large underwater feature called Rocky Bank at the mouth of False Bay. Other examples are the Tsitsikama cliffs and the "blaasbalk" at Robberg.

The wave refraction discussed here "organises" the waves as they propagate towards the coastline, so that they arrive with their crest more or less parallel to the coastline. There is sometimes a small angle between the wave crests and the coastline, as off the Natal coast, which leads to a residual alongshore drift current capable of carrying sediment, so that coastal engineers have to be careful that their sea structures in the shore zone do not interfere with the prevailing longshore currents. If there is an interference, it may mean that sediment will pile up on one side of the structure and be scoured away from the other side. These longshore currents can be dangerous to swimmers and anglers.

TIDES

The tides can be characterised as a very long wavelength wave which circulates around the oceans. Unlike the surface waves discussed in the previous section, which are generated by the wind and have a restoring force due to gravity, the tide wave is generated by the gravitational forces of the sun and moon and has restoring forces of gravity and the Coriolis force (due to the rotating earth). In the open ocean, the tide wave is seldom greater than one metre, but as this wave (or tide) propagates into shallower water the local resonance effects can amplify the height of the tide up to about 16 metres in some places. This resonance is lacking off the southern African coast except at Beira, where the maximum tidal range is 6.4 m. As one proceeds up the coast to Beira, higher ranges of the tide are apparent.

Off the South African coast the *maximum* tidal range is about two metres between successive high and low spring tides. Moreover, the times of a particular phase of the tide (for example a high tide) are almost simultaneous on the west coast between Walvis Bay and Cape Town. On the east coast, the tide propagates up the coast and arrives on average about 35 minutes later at Durban than at Cape Town.

Since the tide can be considered as a wave, as it advances and recedes the individual water particles oscillate backwards and forwards. These oscillations lead to tidal currents: onshore as the tide flows in and offshore as the tide ebbs out. Because of the generally small tidal heights around South Africa, the tidal currents are also weak, except in regions where there may be a narrowing constriction such as between the Knysna heads or through river mouths like those of the Kowie, Swartkops, etc.

In conclusion, from this brief survey, it can be appreciated that southern Africa occupies an extremely interesting and unique position as regards current and wave systems. In addition, it should be emphasised, especially to those who only visit the coast infrequently, that even though the sea can look benign and inviting, changes occur rapidly. Anyone venturing into the unforgiving marine environment should always obtain as much information about local conditions as is possible.

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Ichthyology in South Africa

A few early travellers to the Cape described and in some cases illustrated the fishes they encountered, and several species were taken to Europe to be described by the great zoologists of the 18th and 19th centuries. Linnaeus, Bloch, Schneider, Cuvier and Valenciennes all named fishes from South Africa. Andrew Smith, a physician who became the first director of the South African Museum in Cape Town, published his *Illustrations of the Zoology of South Africa* in serial fashion from 1838 to 1849. This important work contained descriptions and illustrations of 41 fishes as well as many other animals. Additional descriptions and illustrations of sharks by Smith were used by Müller and Henle (1841) in their monumental work on elasmobranchs.

In the latter half of the 19th century, Günther, Bleeker, Kaup, Steindachner and Castelnau were describing new South African fishes. At the turn of the century, Boulenger (Günther's successor at the British Museum) described several new species from South Africa. J. D. F. Gilchrist can be

regarded as the father of South African ichthyology. Professor of Zoology at Cape Town, he was the first to realise the unique position of the Cape, the fishing potential and the numerous species, especially deep-sea forms, that awaited discovery. He started the government's Department of Sea Fisheries, was the first director, and organised ships to collect the wealth of fishes at his doorstep. In addition to publishing many papers with numerous descriptions of new species, Gilchrist also did pioneering work on the eggs and larval development of fishes. Gilchrist also published six papers with W. W. Thompson from 1908 to 1917, and two with C. von Bonde (1923-1924). The next colossus on the scene was K. H. Barnard. To Barnard fell the task of correlating all the information that had been published about South African fishes, and the two volumes of his monumental work, *The Marine Fishes of South Africa,* appeared in 1925 and 1927. H. W. Fowler visited South Africa and persuaded H. W. Bell-Marley, a fisheries officer in Natal with a genius for collecting, to send specimens to him in Philadelphia. From 1925 to 1935, Fowler published seven papers on South African fishes. C. T. Regan and J. R. Norman of the British Museum, who were contemporaries of Gilchrist and Barnard, also did some work on our fishes. C. von Bonde, who succeeded Gilchrist as Director of the Department of Sea Fisheries, produced a few ichthyological papers. A knowledgeable angler, C. L. Biden, wrote *Sea Angling Fishes of the Cape* for the layman.

In 1931, J. L. B. Smith, a trained chemist with a fanatical interest in angling and the fishes he caught, timidly published his first ichthyological paper in the *Annals of the Albany Museum.* He soon discovered that the eastern Cape Province coast had hardly been collected, and his publications increased in numbers and stature until all the museums of the eastern Province were sending him, as their Honorary Curator of fishes, their problem fishes.

Thus he came to identify the first living coelacanth, caught by an Irvin & Johnson trawler captained by Captain Goosen and saved for science and for her East London Museum by its curator, Miss Courtenay-Latimer, in December 1938. This took the name of the East London Museum round the world and focused the attention of ichthyologists on this area. Throughout the war he collected spasmodically along the southern and eastern Cape coasts, and along the Transkei with particular attention to the Xora-Bashee area.

In 1945 he was asked to write *The Sea Fishes of Southern Africa,* and it appeared in June 1949. Its effect on the world of ichthyology was considerable and from then on Smith and his wife (he had married Margaret Mary Macdonald in 1938), who was his scientific assistant and artist, made a series of expeditions up the east African coast, to Mozambique, Tanganyika, Zanzibar, the Seychelles and neighbouring islands. These expeditions resulted in numerous scientific papers produced until his death in 1968.

In 1968 Rhodes University and the Council for Scientific and Industrial Research joined forces and established the J. L. B. Smith Institute of Ichthyology to honour the founder of the University's Department of Ichthyology and to continue his work. The first Director was Professor Margaret M. Smith, J. L. B. Smith's widow, who undertook a world tour in 1969 to gather information on the design of laboratories, libraries, collection rooms and specialised facilities. The Institute was opened in 1977 and is regarded today as one of the best equipped and most modern buildings of its kind in the world.

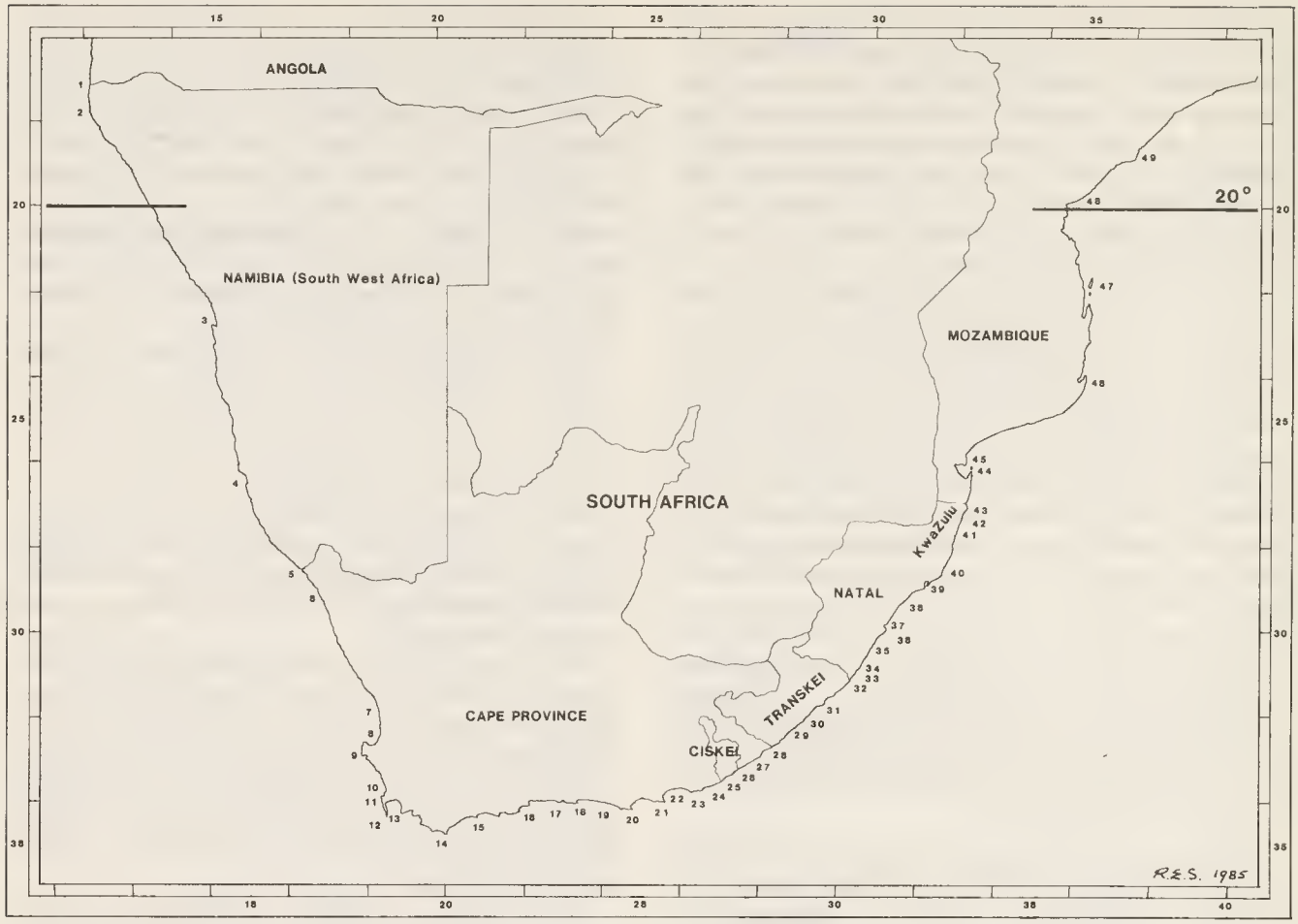
During Margaret Smith's tenure as Director, from 1968 to 1982, the Institute retained the original Department's emphasis on taxonomic research on fishes, but also became involved in national and international research programmes on the distribution, anatomy, ecology, management and culture of marine and freshwater fishes. The remarkable expansion of the Institute, as well as the quality of its fish collections, library and research publications, led in April 1980 to its proclamation by the South African Government as a National Museum.

The second Director of the Institute, Professor Mike Bruton, continued to build on the foundation laid by the Smiths. New research programmes were developed on Antarctic fishes, sharks, evolutionary biology, fish ecology, conservation and aquaculture. The institute staff expanded rapidly, while international collaboration was extended and active research programmes were established in several African countries.

The Institute has world-famous collections of marine fishes from the Atlantic, Indo-Pacific and Antarctic oceans, as well as freshwater fishes from Africa and adjacent islands. Besides the spirit-preserved material, the collection includes a large number of fish skeletons, fossils, photographs, drawings, paintings and radiographs. Ichthyologists from all parts of the world visit the Institute to study these collections.

Besides its essential functions of curation and research, the Institute has an active educational programme. Three serial publications are produced: the *Bulletin, Special Publications* and *Investigational Reports of the J. L. B. Smith Institute of Ichthyology.* A Society of Friends of the Institute, ICHTHOS, was formed in 1984 and now distributes information on fishes to over 650 members throughout the world.

The publication of this revision of *Sea Fishes* represents another milestone in southern African marine ichthyology. Seventy-five scientists from fifteen countries have combined over a period of seven years to produce a treatise that is the most authoritative book of its kind in the world. Approximately 75 000 specimens of 1 500 species were collected, studied and added to the collection of the Institute, while its staff travelled throughout the world to examine material held in other countries. During the revisionary work over 50 new species, eight new genera and two new families of fishes were described from southern Africa.



No.	Place name
1	Cunene River
2	Cape Fria
3	Walvis Bay
4	Luderitz
5	Alexander Bay
6	Port Nolloth
7	Lambert's Bay
8	St. Helena Bay
9	Saldanha Bay
10	Table Bay
10	Cape Town
11	Hout Bay
12	Cape Point
12	Cape of Good Hope
13	False Bay
14	Cape Agulhas
15	St. Sebastian Bay
16	Mossel Bay
17	Knysna
18	Plettenberg Bay
19	Storms River
20	Cape St. Francis
21	Cape Recife
22	Algoa Bay
22	Port Elizabeth
23	Cape Padrone
24	Kowie River
24	Port Alfred
25	Great Fish Point
25	Great Fish River

No.	Place name
26	Chalumna River
27	Buffalo River
27	East London
28	Kei River
29	Qora River
30	Coffee Bay
30	Mtata River
31	Port St. Johns
32	Port Edward
33	Margate
34	Port Shepstone
35	Park Rynie
36	Aliwal Shoal
37	Durban
38	Tugela River
39	Richards Bay
40	Cape St. Lucia
40	Lake St. Lucia
41	Sodwana Bay
42	Lake Sibaya
43	Kosi Bay
44	Inhaca Island
45	Delagoa Bay
45	Maputo
46	Inhambane
47	Bazaruto
48	Beira
49	Zambezi River
49	Chinde

Place name	No.
Alexander Bay	5
Algoa Bay	22
Aliwal Shoal	36
Bazaruto	47
Beira	48
Buffalo River	27
Cape Agulhas	14
Cape Fria	2
Cape of Good Hope	12
Cape Padrone	23
Cape Point	12
Cape Recife	21
Cape St. Francis	20
Cape St. Lucia	40
Cape Town	10
Chalumna River	26
Chinde	49
Coffee Bay	30
Cunene River	1
Delagoa Bay	45
Durban	37
East London	27
False Bay	13
Great Fish Point	25
Great Fish River	25
Hout Bay	11
Inhaca Island	44
Inhambane	46
Kei River	28
Knysna	17

Place name	No.
Kosi Bay	43
Kowie River	24
Lake Sibaya	42
Lake St. Lucia	40
Lambert's Bay	7
Luderitz	4
Maputo	45
Margate	33
Mossel Bay	16
Mtata River	30
Park Rynie	35
Plettenberg Bay	18
Port Alfred	24
Port Edward	32
Port Elizabeth	22
Port Nolloth	6
Port Shepstone	34
Port St. Johns	31
Qora River	29
Richards Bay	39
Saldanha Bay	9
Sodwana Bay	41
St. Helena Bay	8
St. Sebastian Bay	15
Storms River	19
Table Bay	10
Tugela River	38
Walvis Bay	3
Zambezi River	49

KEY TO SUPERCLASSES, CLASSES AND SUBCLASSES

1a Jaws and paired fins absent; front of head with 3 pairs of fleshy barbels surrounding the mouth; eyes rudimentary; body eel-like .... Superclass AGNATHA, p. 32

1b Jaws present; paired fins present (except in some eels); barbels absent in most families; eyes well developed in most families .... Superclass PISCES (GNATHOSTOMATA) 2

2a Five to seven outer gill openings on each side on head (no gill cover or bony operculum covering the gills) .... Class CHONDRICHTHYES (Subclass ELASMOBRANCHII), p. 41

2b A single gill opening on each side of head, the gills being covered with a gill cover or bony operculum 3

3a Skeleton of calcified cartilage only (no bone); fertilisation internal, the male with paired intromittent organs (claspers) on the pelvic fins; upper jaw fused to skull; teeth fused into 3 pairs of tooth plates .... Class CHONDRICHTHYES (Subclass HOLOCEPHALI), p. 144

3b Skeleton (of adults) mostly of bone; fertilisation internal or external, but no paired intromittent organs on pelvic fins; upper jaw not fused to skull; teeth separate in most families ..... Class OSTEICHTHYES, p. 149

Superclass AGNATHA

(Cyclostomata)

The agnathans are an ancient group of chordates that first appear in fossils of the Middle Ordovician period. They are characterised by the absence of true jaws derived from gill arches. They also lack paired fins (pectoral fins are developed in some), true teeth and vertebrae; the gills are carried on the inner edge of the gill arches, which are fused to the neurocranium. The internal skeleton is entirely cartilaginous, but many of the fossil agnathans had a well-developed armour of bony plates, especially about the head region.

Two classes are recognised: the Cephalaspidomorphi and the Pteraspidomorphi. The cephalaspid ancestors are supposed to have given rise to the freshwater lampreys, and the marine hagfishes are thought to be descendants of the early pteraspids (Jarvik, 1980). As we are here concerned only with the modern hagfishes, the fossil pteraspids are not considered further.

Class
PTERASPIDOMORPHI

Order MYXINIFORMES

Hagfishes **Slymslange**

The hagfish order comprises a single family that is represented in the temperate waters of all oceans.

Family No.1: MYXINIDAE

by Bo Fernholm

Hagfishes **Slymslange**

Usually classified with the lampreys (Order Petromyzoniformes, not represented in South Africa) and extinct palaeozoic fishes in the Superclass Agnatha (jawless fishes); therefore often studied by zoologists interested in the evolution of vertebrates. Body eel-shaped, with cartilaginous skeleton. No paired fins, but usually a low ventral finfold. Two pairs of barbels around the single nostril above the mouth, and one barbel on either side of mouth. Mouth with laterally biting, protrusible, orange-yellow, horny teeth. Eyes rudimentary under the skin. One to several pairs of gill openings, leading from the internal gill pouches, restricted to the ventral anterior region. Body usually dark brown, grey or purple, sometimes with lighter ventral coloration and light eye-patches.

(When irritated, hagfishes secrete an abundant amount of sticky slime from the two rows of slime pores along the lower part of the body, quickly turning the water around the fish into slime which acts as a defensive mechanism. Exclusively marine and locally common on muddy bottoms into which they burrow. Of no significant commercial interest. Harmless to man, but loathed by fishermen for biting on hooks or preying on caught fish. All tackle touched by these creatures has to be cut away otherwise no fish will come near the bait. – M.M. Smith.) Occasionally caught in bottom trawls, but most efficiently collected in baited traps. Two genera, with a total of 4 species in our region.

KEY TO GENERA

1a Five to eight pairs of gill openings ..... *Eptatretus*
1b One pair of gill openings ..... *Myxine*

Genus ***Eptatretus*** Cloquet, 1819

Fourteen species; 3 in our area.

KEY TO SPECIES

1a Five pairs of gill openings ..... *E. profundus*
1b Six or more pairs of gill openings 2
2a Six pairs of gill openings ..... *E. hexatrema*
2b Eight pairs of gill openings ..... *E. octatrema*

1.1 *Eptatretus hexatrema*

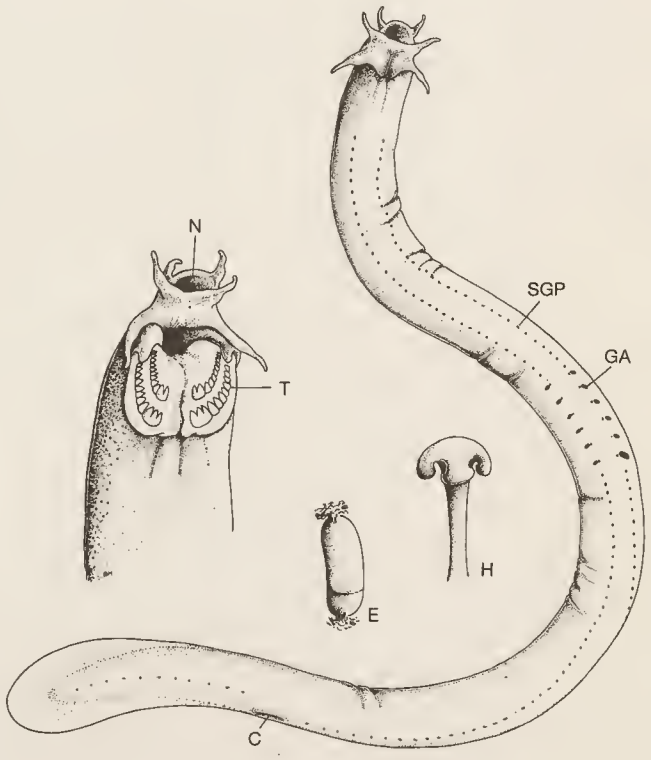
(Müller, 1834)

Sixgill hagfish Seskief-slymslang

Bdellostoma hexatrema Müller, 1834: 79 (Table Bay, Cape of Good Hope); Adam & Strahan, 1963: 6. *Heptatretus hexatrema:* Smith, **SFSA:** 25*; Barnard, 1950: 1. *Eptatretus hexatrema:* Smith, 1975: 9; Strahan, 1975: 144; Hardisty, 1979: 19. *Eptatretus cirrhatus (non* Schneider): Rass, 1971: 18.

Total cusp count of teeth 40-48 with the anterior 3 in outer row, and anterior 2 in inner row fused at bases. Prebranchial length about 30% of total length; 90-103 pairs of slime pores.

Attains 80 cm. A common hagfish known only from Walvis Bay to Durban, in 20 - 400 m.



1.1 *Eptatretus hexatrema:* ventral view of 40 cm specimen (Cape south coast). C = cloacal slit; E = egg capsule; GA = gill apertures; H = hook of egg capsule; N = the single nostril; SGP = slime gland pores; T = teeth in open mouth.

1.2 *Eptatretus octatrema*
Barnard, 1923

Eightgill hagfish — Agkief-slymslang

Heptatretus octatrema Barnard, 1923: 439 (Agulhas Bank).

Total cusp count of teeth 40, with anterior 3 in outer row, and anterior 2 in inner row fused at bases. Prebranchial length 24% total length. Anal fin starting 8-10 mm behind last gill opening; 102-103 pairs of slime pores. More slender than the Japanese eightgilled *E. okinoseana* Dean, 1904.

Only known from the 30 cm holotype caught in 45 - 75 m.

1.3 *Eptatretus profundus*
Barnard, 1923

Fivegill hagfish — Vyfkief-slymslang

Heptatretus profundus Barnard, 1923: 439 (off Cape Point).

Total cusp count of teeth 42, with anterior 3 in outer row, and anterior 2 in inner row fused at bases. Prebranchial length 25% total length. Anal finfold starting far behind (10 cm) last gill opening. 84 pairs of slime pores.

Only known from the 62 cm holotype caught in 730 m.

Genus ***Myxine*** Linnaeus, 1758

Seven species; 1 in our area.

1.4 *Myxine capensis*
Regan, 1913

Cape hagfish — Kaapse slymslang

Myxine capensis Regan, 1913: 398 (Cape of Good Hope); 1913: 229; Fernholm, 1981: 73. *Myxine glutinosa (non* Linnaeus): Adam & Strahan, 1963: 3; Hardisty, 1979: 19.

Total cusp count of teeth 36-43, with 2 anterior cusps in each row fused at bases. Seven pairs of gill pouches; 92-110 pairs of slime pores.

Attains 40 cm. Only known from off Cape of Good Hope and the west coast in 200 - 460 m.

Superclass PISCES

(Gnathostomata, in part)

Fishes **Visse**

Jaws derived from modified gill arches; gills present throughout life, covered with ectoderm and directed externally; gill arches not fused with neurocranium; median and paired fins usually present (secondarily lost in some groups); ears with 3 semicircular canals; vertebral centra usually present; eyes usually well developed (secondarily reduced or absent in a few groups).

The fishes represent one of the two divisions of the Gnathostomata; the other division comprises the tetrapods (amphibians, reptiles, birds and mammals). Two classes of fishes are recognised: the Chondrichthyes (sharks, rays and chimaeras) and the Osteichthyes (bony fishes).

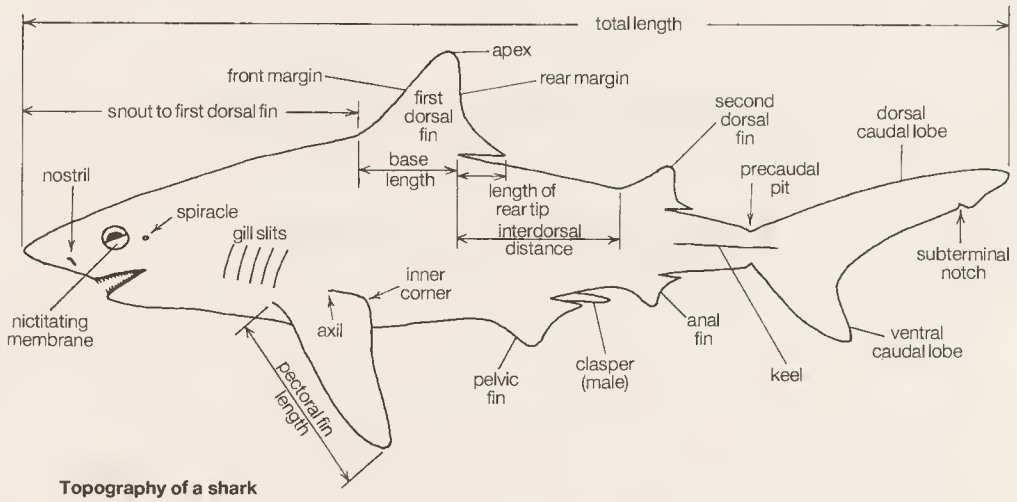
Class
CHONDRICHTHYES

Cartilaginous fishes

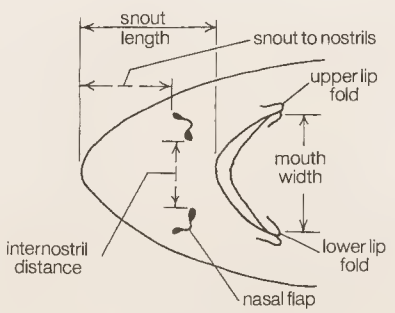
Kraakbeenvisse

The Chondrichthyes (comprising the sharks, rays and chimaeras) are characterised by a skeleton that is entirely cartilaginous, but more or less hardened by calcification. In this group fertilisation is internal and accomplished by means of the paired intromittent organs at the inner edge of the pelvic fins of males. These organs, misnamed "claspers", are actually used to transfer sperm into the oviducts of the female during copulation. Although a few elasmobranchs have adapted to life in fresh water, the chondrichthyans are primarily marine fishes. They have developed an unusual solution to the osmotic problems of life in the sea. By keeping a high concentration of urea in their blood and other tissues, the chondrichthyans are able to maintain the ionic balance of their tissues relative to seawater. After death, the urea is soon broken down to ammonia, which may give the shark flesh an unpleasant smell or taste. Soaking the flesh in a 50% solution of water and vinegar for an hour before cooking will remove all traces of urea and ammonia. Most chondrichthyans are good eating, but the flesh is usually somewhat dry (like the white meat of tuna fishes) and should be cooked accordingly. Any chondrichthyan destined for the table should be thoroughly bled immediately after death and kept on ice or frozen until it is to be cooked.

Two subclasses: Elasmobranchii (sharks and rays), with the upper jaw not fused to the skull, teeth usually separate, and 5-7 pairs of gill openings; and Holocephali (chimaeras), with the upper jaw fused to the skull, teeth represented by solid dental plates, and only one pair of external gill openings.



Topography of a shark



Ventral view of head

Subclass ELASMOBRANCHII

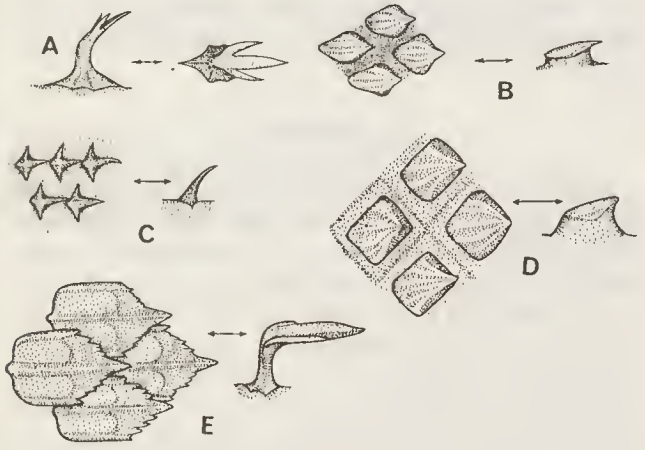
(Euselachii)

Sharks & Rays **Haaie & Roë**

Denticles

Most sharks are covered with minute placoid scales or denticles. Unlike the scales of typical bony fishes, the dermal denticles of elasmobranchs are essentially similar to teeth, with a hard outer layer of enamel over a core of dentine. Also like teeth, most denticles do not increase in size after they are completely formed; individual denticles and teeth are continually being replaced by newly formed and slightly larger ones during the life span of the shark. There is considerable variation in the shape and size of denticles.

The points of the denticles are usually directed toward the tail and account for the roughness of the shark's skin if stroked toward the head. The cured skin of some sharks has been used as sandpaper by cabinetmakers for smoothing hard woods.



Shark denticles: A. *Deania calcea*, B. *Centrophorus lusitanicus*, C. *Etmopterus lucifer*, D. *Centrophorus scalpratus*, E. *Centrophorus squamosus*

Teeth and feeding

The teeth of elasmobranchs are thought to be modified dermal denticles. Sharks have a lifetime supply of teeth, as new ones are continually being formed on the inner surface of the jaws. The teeth are firmly anchored to a layer of tough connective tissue, not fixed in sockets in the jaws (as in most bony fishes). When the outer teeth are lost, the next one in the row moves forward to take its place. In the few species in which tooth replacement rate has been measured, the outer teeth are replaced about once a fortnight; thus a species that lives for 20 to 30 years produces thousands of teeth during its lifetime.

Shark teeth are a useful taxonomic character, as their number and shape are more or less distinctive, and a species may sometimes be identified with certainty from a single tooth. There are three basic types of teeth in elasmobranchs: broad, triangular, blade-like teeth (e.g. great white and tiger sharks) which are well adapted for cutting pieces from large prey; slender awl-like teeth (e.g. ragged-tooth sharks) which are suited for catching and holding "bite-sized" fishes and squid; and blunt, pavement-like dentition characteristic of smooth-hound sharks and rays, which generally feed on hard-shelled molluscs and crustaceans.

A common misconception regarding the feeding of sharks is that they must roll on their sides or back to bite their prey. Although the mouth of most sharks is on the underside of the head, they are not obliged to roll over when they bite something. When feeding at the surface, a shark often pushes its snout right out of the water in order to bite the food item. Many sharks can protrude their jaws to a considerable degree, and this ability is important in biting large pieces from their prey.

Spiral valve

A spiral "valve" is present in the intestine of all elasmobranchs (as well as chimaeras and some primitive bony fishes). In most species the valve is just like a spiral staircase, in others it looks like a series of elongated cones one inside the other, and, in the requiem and hammerhead sharks, it resembles a scroll of rolled paper. By means of the spiral valve, a much greater area of absorptive intestinal surface is provided than would be the case in a straight tube.

Buoyancy

Unlike most bony fishes, elasmobranchs have no gasbladder. Buoyancy is provided in many sharks by a large liver with considerable quantities of oil that is less dense than seawater. The ragged-tooth shark uses its stomach as a gasbladder by swallowing air at the surface.

Spiracle

Many elasmobranchs have an opening of varying size situated behind the eye, known as a spiracle. Apparently the vestige of a gill slit of ancestral forms, the spiracle is absent or greatly reduced in pelagic species (Lamnidae, Carcharhinidae and Sphyrnidae), but well developed in benthic (bottom living) sharks and batoids. In batoids such as stingrays and skates, the spiracle is the major inlet for water pumped over the gills, for the mouth of these sedentary fishes is usually submerged in sand or mud, and a respiratory current of water coming in through the mouth would soon foul the gills.

Nictitating membrane

Some sharks have a movable inner eyelid called a nictitating membrane or nictitans. This structure is variously developed in different species. In sharks with a large spiracle, the nictitans is absent or represented by a rudimentary groove along the lower edge of the orbit; whilst those without a spiracle (or a very small one) have a well-developed nictitans that can be pulled up to cover the eye completely.

Sensory abilities

The sense of smell in elasmobranchs is well developed and very important in locating their food. The common names "smooth-hound" and "dogfish" for some sharks were probably coined as much in allusion to their ability to follow a scent trail through the water as to their habit of hunting in packs. In addition to the shark's keen sense of smell, hearing (including the related ability to detect low-frequency vibrations) and vision are also well developed. Most elasmobranchs have an extensive system of small pores on the underside of the snout. These pores are the openings into a network of small flask-shaped sense organs called the ampullae of Lorenzini. Recent experiments have shown that the ampullae are able to detect the minute electrical impulses from the contractions of respiratory muscles of buried prey animals (e.g. crabs and small fishes).

Reproduction

Although fertilisation is internal in all elasmobranchs, there are three fairly distinct modes of reproduction: (1) Oviparous, in which the eggs are contained in a tough horny case and the embryo develops almost completely in the egg-case after the eggs are laid; (2) Ovoviviparous, in which the egg-cases are retained in the oviducts and the embryos subsist only on their yolk supply until they are nearly or quite fully developed; and (3) Viviparous, in which the embryos develop in the oviducts and are provided with nutrients from the mother so that they are born at a relatively large size (compared to ovoviviparous species).

Identification

Identification of elasmobranchs is often not easy, as there are relatively few external features on which distinctions may be based, and these sometimes vary in puzzling fashion. Colour is of limited assistance, being often drab or else variable within one species. Most characters change significantly during growth. When the adult is large, it is not easily captured, and few museums can provide storage for these huge specimens. Thus an adequate series of specimens for many species is difficult to assemble.

The 700-800 species of elasmobranchs can be conveniently divided into two groups: the Squalomorphea (sharks), with the pectoral fins not attached to the head, and the Batoidea (sawfish, guitarfish, skates and rays), with the pectoral fins expanded and fused to the sides of the head over the gill slits, which are thus located on the underside of the fish.

Superorder SQUALOMORPHEA

Sharks **Haaie**

Cartilaginous fishes with 5-7 gill openings located above or in front of pectoral fins, upper edge of orbit free from eye, one or two dorsal fins (with or without spines), anal fin present or absent.

There are about 350 species of sharks, ranging in size from the 6 inch (15 cm) adult of the dwarf shark, *Squaliolus laticaudus*, to the forty foot (12 m) whale shark – the largest species of fish in the sea. As a group, sharks inhabit most regions of the sea, from the shore down to at least 4 000 m. The Zambezi shark, *Carcharhinus leucas*, is common in estuaries and often found well up rivers in many parts of the world.

Shark attack

Although all sharks feed on other animals, and are thereby considered predators, fewer than 10% of the species are dangerous to man. Much evidence has accumulated in recent years to indicate that certain factors predispose swimmers to shark attack. All of the following practices can increase the probability of being attacked: swimming alone or far from a group of other bathers, or in deep water far from shore; spearing fish or swimming in an area where fish were recently speared; swimming at dusk or at night; swimming in areas not protected by shark nets or where sharks are frequently sighted; and molesting or provoking a shark in any way.

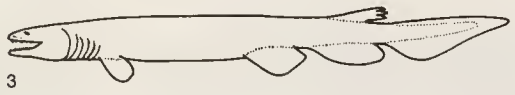
In addition to the factors just listed, divers should be aware of the threat display behavioural pattern that has been found to precede attack in some species of *Carcharhinus*: the shark swims with exaggerated lateral movements of the head and body; the snout is lifted, while the back is arched and the pectoral fins are depressed. This behaviour has been observed in sharks that were situated between a stationary or approaching diver and some object (e.g. boat or reef) restricting the shark's escape route. Also some sharks faced with a rapidly approaching diver in open water reacted in the same way; if the diver did not retreat, the display was usually followed by an attack on the diver.

For treatment of shark bite see "Dangers of the Sea" (page 17).

KEY TO FAMILIES OF SHARKS IN SOUTHERN AFRICA

1a One dorsal fin; 6 or 7 gill slits 2
1b Two dorsal fins; 5 or 6 gill slits 3

2a Lower ends of 1st gill slits meeting under throat; mouth terminal .... CHLAMYDOSELACHIDAE (No. 3)



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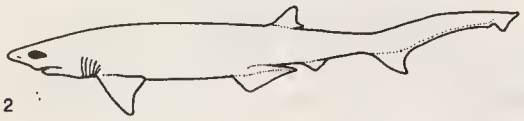
2b First gill slits not joined under throat; mouth ventral ..... HEXANCHIDAE (No. 2)



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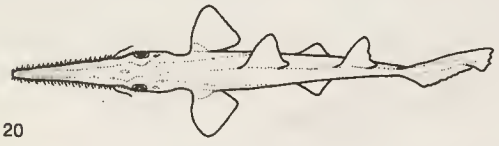
3a Snout produced into a long flat blade with distinct awl-like "teeth" along each side; 6 gill slits ..... PRISTIOPHORIDAE (No. 20)



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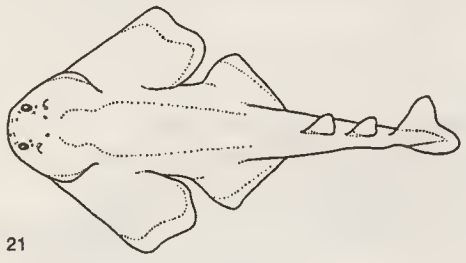
3b Snout not as above; 5 gill slits 4

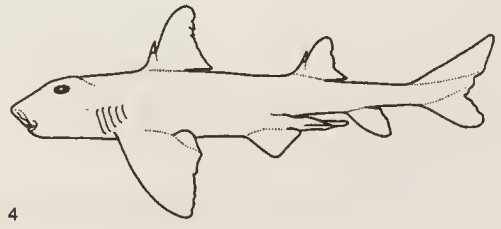
4a Head and body greatly depressed; P expanded anteriorly to form triangular lobes extending over gill slits; mouth terminal ..... SQUATINIDAE (No. 21)



21

4b Head and body not so depressed; P not expanded over gill slits 5

5a A strong spine at front of each D; anal fin present; median teeth in jaws with single sharp cusp, lateral teeth molariform ..... HETERODONTIDAE (No. 4)



4

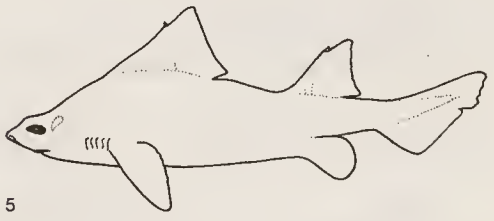
5b D spines and anal fin not *both* present; teeth not as described in 5a 6

6a Anal fin present (but not distinct from lower margin of C in *Chiloscyllium*); nictitans well developed, rudimentary or absent 8
6b Anal fin absent; nictitans absent 7

7a Denticles conspicuously enlarged (up to 15 mm wide at their base) and sparsely scattered over naked skin; dorsal fins situated over V ..... ECHINORHINIDAE (No. 6)

6

7b Denticles not conspicuously enlarged and densely covering skin; D not both situated over V ..... SQUALIDAE (No. 5)



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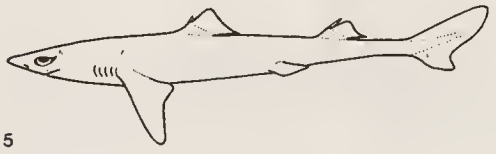

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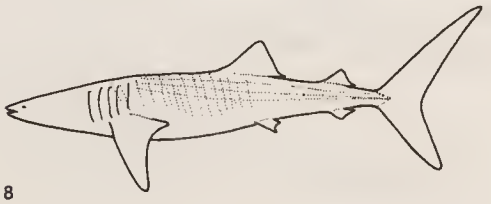
5

8a Snout flattened, produced into a long pointed blade-like rostrum; jaws very protrusile, with needle-like teeth .. MITSUKURINIDAE (No. 17)

17

8b Snout not produced into a long blade-like pointed rostrum 9

9a Mouth terminal (no definite snout); eye behind corner of mouth; teeth very small ..... RHINCODONTIDAE (No. 8)



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9b Mouth ventral (under snout) 10

10a Length of upper C lobe about half or more of total length ..... ALOPIIDAE (No. 16)

16

10b Upper C lobe much less than half of total length 11

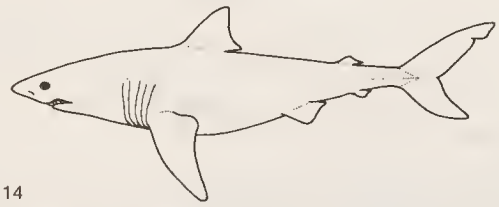
11a C lunate, its lower lobe more than half as long as upper lobe; distinct keel along each side of caudal peduncle 12

11b C not lunate, the lower lobe less than half length of upper lobe; keel on peduncle present or absent 13

12a Teeth minute, with 4 or 5 functional series in rows of 100 or more in each jaw; gill-rakers long and numerous; 1st gill slits nearly continuous under throat .. CETORHINIDAE (No. 15)

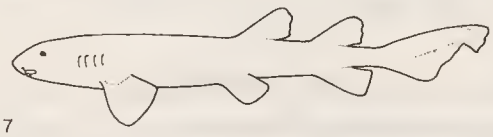
15

12b Teeth large, with 1 or 2 functional series in rows of 24-30 in each jaw; 1st gill slits widely separated ..... LAMNIDAE (No. 14)



14

13a A groove from each nostril to mouth; nasal barbel distinct; last 2 gill slits close together ..... ORECTOLOBIDAE (No. 7)

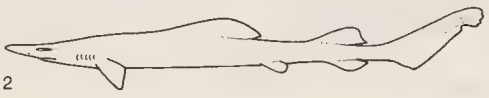


7

13b Nostril groove and barbel not *both* present; last 2 gill slits not closer together than the others 14

14a First D base distinctly shorter than C 15

14b First D base about as long as C and situated in front of V ..... PSEUDOTRIAKIDAE (No. 12)



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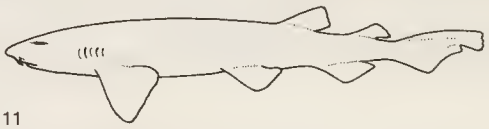
15a First D base in front of V 16

15b First D base over or behind V ..... SCYLIORHINIDAE (No. 11)



11

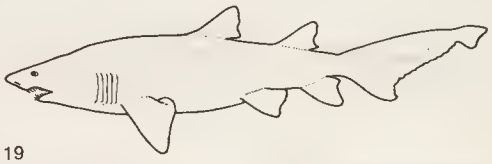
16a Last gill slits in front of P; teeth slender, awl-like, similar in both jaws 17

16b Last gill slits over P base 18

17a Orbit height greater than height of 2nd D; apex of dorsal fins over middle of their bases ..... PSEUDOCARCHARIIDAE (No. 18)

18

17b Orbit height less than height of 2nd D; apex of dorsal fins over rear end of their bases ..... ODONTASPIDIDAE (No. 19)



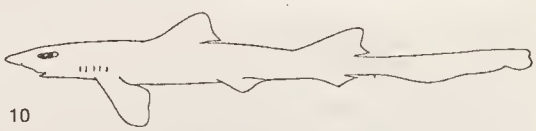
19

18a Head hammer-shaped (flattened in front and greatly expanded laterally) ..... SPHYRNIDAE (No. 13)

13

18b Head normal, not expanded laterally 19

19a C without distinct lower lobe; 2nd D base subequal to or greater than length of 1st D base; teeth with erect cusps, usually several functional rows ..... PROSCYLLIIDAE (No. 10)



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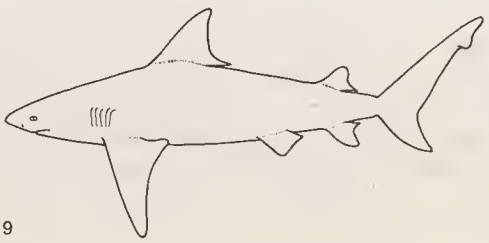
19b Lower caudal lobe distinct; 2nd D base shorter than 1st D base ..... CARCHARHINIDAE (No. 9)



9

Order HEXANCHIFORMES

Cow & Frill sharks — Koei- & Frilletjieshaaie

The only sharks combining a single dorsal fin and 6 or 7 pairs of gill slits. Adults reach 85-482 cm total length. Ovoviviparous. Two families of coastal and deep-water benthic sharks distributed in all 3 major oceans.

Family No. 2: HEXANCHIDAE

by A.J. Bass, P.C. Heemstra & L.J.V. Compagno

Cow sharks — Koeihaaie

One dorsal fin; anal fin present; no fin spines. Six or 7 pairs of gill slits which extend on to ventral surface of throat; first gill slits not joined ventrally. Lateral-line canals closed. No nictitans. Upper jaw teeth unlike lower. Claspers sheathed by expanded inner margins of pelvic fins. Three genera with 6 or 7 species, 4 in our area.

KEY TO GENERA

1a Six gill slits ..... *Hexanchus*
1b Seven gill slits 2

2a Orbit length greater than internostril distance; snout length 1.6-2.0 times internostril distance ..... *Heptranchias*
2b Orbit length much less than internostril distance; snout length 1.1-1.3 times internostril distance ..... *Notorynchus*

Genus ***Heptranchias*** Rafinesque, 1810

Apparently monotypic.

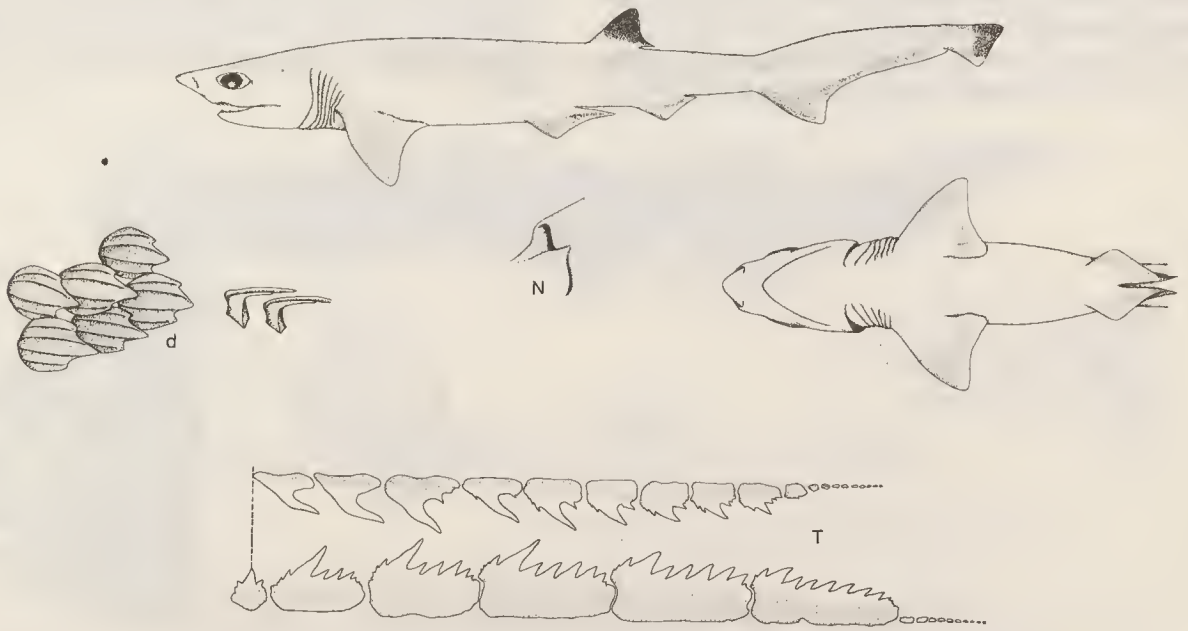
2.1 *Heptranchias perlo*
(Bonnaterre, 1788)

Sharpnose sevengill shark — Skerpneus-sewekiefhaai

Squalus perlo Bonnaterre, 1788: 668 (Mediterranean). *Heptranchias perlo:* Bigelow & Schroeder, 1949: 88*; Smith, **SFSA No. 3a**; Garrick & Paul, 1971*; Bass et al., 1975: 11*; Capape, 1980*; Compagno, 1981: 2*.

Snout long and pointed; A height 0.5-0.6 x D height; spiracles minute; precaudal vertebrae 78-90; tooth counts (of large teeth only) $\frac{9\text{-}11/9\text{-}11}{5\text{-}1\text{-}5}$.

Ovoviviparous; litters of 9-20 pups, 25 cm at birth; females mature at 92-100 cm, males at about 80 cm; attains 137 cm. Brownish grey, paler below, sometimes with indistinct dark blotches on body; young with D and C dark tipped, those of adults plain. Feeds on small fishes (including sharks) and squid. Circumglobal in warm seas at depths of 50 - 1 000 m; in our area, specimens have been caught off Natal, southern Mozambique and Namibia.



2.1 *Heptranchias perlo:* 68 cm immature male (S. Mozambique). N = left nostril, d = denticles; T = teeth, upper jaw teeth (above), lower jaw teeth (below).

2.2 *Hexanchus griseus:* 97 cm immature male (Namibia). N & T as in 2.1.

Genus ***Hexanchus*** Rafinesque, 1810

Two species, both in our area.

KEY TO SPECIES

1a Lower jaw with 5 rows of large teeth on each side; mouth length 1.2-1.7 in its width ..... *H. vitulus*

1b Lower jaw with 6 rows of large teeth on each side; mouth length 1.6-2.7 in its width ..... *H. griseus*

2.2 *Hexanchus griseus*
(Bonnaterre, 1788)

Sixgill shark — Seskiefhaai

Squalus griseus Bonnaterre, 1788: 9 (Mediterranean). *Hexanchus griseus:* Smith, **SFSA No. 1*;** Bass et al., 1975: 8*.

Snout length 4-7 %TL, 2.0-2.8 times in mouth width; D base 1.1-1.4 in distance from D base to upper C lobe. Precaudal vertebrae 57.

Head and body grey; fins with thin white trailing edges. Ovoviviparous; litters of 22-108 pups, 70 cm at birth; females mature at 4.0-4.5 m, males at 3.5-4.0 m; attains 5+ m, 730+ kg. A benthic species found in all oceans, usually in deep water (100 - 1 500 m). Our specimens from Namibia, Port Elizabeth, Durban and southern Mozambique.

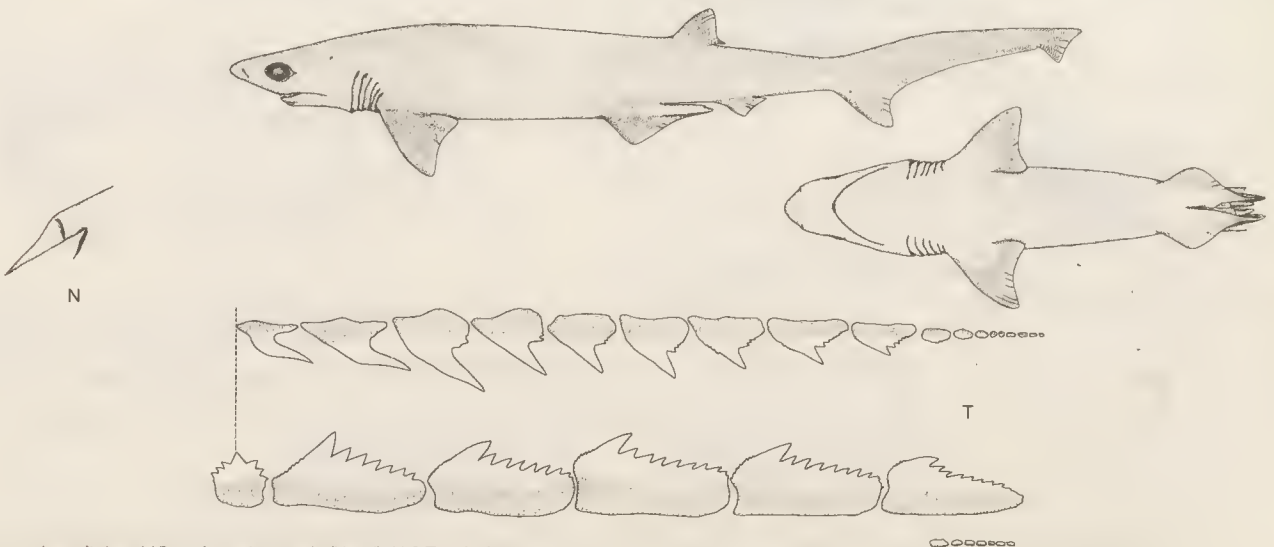
2.3 *Hexanchus vitulus*
Springer & Waller, 1969

Bigeye sixgill shark — Gróotoog-seskiefhaai

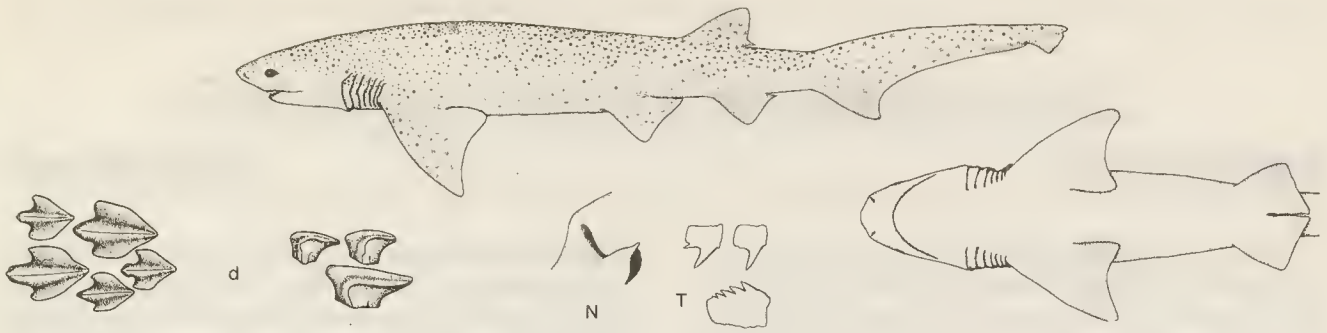
Hexanchus vitulus Springer & Waller, 1969: 160, Figs. 1-4 (Bimini, Bahamas); Bass et al., 1975: 9*; Compagno, 1981: 2*.

Snout length 6-8% TL, 1.5-2.1 in mouth width; D base 1.8-2.1 in distance from D base to upper C lobe.

Brownish grey; trailing edges of fins white. Ovoviviparous; about 13 pups per litter, 42 cm at birth; females mature at 142 cm, males at 123 cm; attains 180 cm. Previously confused with *H. griseus,* this species is known from the Atlantic, southwest Indian Ocean, Taiwan and the Philippines. A benthic species that normally inhabits deep water (90 - 600 m), with occasional excursions towards the surface.



2.3 *Hexanchus vitulus:* 115 cm immature male (Natal). N & T as in 2.1.



2.4 *Notorhynchus cepedianus:* 209 cm mature male (E. Cape). N, T and d as in 2.1.

Genus ***Notorynchus*** Ayres, 1855

Probably only 1 worldwide species.

2.4 *Notorynchus cepedianus*
(Peron, 1807)

Broadnose sevengill shark — Platneus-sewekiefhaai

Squalus cepedianus Peron, 1807: 337 (Tasmania). *Heptranchias pectorosus:* Smith, **SFSA No. 3*.** *Heptranchias cepedianus:* Smith, **SFSA No. 2*.** *Notorynchus cepedianus:* Bass et al., 1975: 14*.

Snout length less than distance between lower ends of first gill slits; orbit length 1.6-3.0 in least depth of caudal peduncle. Six rows of large teeth on each side of lower jaw. Precaudal vertebrae 71.

Body pale grey dorsally, white below; dorsal surface of body and fins speckled with black spots. Ovoviviparous. Mature at about 2 m; attains 3 m. Commonly enters shallow water and often caught by anglers from shore. All oceans (except North Atlantic and Mediterranean Sea); apparently an anti-tropical species, the report of its presence in Indian waters is dubious. Our records range from Algoa Bay to Namibia.

Family No. 3: CHLAMYDOSELACHIDAE

by A.J. Bass

Frill sharks — **Frilletjieshaaie**

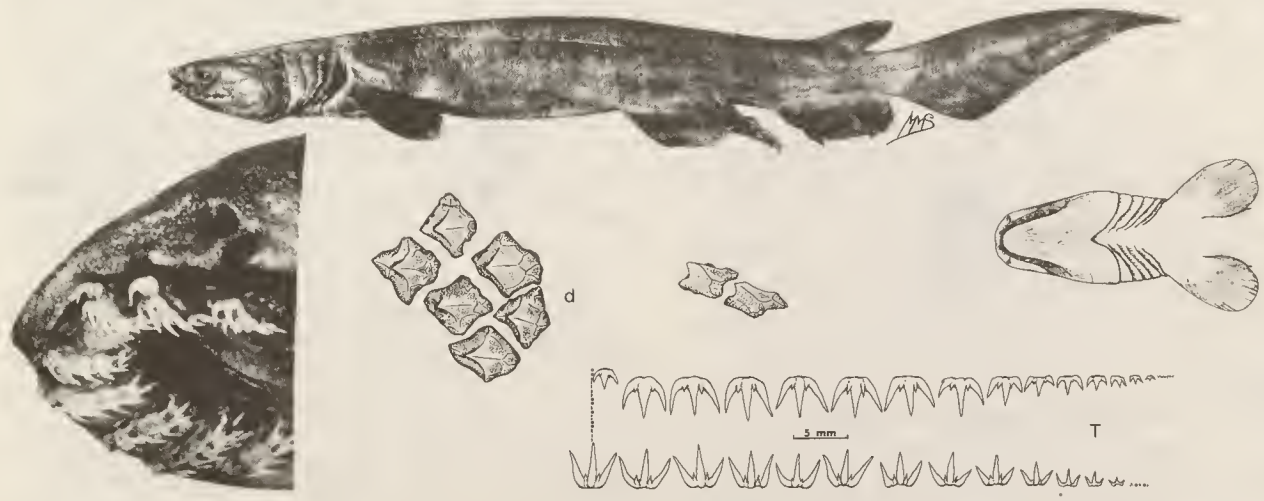
Body elongate, soft. One dorsal fin, positioned over the anal fin. Six gill slits, the first pair meeting ventrally. Mouth terminal, large. Teeth with 3 subequal lanceolate cusps, similar in upper and lower jaws. No nictitans. A single widespread species.

3.1 *Chlamydoselachus anguineus*
Garman, 1884

Frill shark — Frilletjieshaai

Chlamydoselachus anguineus Garman, 1884: 47, Fig. (Japan); Smith, 1953: 511, **No. 3b*;** Bass et al., 1975: 16*.

Greyish brown above, slightly paler below. Ovoviviparous; 4-12 pups per litter, born at 40 cm; males mature at 100 cm, females at 135 cm; attains 2.0 m. Normally inhabits deep water (100 - 600 m). Recorded from Namibia and Angola; elsewhere known from New Zealand, Japan, California, Chile and the North Atlantic.



3.1 *Chlamydoselachus anguineus:* 100 cm male (Walvis Bay); upper jaw showing teeth and 2 nostrils; ventral view of head of 102 cm immature female; T & d as in 2.1.

Order HETERODONTIFORMES

Bullhead sharks — Bulkophaaie

The only sharks combining 2 dorsal fins with strong fin spines and an anal fin. Five pairs of gill slits on sides of head; mouth small and well in front of eyes; snout pig-like; teeth in rear of mouth expanded to molar-like crushers, for hard invertebrate prey. Oviparous, eggs deposited in conical cases with spiral flanges. Adults 70-165 cm. A single family of inshore to deepish water benthic sharks found in warm waters of the Pacific and western Indian oceans.

Family No. 4: HETERODONTIDAE

by A.J.Bass

Bullhead sharks — **Bulkophaaie**

Distinguished by unique combination of dorsal fin spines and an anal fin. The teeth are also distinctive: those at the middle of the jaws have a single pointed cusp while the lateral teeth are bluntly rounded molars. Oviparous with distinctive, spirally flanged egg-cases. A single genus, *Heterodontus* Blainville, 1816, with 8 species, only 1 in our area. A second species, *H. bonae-spei* Ogilby, 1908, was originally described as coming from Table Bay (Smith, **SFSA No. 4**) but this locality was erroneous and the species is now considered to be invalid.

4.1 *Heterodontus ramalheira*

(Smith, 1949)

PLATE 4

Mozambique bullhead shark — Mosambiekse bulkophaai

Gyropleurodus ramalheira Smith, 1949: 367, Fig. 1 (off Inhambane, Mozambique); Smith, **SFSA No. 4a***. *Heterodontus ramalheira:* Bass et al., 1975: 18*.

Dark red-brown with scattered white spots. Males mature at 60 cm, females at 75 cm; attains 83 cm. Known from the type, obtained by a depth charge in deepish water, 5 specimens trawled in 110 - 275 m off southern Mozambique and 2 recorded from northwest Indian Ocean.

4.1 *Heterodontus ramalheira:* 64 cm male (S. Mozambique). N = nostril.

Order SQUALIFORMES

Dogfish sharks — Hondhaaie

Sharks of normal cylindrical or somewhat compressed form, without an anal fin, and with 2 dorsal fins and 5 pairs of gill slits. The dorsal fins may have small to large spines on their front margins. Adults 15 cm to over 6.4 m total length. Ovoviviparous. Coastal, oceanic and deepwater benthic sharks found in all oceans; 2 families, both in our area.

Family No. 5: SQUALIDAE

by A.J. Bass, L.J.V. Compagno & P.C. Heemstra

Dogfishes — **Hondhaaie**

Two dorsal fins (with or without spines). Anal fin absent. Trunk roughly circular in cross section, without any pronounced ventrolateral ridges. Five gill slits. Spiracle large. Nictitans absent. Ovoviviparous. About 15 valid genera with many species, 12 genera and 25 species in our area.

KEY TO GENERA

1a Trunk triangular in cross-section, belly flat with a distinct ridge on each side between P and V ..... *Oxynotus*
1b Body more or less rounded in cross-section, no distinct ridge along sides of belly 2

2a Spines present at front of both D (in *Centroscymnus* the tip of the 2nd D spine may be covered by skin, but the presence of the spine is easily ascertained by touch) 3
2b No spine at front of 2nd D 8

3a Teeth in upper jaw with one cusp 4
3b Teeth in upper jaw with 3 or more cusps 7

4a Lower teeth similar to uppers and about the same size; upper C lobe without a subterminal notch; no lateral grooves on D spines ..... *Squalus*
4b Lower teeth distinctly broader than upper; upper C lobe with a subterminal notch; D spines with lateral grooves 5

5a Distance from tip of snout to mouth longer than that from mouth to level of P origins ..... *Deania*
5b Distance from snout to mouth not longer than that from mouth to P origins 6

6a Upper jaw teeth set close together, at least some of the bases overlapping to form an interlocking band ..... *Centrophorus*
6b Upper teeth narrow, their bases not overlapping .. *Centroscymnus*

7a Teeth in lower jaw asymmetric, with one oblique cusp; upper teeth with 3-5 cusps ..... *Etmopterus*
7b Teeth similar in both jaws, with 3-5 cusps, erect and symmetric, or nearly so, all along the jaw ..... *Centroscyllium*

8a Tip of 1st D over V ..... *Isistius*
8b Tip of 1st D well in front of V 9

9a Base of 2nd D more than 3 times length of 1st D base; vertical diameter of orbit greater than depth of peduncle ..... *Euprotomicrus*
9b Base of 2nd D less than 3 times 1st D base; vertical orbit diameter less than peduncle depth 10

10a Gill slits increasing in length posteriorly, last one longer than distance from spiracle to 1st gill slit ..... *Euprotomicroides*
10b Gill slits subequal in length, last one much shorter than distance from spiracle to 1st gill slit 11

11a Lower C lobe indistinct; lower teeth with strongly serrated, erect, large triangular cusps; lips thick and pleated ..... *Scymnorhinus*
11b Lower C lobe quite distinct; lower teeth with smooth or weakly serrated, oblique, small cusps 12

12a Snout as long as mouth to P or longer; rear of 1st D base closer to V bases than P bases ..... *Heteroscymnoides*
12b Snout shorter than mouth to P; rear of 1st D base closer to V bases than P bases ..... *Somniosus*

Genus ***Centrophorus*** Müller & Henle, 1837

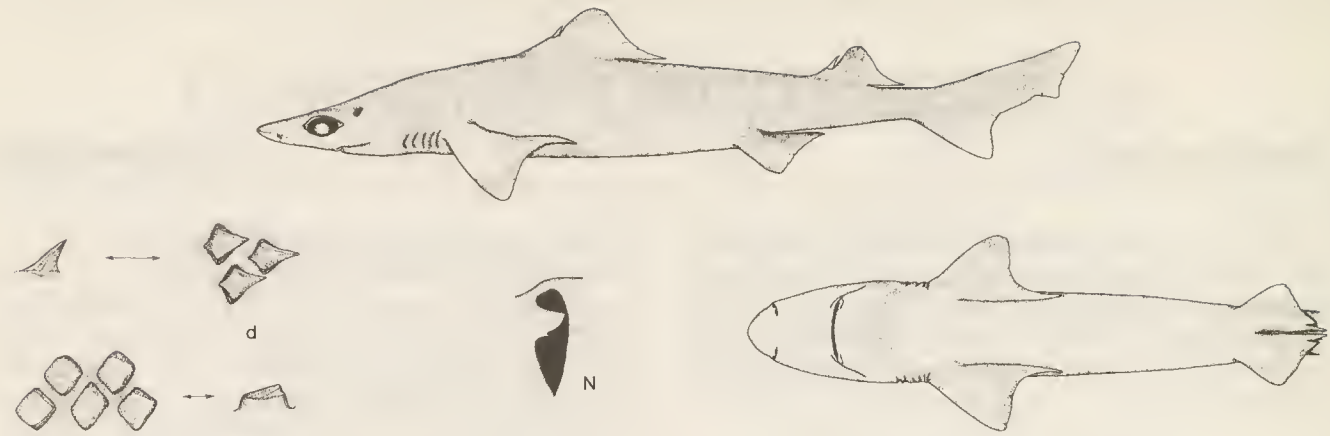
Our definition of this genus includes *Atractophorus* Gilchrist, *Encheiridiodon* J.L.B. Smith, and *Lepidorhinus* Bonaparte. About 6 valid species, 4 in our area. This genus is in need of revision. The form of the denticles apparently changes considerably with age. Second D spine often barbed in young, but the tip usually worn down in adults. Teeth in upper jaw of adult males with cusps more erect than in juveniles and females.

KEY TO SPECIES

1a First D higher than 2nd D; 1st D base contained about twice in distance between D bases 2
1b First D lower than 2nd; 1st D base contained less than 1½ times in distance between D bases 3

2a Height of 2nd D not more than ½ that of 1st D; inner edge of P markedly longer than distance from base of exposed part of 2nd D spine to origin of upper C lobe ..... *C. scalpratus*
2b Height of 2nd D more than ½ that of 1st D; inner edge of P subequal to distance from 2nd D spine to upper C lobe ..... *C. granulosus*

3a P subtriangular, inner edge longer than anterior edge, inner corner acutely pointed and reaching past vertical from tip of 1st D spine ..... *C. lusitanicus*
3b P not triangular, inner edge shorter than anterior edge; inner P corner rounded or angular, but not reaching vertical from tip of 1st D spine ..... *C. squamosus*



5.1 *Centrophorus granulosus:* 85 cm male (S. Mozambique). N as in 2.1; d = denticles, above of immature female, below of mature male.

5.1 *Centrophorus granulosus*
(Bloch & Schneider, 1801)

Squalus granulosus Bloch & Schneider, 1801: 135 (type-locality not given). *Centrophorus granulosus:* Karrer, 1975: 64. *Centrophorus uyato:* Bass et al., 1976: 31*. NOTE: We regard *Squalus uyato* Rafinesque, 1810 a *nomen dubium,* as it is uncertain even to which genus Rafinesque's description applies and his figure is equally imprecise. Our use of *C. granulosus* for this species is based on Müller & Henle (1841) who examined the type-specimen from Bloch's collection.

Length of 1st D base 9-13% TL; 2nd D base 7-10%; height 4-6% TL. Teeth $\frac{16\text{-}19/1/16\text{-}19}{14\text{-}17/1/14\text{-}17}$.

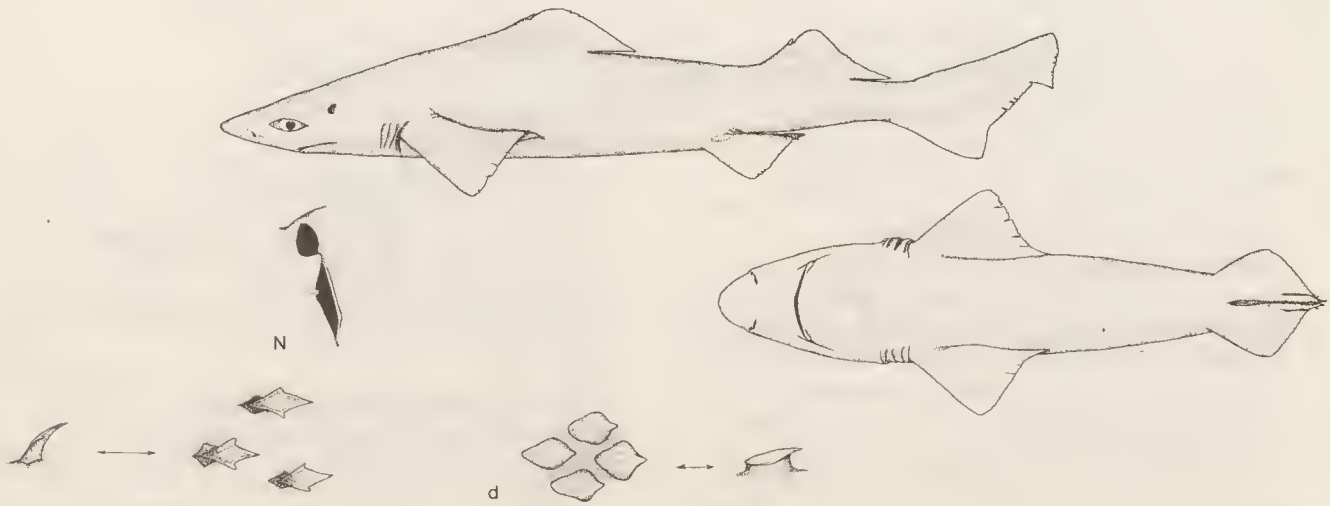
Colour grey or dark brown above, fins dark, trailing edges pale. Attains 1.5 m. Mediterranean and both sides of Atlantic Ocean. Our records from Walvis Bay and off southern Mozambique are from depths of 274 - 457 m.

5.2 *Centrophorus lusitanicus*
Bocage & Capello, 1864

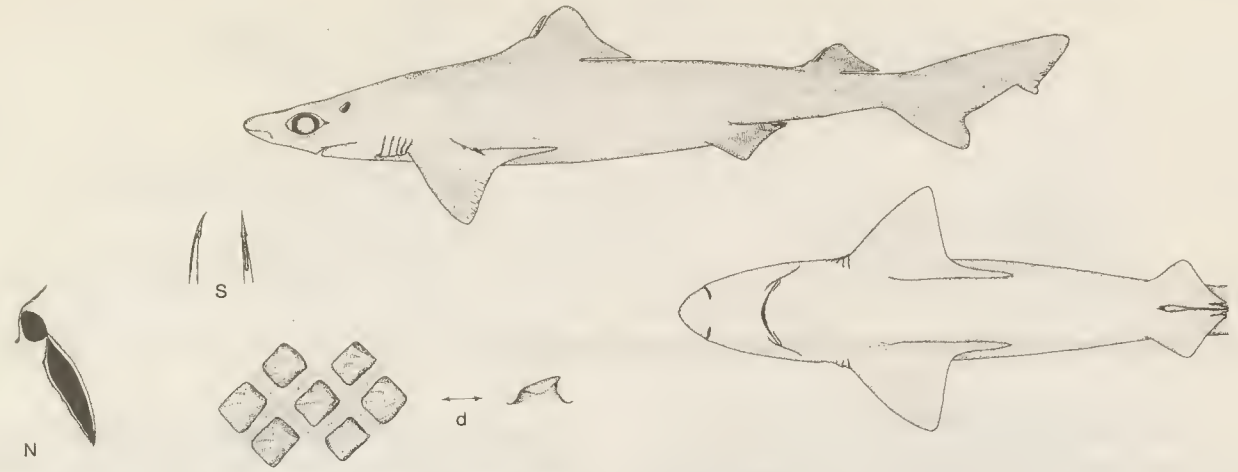
Centrophorus lusitanicus Bocage & Capello, 1864: 260 (Portugal); Bass et al., 1976: 32*.

Snout length 8.1-9.3% TL; orbit length 3.4-4.8% TL; 1st D base 18-21% TL; 1st D height contained 3 times in its base; 2nd D base 10-12%, height 5-7% TL; teeth $\frac{15/1/15}{14/1/14}$.

Colour dark grey or brown, slightly paler below. Juveniles with dark fins with wide white trailing margins. Pups about 36 cm at birth, with 4-6 per litter. Attains 1.6 m. Reported from northeast Atlantic, Natal, Mozambique and China in depths of 400 - 1 000 m.



5.2 *Centrophorus lusitanicus:* 112 cm male (S. Mozambique). N as in 2.1; d = denticles, left of 30 cm embryo, right of 112 cm mature male.



5.3 *Centrophorus scalpratus:* 78 cm mature male (S. Mozambique). N & d as in 2.1; S = spine at origin of 2nd D of full-term embryo.

5.3 *Centrophorus scalpratus*
McCulloch, 1915

Centrophorus scalpratus McCulloch, 1915: 97, Pl. 13, Figs. 2-7 (Victoria coast of Australia); Bass et al., 1976: 29*. *Atractophorus armatus* Gilchrist, 1922: 48, Pl. 7, Fig. 3 (Natal); Smith, **SFSA No. 47*.**

Snout length 9.4-12.0% TL; orbit length 4.8-6.9% TL; 1st D base 10-12% TL; 2nd D base 5-6%, height 3-4% TL. Teeth $\frac{18\text{-}20\,/\,18\text{-}20}{15\text{-}17/1/15\text{-}17}$.

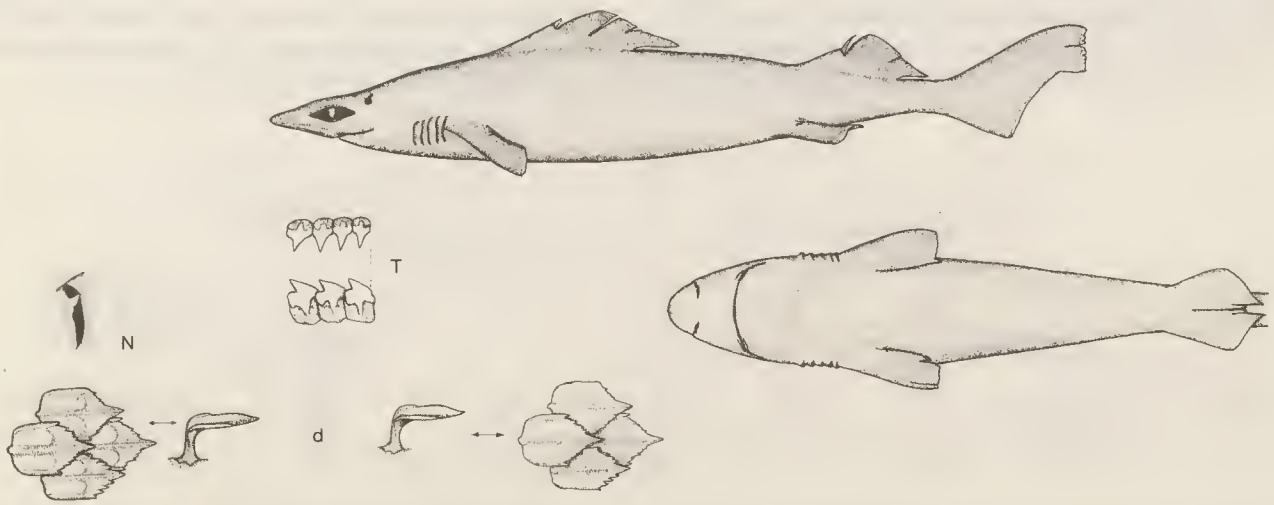
Colour greyish brown dorsally, paler below; fins of juveniles dark, with pale edges. Pups 31-37 cm at birth, 2 per litter. Males mature at 70 cm, females at about 80 cm; attains 98 cm. Known from Australia, Taiwan and Japan. Common from Natal to southern Mozambique in 250 - 400 m.

5.4 *Centrophorus squamosus*
(Bonnaterre, 1788)

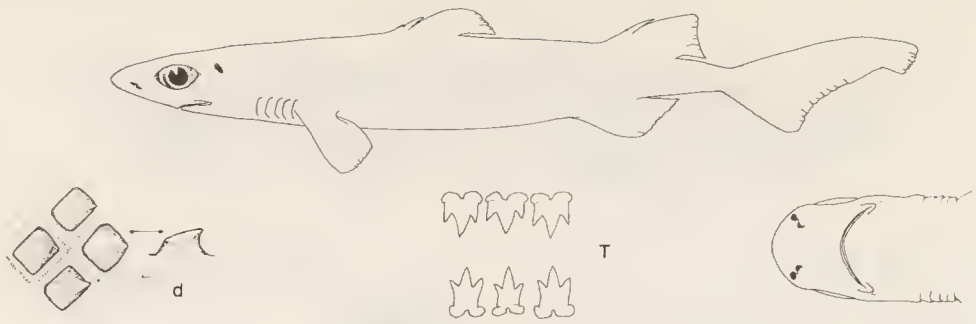
Squalus squamosus Bonnaterre, 1788: 12 (type-locality unknown, probably eastern North Atlantic). *Centroscymnus fuscus* Gilchrist & von Bonde, 1924: 2 (west coast of South Africa); Smith, **SFSA No. 48;** *Encheiridiodon hendersoni* Smith, 1967: 129, Pls. 24-27 (Port Elizabeth). *Lepidorhinus squamosus:* Karrer, 1975: 65. *Centrophorus squamosus:* Bass et al., 1976: 28*.

Length of 1st D base 14-18% TL; 2nd D base 12-13% TL.
Teeth $\frac{16\text{-}17/1/16\text{-}17}{13\text{-}14/1/13\text{-}14}$.

Colour dark grey or brown. Males mature at about 1.0 m; attains 1.6 m. Northeastern Atlantic, New Zealand, Australia, Philippines, Japan and Aldabra. In our area: Walvis Bay and western Cape Province in 370 - 648 m and an inexplicably shallow record of 3 m for the holotype of *E. hendersoni* collected in Algoa Bay.



5.4 *Centrophorus squamosus:* 93 cm male (E. Cape). N, T & d as in 2.1.



5.5 *Centroscyllium fabricii:* 64 cm (N. Atlantic; after Bigelow & Schroeder, 1948). T & d as in 2.1.

Genus ***Centroscyllium*** Müller & Henle, 1841

Dorsal fin spines well developed with 2 shallow longitudinal grooves on each side; inner corner of P rounded. Newborn pups naked, the denticles developing first along the back, spreading later to sides and then to lower surface. Deep-water (275 - 1 100 m) sharks represented in all oceans. Five species; only 1 in our area.

5.5 *Centroscyllium fabricii*
(Reinhardt, 1825)

Spinax fabricii Reinhardt, 1825: 3 (West Greenland). *Centroscyllium fabricii:* Bass et al., 1976: 21*.

Distance from base of 2nd D to origin of C subequal to that from eye to 1st gill slit.

Adults uniformly blackish; fins of juveniles with white margins. Born at about 16 cm; males mature at about 60 cm; attains 83 cm. Reported from North Atlantic to depths of 1 100 m and off Walvis Bay in 605 - 625 m.

Genus ***Centroscymnus*** Bocage & Capello, 1864

Dorsal fin spines small, mostly or entirely covered by skin. Teeth unicuspid; uppers along middle of jaw slender, with erect cusps. Inner corner of P rounded. Our definition of this genus includes those species previously assigned to *Scymnodon*. The trivial tooth differences supposed to separate these 2 genera are invalidated by the sexual dimorphism in tooth shapes (Garrick, 1959; Pinchuk & Permitin, 1970). The difference in denticle sculpturing used by Garrick (1959) to separate the 2 groups is also obscured by intra- and inter-specific variation. About 11 species; 2 in our area.

KEY TO SPECIES

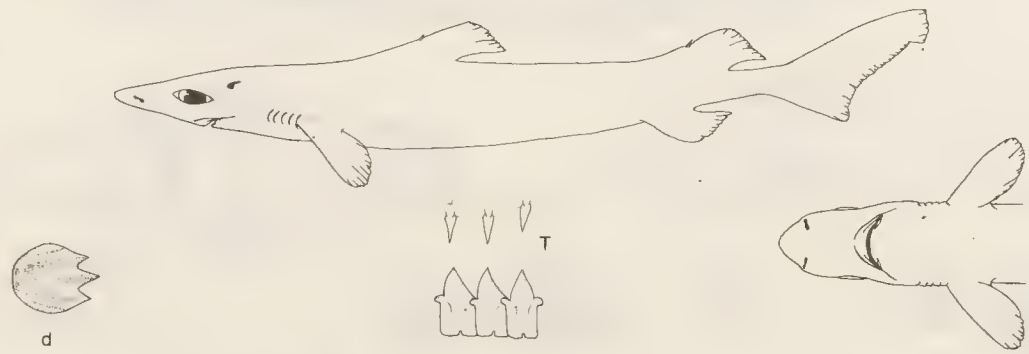
1a Pre-oral grooves long, almost meeting in front of mouth; denticles without cross-striations ..... *C. crepidater*
1b Pre-oral grooves short, separated by a distance equal to twice that between nostrils; denticles with distinct cross-striations joining the 3 longitudinal ridges ..... *C. obscurus*

5.6 *Centroscymnus crepidater*
(Bocage & Capello, 1864)

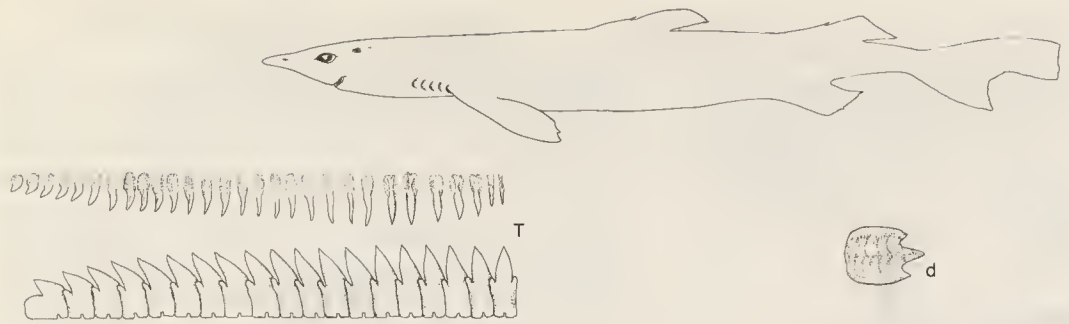
Centrophorus crepidater Bocage & Capello, 1864: 262 (off Portugal). *Centroscymnus crepidater:* Bass et al., 1976: 33*. *Centroscymnus owstoni (non* Garman, 1906; specimens in British Museum examined for us by A. Wheeler): Forster et al., 1970: 394.

Distance between inner ends of pre-oral grooves about ⅓ inter-nostril distance; snout length greater than head width at orbits; distance from snout tip to level of P origins 21-26% TL.

Dark grey in colour. Attains 130 cm. Eastern North Atlantic, New Zealand and tropical western Indian Ocean; reported from off Walvis Bay in 605 - 625 m.



5.6 *Centroscymnus crepidater:* 90 cm female (New Zealand; after Garrick, 1959). T & d as in 2.1.



5.7 *Centroscymnus obscurus:* 59 cm female (NW Africa; after Vaillant, 1888). T & d (from 62 cm specimen from Natal) as in 2.1.

5.7 *Centroscymnus obscurus*
Vaillant, 1888

Centroscymnus obscurus Vaillant, 1888: 67, Pl. 2, Fig. 2 (off north-west Africa). *Scymnodon ?obscurus:* Bass et al., 1976: 35*.

Snout length subequal to mouth width; P distinctly longer than V.

Colour blackish. Attains 88 cm? Northwest Africa, Madeira, Iceland-Faroe Rise and southern Brazil. South African record based on 4 semi-digested sharks from the stomach of a sperm whale killed off Durban.

Genus ***Deania*** Jordan & Snyder, 1902

Head depressed; body and caudal peduncle compressed. Teeth unicuspid, dissimilar in upper and lower jaws; cusps of lower teeth in adult males erect, those of females and juveniles more oblique. Denticles erect, shaped like a three-pronged pitchfork, sometimes with smaller accessory cusps on the prongs. Snout long and flattened, its length in front of mouth more than 50% of head length (to level of P origins). Probably only 3 wide-ranging species; all 3 are found in our area. The shape of the snout, teeth and denticles varies considerably within each species.

KEY TO SPECIES

1a Low flap of skin along ventral midline behind V; length of 1st D base usually somewhat less than distance between D bases ..... *D. profundorum*

1b No midventral flap behind V; 1st D base either longer or much shorter than distance between D bases 2

2a Distance from origin of exposed part of 1st D spine to tip of fin reaches from tip of fin past origin of 2nd D spine; distance between D bases less than that from snout tip to mouth ..... *D. calceus*

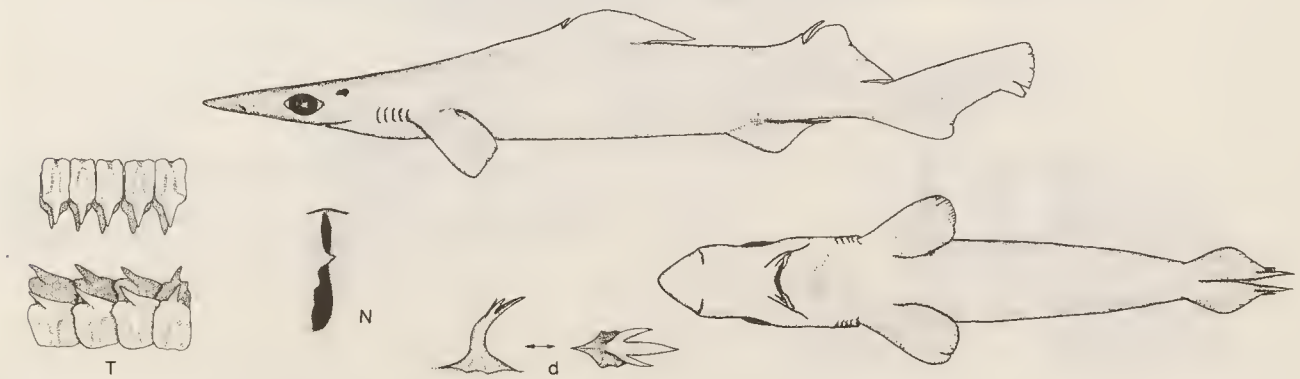
2b Distance from origin of 1st D spine to tip of fin reaches from tip of fin to a point well in front of 2nd D spine; distance between D bases more than snout length ..... *D. quadrispinosus*

5.8 *Deania calceus*
(Lowe, 1839)

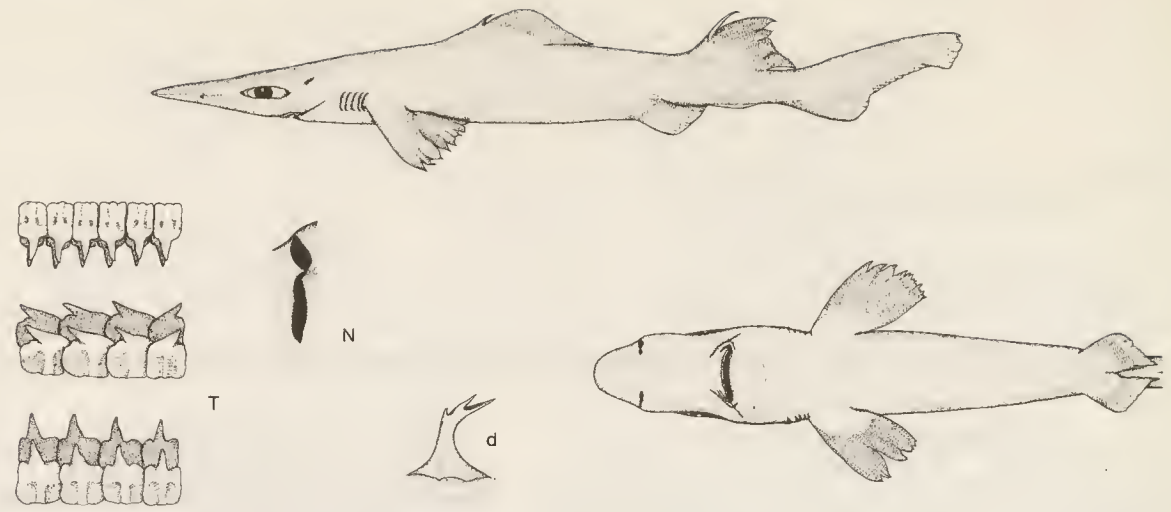
Acanthidium calceus Lowe, 1839: 92 (off Madeira). *Deania calcea:* Bass et al., 1976: 36*.

First D height 2.5-4.0 in distance from spine to rear end of base; interdorsal distance 9-14% TL; adpressed P falls short of vertical through 1st D spine by a distance equal to interorbital space.

Grey-brownish. Males mature at 75-80 cm; attains 111 cm. Eastern North Atlantic, New Zealand and Japan; reported from west of Cape Point and off Algoa Bay in depths of 400 - 500 m.



5.8 *Deania calceus:* 84 cm male (off Algoa Bay). N, T & d as in 2.1.



5.9 *Deania profundorum:* 33 cm male (Natal). N, T & d as in 2.1; bottom row of teeth from 58 cm male from Namibia.

5.9 *Deania profundorum*
(Smith & Radcliffe, 1912)

Nasisqualus profundorum Smith & Radcliffe, 1912: 681: Fig. 3, Pl. 53 (Mindanao Sea, Philippines in 736 fms.). *Acanthidium natalense* Gilchrist, 1922: 49, Pl. 7, Fig. 2 (off Illovo River, Natal in 160 fms.). *Deania eglantina (non* Jordan & Snyder): Smith, **SFSA No. 49** (in part, not figure). *Deania quadrispinosa (non* McCulloch): Karrer, 1973: 197. *Deania profundorum:* Bass et al., 1976: 38*.

Distance between D bases 14-20% TL; adpressed P reaches to within orbit length of vertical through 1st D spine.

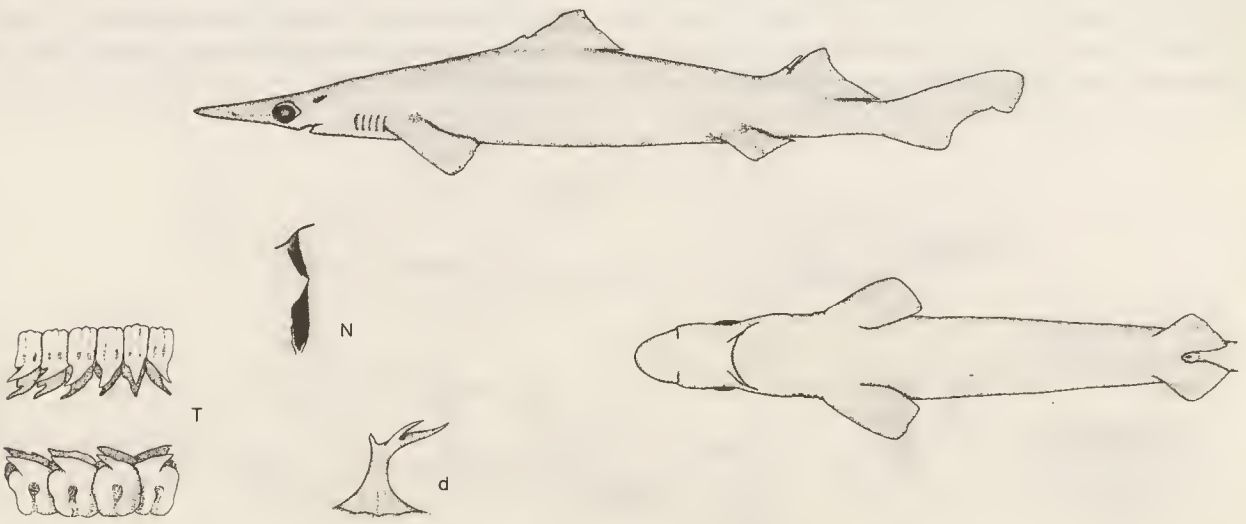
Uniformly dark grey. Males mature at 50-55 cm, females at about 70 cm; attains 79 cm. Philippines, Senegal, northwest Atlantic; off Namibia and Natal in depths of 275 - 608 m.

5.10 *Deania quadrispinosus*
(McCulloch, 1915)

Acanthidium quadrispinosum McCulloch, 1915: 100 (south of Gabo Id., Victoria). *Deania eglantina (non* Jordan & Snyder): Smith, **SFSA No. 49*** (in part; figure appears to be *D. quadrispinosus). Deania* sp.: Karrer 1975: 66. *Deania quadrispinosum:* Bass et al., 1976: 37*.

Distance between D bases 16-20% TL; height of 1st D 2.0 or less in distance from exposed base of spine to rear end of fin base.

Dark brown. Females mature at 110 cm; attains at least 114 cm. Known only from south coast of Australia and from northern Namibia to southern Mozambique in depths of 275 - 640 m.



5.10 *Deania quadrispinosus:* 110 cm female (S. Mozambique). N, T & d as in 2.1.

Genus ***Etmopterus*** Rafinesque, 1810

Dorsal fin spines well developed, with lateral grooves. No precaudal pits. Upper C lobe usually with subterminal notch, sometimes not. No keels or lateral ridges on caudal peduncle. Small deep-water sharks with luminescent organs, characteristic dark markings on flanks above V and on caudal peduncle. Several species, 6 known from our region. The eastern Atlantic species *Etmopterus spinax* (Linnaeus) has been reported from our area (Smith, **SFSA No. 51***), but we are unable to confirm its presence here.

KEY TO SPECIES

1a Denticles on sides below 1st D flat, concave, without any spine ..... *E. pusillus*
1b Denticles on sides below 1st D with a definite spine 2

2a Two or 3 short rows of conspicuously enlarged denticles on each side below 1st D; denticles with a distinct concavity on their upper surface ..... *E. sentosus*
2b No conspicuous enlarged denticles on each side below 1st D; denticles without any concavity on their upper surface 3

3a Denticles in random arrangement, not in conspicuous regular rows ..... *E.* sp.
3b Denticles arranged in conspicuous, regular rows 4

4a Denticles on top of head not in longitudinal rows; caudal peduncle short, length from 2nd D base to upper C origin 0.9-1.1 times 2nd D base and 7.8-8.9% TL, length from V base to lower C origin 2.1- 2.7 times height at V base; black mark above V inner margins not extending in front of V as a long narrow black bar ..... *E. granulosus*

4b Denticles on top of head in longitudinal rows extending to snout tip; caudal peduncle longer, length from 2nd D base to upper C origin 1.2-2.1 times 2nd D base and 10.2-15.9% TL, length from V base to lower C origin 2.7-4.4 times height at V base; black mark above V inner margins extending as a long narrow bar or line in front of V 5

5a Body slender, height at P origins 7.9-9.0% TL; mouth narrow, width 1.4-1.8 in preoral snout and 6.1-7.2% TL; posterior branch of black marking above V usually very narrow ..... *E. brachyurus*
5b Body rather stout, height at P origins 9.4-11.8% TL; mouth broader, width 1.2-1.4 in preoral snout and 7.6-8.6% TL; posterior branch of flank marking usually broad and short ..... *E. lucifer*

5.11 *Etmopterus brachyurus*
Smith & Radcliffe, 1912

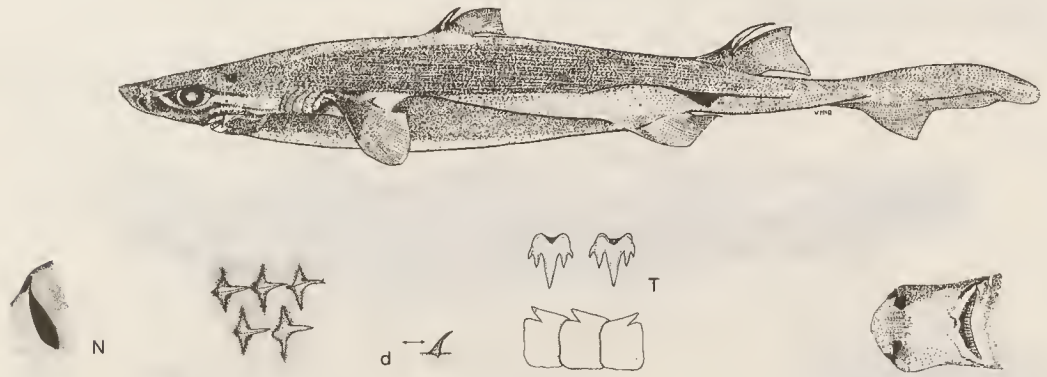
Etmopterus brachyurus Smith & Radcliffe, 1912: 679, Fig. 2, Pl. 52 (Philippines); Smith, **SFSA No. 52*** (in part); Bass et al., 1976: 25 (in part).

Dark grey above, black below. Males maturing at 24-29 cm and probably reaching at least 30 cm, females maturing at 42 cm. A little-known species often confused with *E. lucifer,* but definitely in our area in 420 - 430 m off the western Cape, Natal and southern Mozambique. Elsewhere from the Philippines and possibly Bali and Australia.

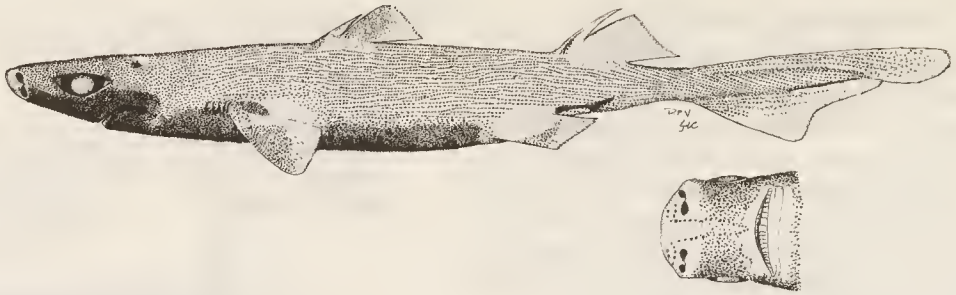
5.12 *Etmopterus granulosus*
(Günther, 1880)

Spinax granulosus Günther, 1880: 19 (Chile). *Etmopterus granulosus:* Smith, **SFSA No. 50*** (in part).

Dark grey above, black below. Males maturing between 26-56 cm, females immature at 45 cm. A poorly known species said to occur in 366 - 1 464 m off Cape Point; elsewhere from southern Argentina, Falklands, and southern Chile in water 220 - 637 m deep.



5.11 *Etmopterus brachyurus:* 44 cm female (off Saldanha). N, T & d as in 2.1.



5.12 *Etmopterus granulosus:* 31 cm male holotype (South America).

5.13 *Etmopterus lucifer*
Jordan & Snyder, 1902

Etmopterus lucifer Jordan & Snyder, 1902: 79 (Japan); Smith, **SFSA No. 52*** (in part); Bass et al., 1976: 25* (in part).

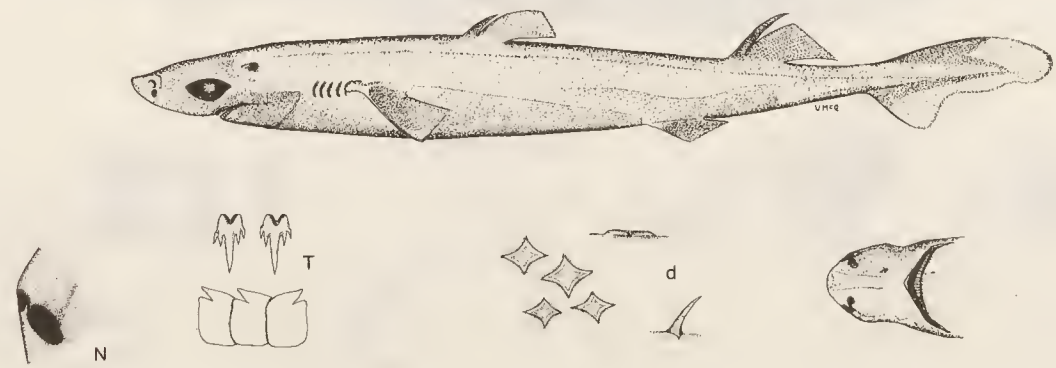
Dark grey above, black below. Males adult at 29-42 cm, females adult at 34-50 cm. Off Natal below 200 m; wide-ranging from Tanzania east to Japan and Australasia, and off the east coast of South America. Apparently often confused with *E. brachyurus*.

5.14 *Etmopterus pusillus*
(Lowe, 1839)

Acanthidium pusillum Lowe, 1839: 91 (Madeira). *Etmopterus pusillus:* Bass et al., 1976: 23*.

Dark grey-brown above and below, flank markings only just visible. Skin smooth compared to that of other species in this genus. Off Natal males mature at 31 cm, but western Atlantic males are immature at 39 cm and females immature at 47 cm. In our area trawled in 274 - 421 m off Natal; also recorded from both sides of the Atlantic as well as Japan and New Zealand.

5.13 *Etmopterus lucifer:* 28 cm male holotype (Japan).



5.14 *Etmopterus pusillus:* 33 cm female (Natal). N, T & d as in 2.1.

5.15 *Etmopterus sentosus*
Bass, D'Aubrey & Kistnasamy, 1973

Etmopterus sentosus Bass, D'Aubrey & Kistnasamy, 1973: 22, Figs. 15, 18a (southern Mozambique, Natal).

Dark grey above and below, markings indistinct – the figure shows a faded specimen where the markings stand out clearly. Two or 3 short rows of enlarged denticles on each side below 1st dorsal. Only 4 known specimens: a 23 cm female from 454 m off the Kenya coast and 3 immature specimens (2 male, 1 female, 24-27 cm) from deep water off Natal and southern Mozambique.

5.16 *Etmopterus* sp.

Etmopterus granulosus (non Günther): Smith, **SFSA No. 50*** (in part). *?Etmopterus gracilispinis (non* Krefft): Karrer, 1973: 199.

Head width at corners of mouth distinctly greater than length of snout in front of mouth. Precaudal vertebrae 57-60; monospondylic vertebrae 43-45. Southern African records of *E. spinax* are probably all referrable to this species.

Dark brown above and below, no conspicuous flank markings. Larger than most species of this genus, with males immature at 44 cm, mature at 55 cm; attains 78 cm. Trawled in deep water off southwestern Cape Province; 2 from northern Natal.

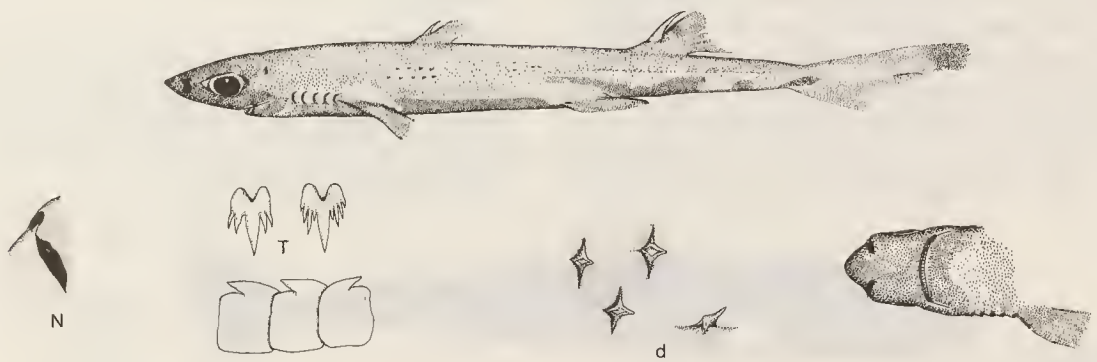
Genus ***Euprotomicroides*** Hulley & Penrith, 1966

No D spines. First D smaller than 2nd, its origin midway between P & V. Short blunt snout. Long gill slits. One species.

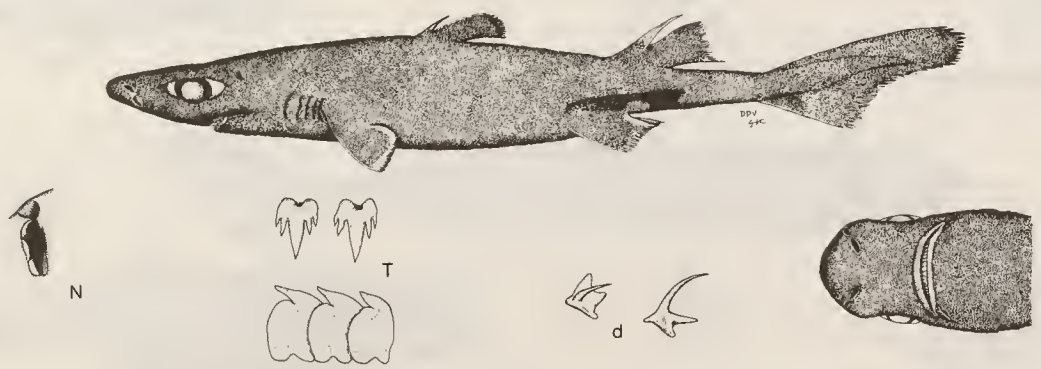
5.17 *Euprotomicroides zantedeschia*
Hulley & Penrith, 1966

Euprotomicroides zantedeschia Hulley & Penrith, 1966: 222, Fig. 1 (off Cape Town); Bass et al., 1976: 50*.

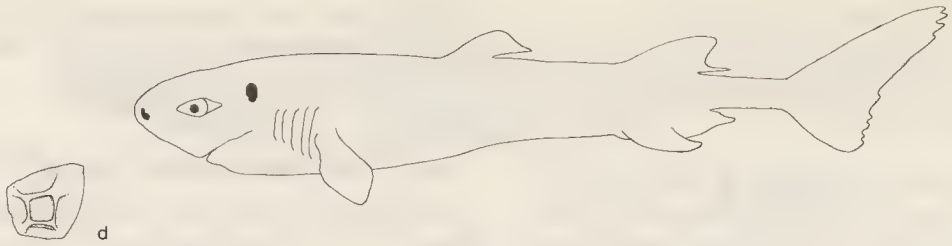
Brown with black underparts. The 176 mm holotype, an immature female trawled west of Cape Town, was examined by Dr L.J.V. Compagno, who found that the supposed claspers are actually the enlarged lips of the cloaca. An adult male of 41 cm has been reported from the southwest Atlantic (Krefft, 1980: 7).



5.15 *Etmoptopus sentosus:* 27 cm male (S. Mozambique). N, T & d as in 2.1.



5.16 *Etmopterus* sp.: 32 cm male (off Natal). N, T & d as in 2.1.



5.17 *Euprotomicroides zantedeschia:* 18 cm female (off Cape Town); d = denticle.

Genus ***Euprotomicrus*** Gill, 1864

Body cylindrical, tapering to a narrow caudal peduncle. No D spines; minute photophores scattered over ventral surface of head and body. Monotypic; Hubbs et al. (1967) have published a fine paper on the taxonomy, anatomy and biology of this species.

5.18 *Euprotomicrus bispinatus*
(Quoy & Gaimard, 1824)

Scymnus bispinatus Quoy & Gaimard, 1824: 197, Pl. 44, Figs. 1, 2 (Mauritius). *Euprotomicrus bispinatus:* Hubbs et al., 1967; Bass et al., 1976: 47*.

Head and body black, fins with prominent white (transparent in life) areas as shown in figure. A dwarf species, with males maturing at 17 cm, females at 22-24 cm; attains 27 cm. Bathypelagic, making regular nocturnal migrations to the surface (where it is easily taken with a dip-net or bucket); during daylight hours it inhabits depth in excess of 300 m. A shark of the open seas, it has been found in all oceans; our records from off southern Natal and 800 km west of Cape Town.

Genus ***Heteroscymnoides*** Fowler, 1934

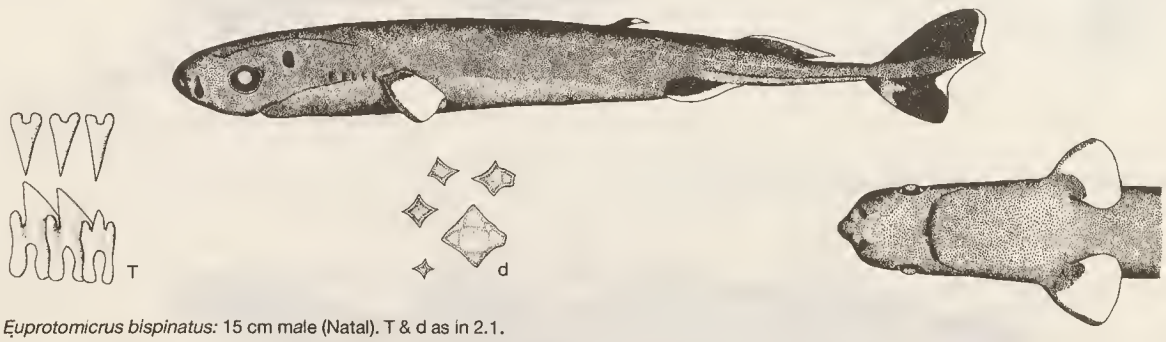
No D spines; 1st D base longer than 2nd, its origin over P base. Snout length more than twice width of mouth. Gill slits minute, their length less than diameter of pupil. One species.

5.19 *Heteroscymnoides marleyi*
Fowler, 1934

Heteroscymnoides marleyi Fowler, 1934: 240, Fig. 4 (Point Ocean Beach, Durban); Smith, **SFSA No. 45***; Bass et al., 1976: 49*; Krefft, 1980: 8*.

Teeth $\frac{6/1/6}{11/1/11}$.

Colour blackish brown; tip of C and P white. Ventral surface covered with minute photophores. The 126 mm holotype, a female with a recently healed umbilical scar, was found on a beach in Durban; another female, 285 mm, was described by Krefft (1980).



5.18 *Euprotomicrus bispinatus:* 15 cm male (Natal). T & d as in 2.1.

5.19 *Heteroscymnoides marleyi:* 13 cm female (Durban). T & d as in 2.1.

Genus ***Isistius*** Gill, 1864

Dorsal fins subequal, both situated in rear third of precaudal length; no D spines. Snout length subequal to mouth width. Teeth markedly dissimilar in the 2 jaws. Ventral surface of head and body sprinkled with minute photophores, which emit a greenish glow at night. Two species. *Isistius plutodus* Garrick & Springer, 1964 is known only from the Gulf of Mexico and off Okinawa.

5.20 *Isistius brasiliensis*
(Quoy & Gaimard, 1824)

Scymnus brasiliensis Quoy & Gaimard, 1824: 198 (Brazil). *Isistius brasiliensis:* Bass et al., 1976: 44*.

Teeth $\frac{15\text{-}18/1/15\text{-}18}{12\text{-}15/1/12\text{-}15}$.

Colour usually dark brown dorsally, distinctly paler below except for blackish band across throat; tips of C lobes blackish. About 14 cm at birth; males mature at 32-37 cm, females at 40-44 cm; attains 50 cm. Feeds largely on squid, but also bites circular plugs of tissue from large pelagic animals such as tuna, billfishes and cetaceans (Jones, 1971). Most records from tropical waters of Atlantic and Pacific Oceans; not yet reported from our area, but records from the Gulf of Guinea and Mauritius indicate that it will eventually turn up here.

Genus ***Oxynotus*** Rafinesque, 1810

Large dorsal fins with spines of which only the tips are visible. No anal fin. Three or 4 species, 1 in our area.

5.21 *Oxynotus centrina*
(Linnaeus, 1758)

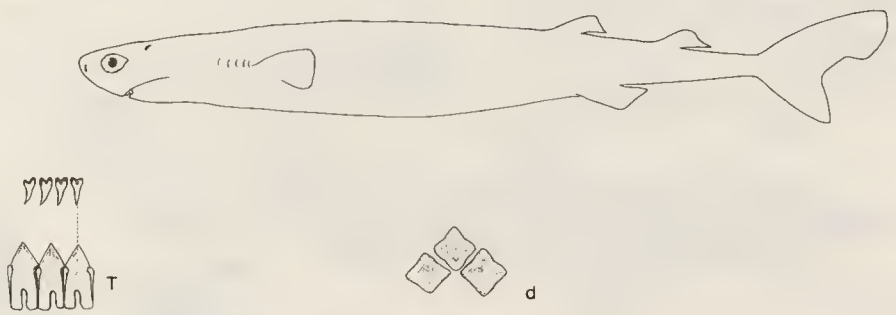
Flatiron shark — Strykysterhaai

Squalus centrina Linnaeus, 1758: 233 (Mediterranean). *Oxynotus centrina:* Smith, **SFSA No. 54a***; Karrer, 1973: 196. *Oxynotus* sp.: Bass et al., 1976: 8*.

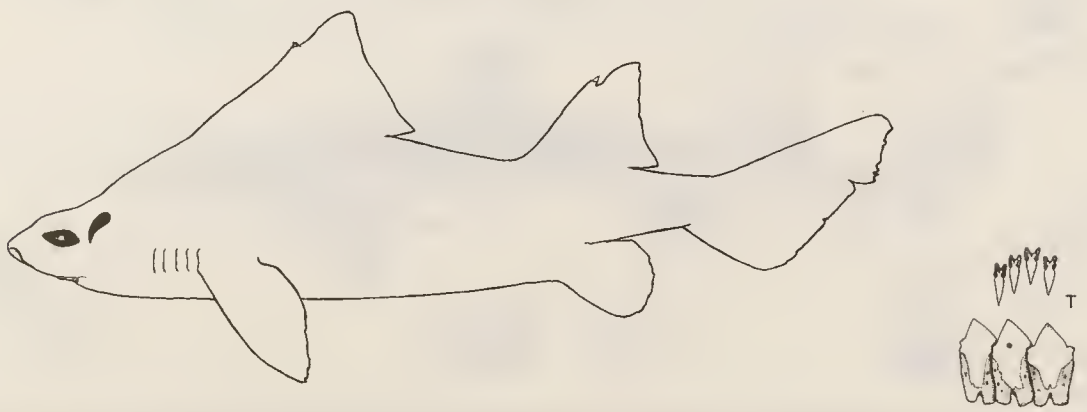
First D spine slopes forwards. Large spiracle close to eye.

Teeth $\frac{5\text{-}5}{4\text{-}1\text{-}4}$. Precaudal vertebrae 63.

Uniformly brown. Our specimens 55 and 56 cm, trawled between Cape Town and Walvis Bay in 270 - 280 m; tentatively ascribed to *Oxynotus centrina,* but with a comparatively short interdorsal distance as compared to published figures of North Atlantic specimens. In North Atlantic attains 80 cm; also known from Mediterranean.



5.20 *Isistius brasiliensis:* 43 cm female (Gulf of Mexico; after Garrick & Springer, 1964). T & d as in 2.1.



5.21 *Oxynotus centrina:* 55 cm female (Walvis Bay). T = teeth.

Genus ***Scymnorhinus*** Bonaparte, 1846

Dorsal fins subequal, first situated midway between P & V; no D spines. Short blunt snout. Upper teeth spiky, smooth-edged; lowers triangular, serrated. One species.

5.22 *Scymnorhinus licha*
(Bonnaterre, 1788)

Seal shark — Robhaai

Squalus licha Bonnaterre, 1788: 12 (France). *Dalatias licha:* Smith, **SFSA No. 46*;** Bass et al., 1976: 41*.

Teeth $\frac{9\text{-}1\text{-}9}{9\text{-}1\text{-}9}$.

Dark grey above and below, with trailing edges of fins transparent. Ten to 16 pups per litter, born at about 35 cm; mature at 120 cm (females); attains 120 cm (males) and almost 160 cm (females). Scavenger-predator near seabed, often capturing fast-swimming prey. Widespread on continental slopes and outer shelves, in our area common off southern Mozambique and Natal, rare off Algoa Bay, absent from southwestern Cape and Namibia.

Genus ***Somniosus*** Lesueur, 1818

Dorsal fins subequal, without spines, the first midway between P and V; C with distinct lower lobe. Several species of relatively large sharks (up to about 5 m); only 2 records from southern hemisphere.

5.23 *Somniosus microcephalus*
(Schneider, 1801)

Greenland shark — Groenlandse haai

Squalus microcephalus Schneider, *in* Bloch & Schneider, 1801: 135 ("Habitat in mari glaciali"). *Somniosus microcephalus:* Bass et al., 1976: 43*.

Teeth $\frac{48}{53}$.

Dark grey above and below. Attains at least 5 m. Common in cold waters of northern hemisphere; a female of about 4.4 m trawled off Cape Columbine.

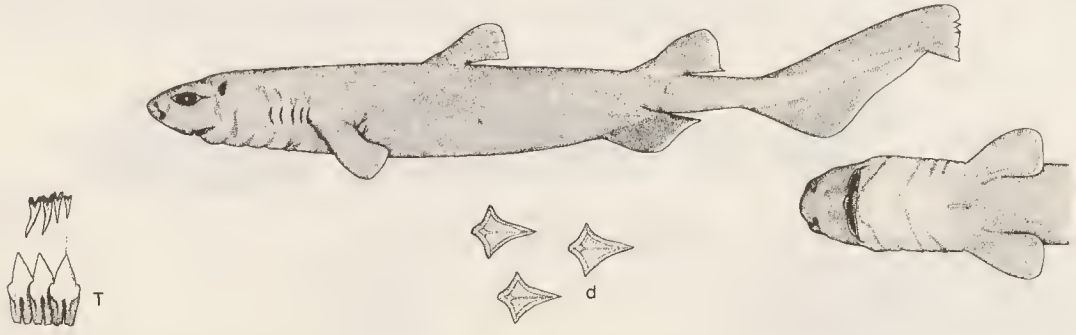
Genus ***Squalus*** Linnaeus, 1758

Dorsal fin spines well developed, without lateral grooves. Dermal ridge or keel on each side of caudal peduncle. Precaudal pits usually present, sometimes absent. Caudal fin without subterminal notch. Several species, 4 in our area.

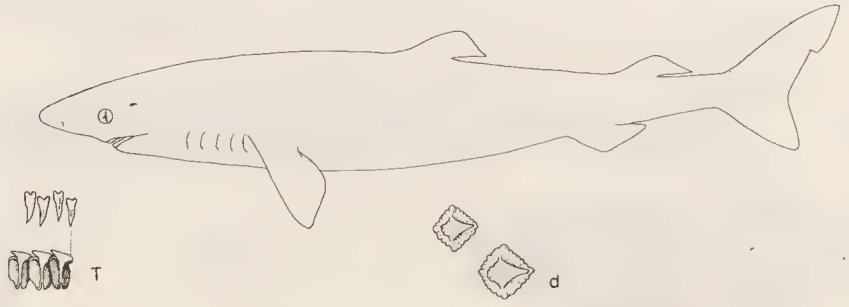
KEY TO SPECIES

1a Second D almost as large as 1st; nasal flap with prominent lobe resembling a small barbel ..... *S. asper*
1b Second D markedly smaller than 1st; nasal flap with a small or minute lobe, not large enough to resemble a barbel 2

2a First D spine behind inner P corner; usually white spots on upper trunk ..... *S. acanthias*
2b First D spine over or in front of inner P corner; no white spots 3



5.22 *Scymnorhinus lichia:* 41 cm male (Natal). T & d as in 2.1.



5.23 *Somniosus microcephalus:* 174 cm female (NW Atlantic; after Bigelow & Schroeder, 1948). T & d as in 2.1.

3a Distance from tip of snout to inner end of a nostril not longer than distance from inner end of nostril to front end of lip groove; inner corner of P sharply pointed; denticles dagger-shaped with a single cusp ..... *S. megalops*

3b Distance from tip of snout to inner end of a nostril longer than distance from inner end of nostril to front end of lip groove; inner corner of P rounded; denticles broad with 3 cusps ..... *S. mitsukurii*

5.24 *Squalus acanthias*
Linnaeus, 1758

Spotted spiny dogfish **Spikkel-penhaai**

Squalus acanthias Linnaeus, 1758: 233 (European Ocean); Smith, **SFSA No. 54*;** Bass et al., 1976: 13*; van der Elst, 1981: 61*.

Teeth $\frac{13\text{-}1\text{-}13}{11\text{-}1\text{-}11}$.

Brownish grey above, paler below. White spots on upper surface prominent in juveniles, often indiscernible in adults. Three to 4 pups per litter, born at about 33 cm; males mature at 48-50 cm, females at 55-60 cm; attains at least 68 cm (males) and 79 cm (females). Specimens from our area smaller than in many other parts of the world. Found in cooler shallow waters of all oceans in both hemispheres; in our area common off the southern and southwestern Cape, ranges east at least to Port Elizabeth, particularly during winter.

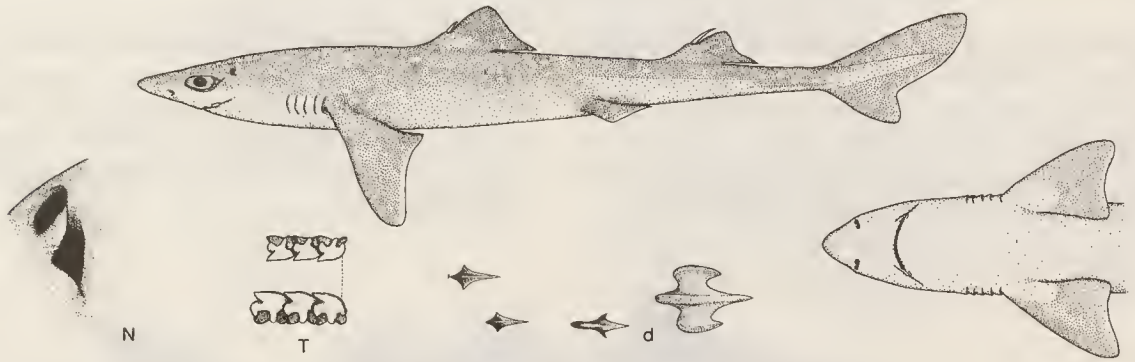
5.25 *Squalus asper*
Merrett, 1973

Roughskin spiny dogfish **Ruwevel-penhaai**

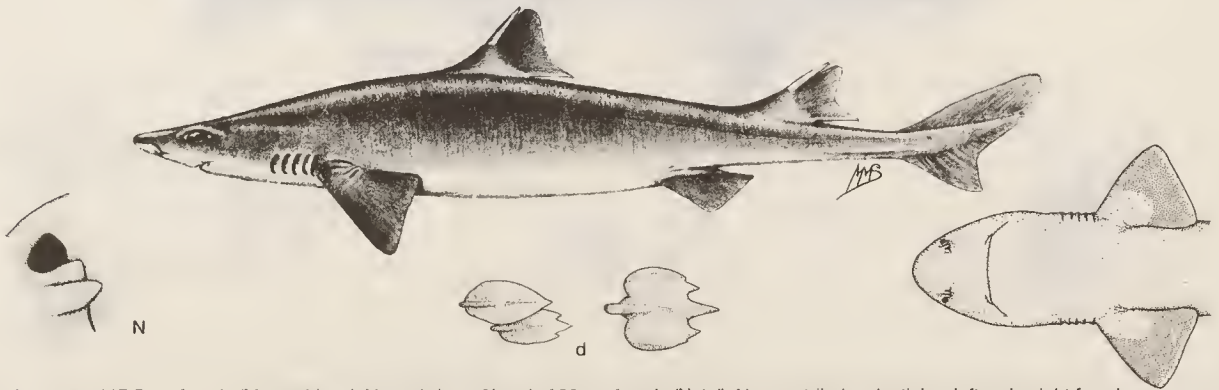
Squalus asper Merrett, 1973: 94, Pl. 1b, Figs. 1-4 (equatorial western Indian Ocean); Bass et al., 1976: 18*.

Teeth $\frac{13\text{-}1\text{-}13}{11\text{-}1\text{-}11}$.

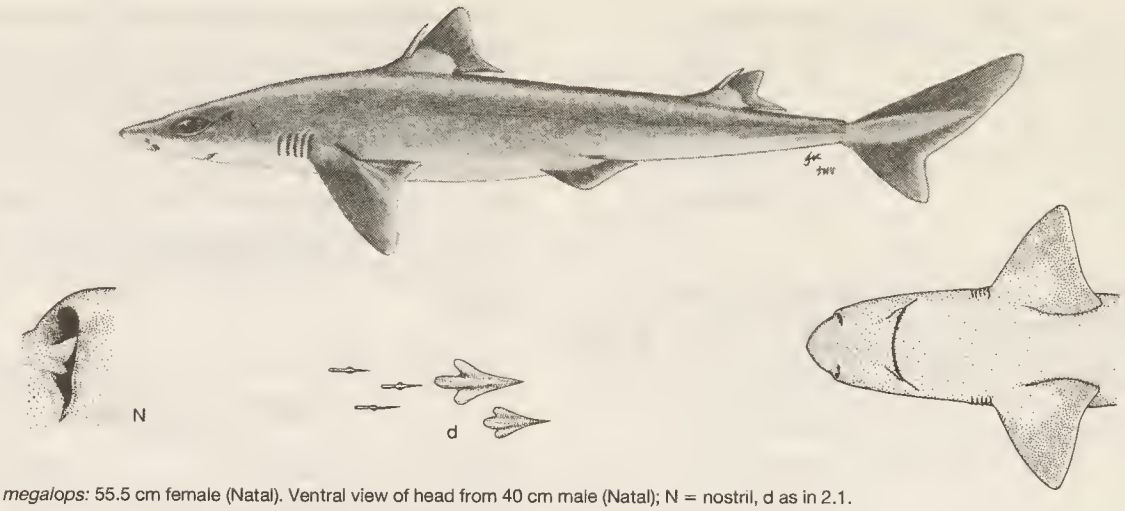
Juveniles brown, adults grey; paler below. Fins prominently white-edged. Skin rough. About 22 pups per litter, born at about 28 cm; attains at least 90 cm (males) and 118 cm (females). Edge and slope of continental shelf; Natal to north of Madagascar, also reported from western Atlantic.



5.24 *Squalus acanthias:* 46 cm female (off Cape Town). N, T & d as in 2.1.



5.25 *Squalus asper:* 117.5 cm female (Mozambique). Ventral view of head of 38 cm female (Natal). N = nostril, d = denticles: left male, right female.



5.26 *Squalus megalops:* 55.5 cm female (Natal). Ventral view of head from 40 cm male (Natal); N = nostril, d as in 2.1.

5.26 *Squalus megalops*
(MacLeay, 1882)

Bluntnose spiny dogfish — Stompneus-penhaai

Acanthias megalops MacLeay, 1882: 367 (Australia). *Squalus acutipinnis* Regan, 1908: 248, Pl. 37 (South Africa, Mauritius). *Squalus fernandinus:* Smith, **SFSA No. 53.** *Squalus megalops:* Bass et al., 1976: 16*; van der Elst, 1981: 62*.

Teeth $\frac{12 \text{ or } 13\text{-}1\text{-}12 \text{ or } 13}{11\text{-}11}$.

Dark brown or grey above, paler below. Fins of juveniles white-tipped, adults almost plain. Two to 4 pups per litter, born at about 23 cm; mature at 42 cm (males) and 55 cm (females); attains 55 cm (males) and at least 70 cm (females). On continental shelf of warmer oceans; found off Namibia and, on the east coast, south to Algoa Bay.

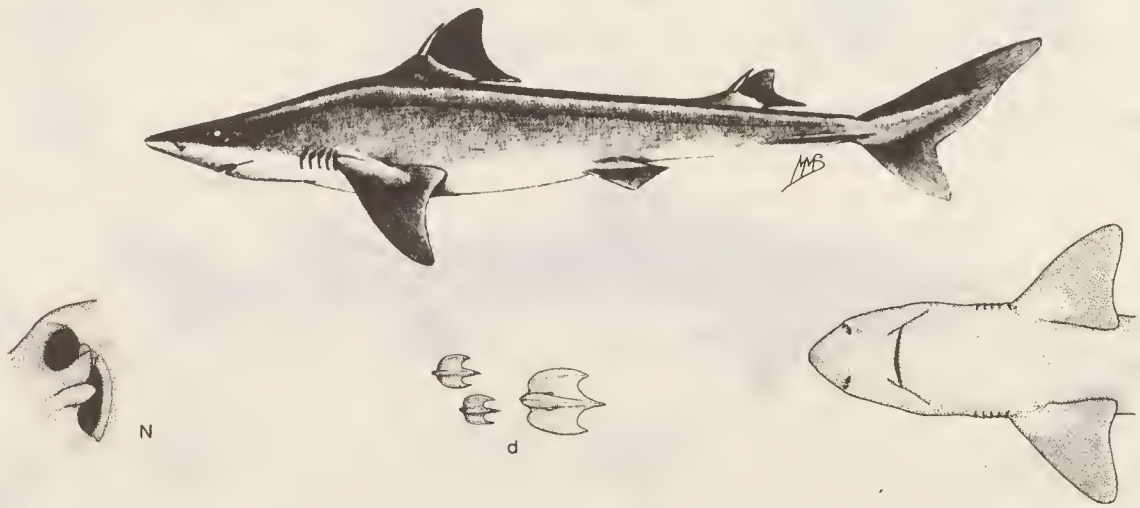
5.27 *Squalus mitsukurii*
Jordan & Fowler, 1903

Longnose spiny dogfish — Langneus-penhaai

Squalus mitsukurii Jordan & Snyder, 1901: 129 (name only); Jordan & Fowler, 1903: 629, Fig. 3 (Misaki, Japan); Chen et al., 1979: 31*. *Squalus blainvillei:* Bass et al., 1976: 15*.

Teeth $\frac{13\text{-}1\text{-}13}{11\text{-}1\text{-}11}$.

Grey above, white below. Juveniles with white trailing edges to fins. About 6-9 pups per litter, born at 22-26 cm; males mature at about 60 cm, females at about 70 cm; attains 80 cm (males) and almost 100 cm (females). All oceans; in our area from tropics to Algoa Bay, absent from southwestern Cape.



5.27 *Squalus mitsukurii:* 80.6 cm female (Mozambique). Ventral view of head of 43 cm male (Natal); N & d as in 2.1.

Family No. 6: ECHINORHINIDAE

by A.J. Bass & L.J.V. Compagno

Bramble sharks **Braamhaaie**

Dorsal fins without spines; first dorsal origin behind origin of pelvics. No anal fin. Spiracle minute. Teeth similar in both jaws, with 1 cusp in juveniles but 3-7 cusps in adults. Lateral line an open furrow along sides of body, its walls supported by incomplete skeletal rings whose free ends project as spines along edges of furrow, bridged at irregular intervals by narrow cross-connections of skin. Caudal tip pointed, without subterminal notch. One genus, *Echinorhinus* Blainville, 1816 with 2 species. Only *Echinorhinus brucus* has been reported from our area; *E. cookei* Pietschmann, 1928, widespread in the Pacific Ocean, may also occur here.

KEY TO SPECIES

1a Dermal denticles small (not more than 4 mm in basal diameter), numerous and uniformly distributed, with deeply indented, angular bases and prominently ridged spines; skin of adults almost smooth under snout and around mouth ..... *E. cookei*

1b Dermal denticles large (up to 15 mm or more in basal diameter, even larger in compound denticles), sparse and irregularly distributed, with entire-margined bases and finely ridged spines; skin of adults under snout and around mouth with distinct denticles ..... *E. brucus*

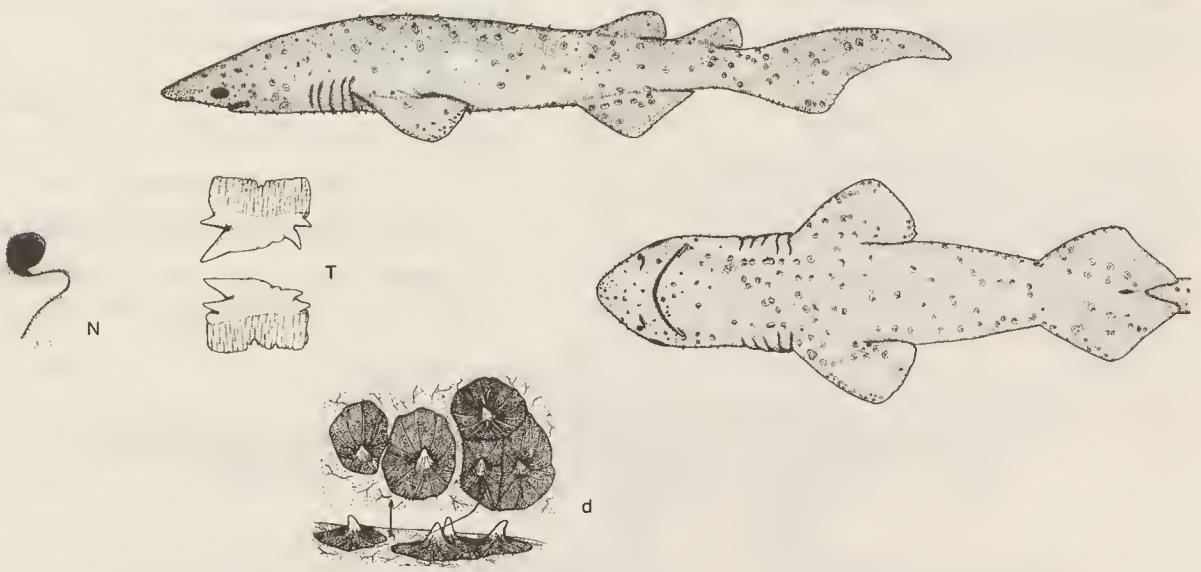
6.1 *Echinorhinus brucus*

(Bonnaterre, 1788)

Bramble shark Braamhaai

Squalus brucus Bonnaterre, 1788: 11 ("L'Ocean" = North Atlantic). *Echinorhinus obesus* Smith, 1849: Pl.1 (Cape of Good Hope). *Echinorhinus brucus:* Smith, **SFSA No. 44*;** Bass et al., 1976: 51*.

Dark purplish grey. Ovoviviparous; about 24 pups per litter, born at 30 cm; males mature at 160 cm, females at 200 cm. In all oceans but apparently absent from eastern Pacific. Our few records are from Namibia to southern Natal, in 10 - 400 m. Smith (**SFSA**) states "The oil from the liver of this shark has long had a high reputation as a medicament among black and coloured races in South Africa and commands an exceedingly high price."



6.1 *Echinorhinus brucus:* 122 cm female (Namibia). N, T & d as in 2.1.

Order ORECTOLOBIFORMES

Carpet sharks — Tapythaaie

The only sharks with 2 spineless dorsal fins, an anal fin, and a short mouth situated well in front of eyes. Five pairs of gill slits on sides of head; teeth in rear of mouth not expanded to molar-like crushers. Oviparous, eggs deposited in oval cases, or ovoviviparous. Adults 33 cm to possibly 18 m in length. Inshore benthic and oceanic sharks with a circumtropical distribution; 2 to 7 families, depending on the classification; 13 genera and about 33 species.

Family No. 7: ORECTOLOBIDAE

by A.J. Bass

Carpet sharks — **Tapythaaie**

Sluggish, bottom-living sharks. Nostrils with distinct barbels and continuous with mouth. Second dorsal and anal fins relatively larger. Anal fin sometimes appearing to be part of lower caudal. No precaudal pits. No nictitans. Teeth multicuspid, in several functional series. Several genera, many species, 4 in our general area. Some workers put these species in 3 different families.

KEY TO GENERA

1a Spiracle minute, its length less than half of eye diameter 2
1b Spiracle large, its length equal to half or more of eye diameter 3

2a First D origin over or in front of V origin; A origin under centre of 2nd D base ..... *Nebrius*
2b First D origin behind V origin; A origin under 2nd D origin ..... *Ginglymostoma*

3a Lower lip grooves continuous across chin; spiracle under eye; C shorter than body less head ..... *Chiloscyllium*
3b Lower lip grooves separate, not continuous across chin; spiracle behind eye; C longer than body less head ..... *Stegostoma*

Genus ***Chiloscyllium*** Müller & Henle, 1837

The 3 species recorded by Smith: *C. plagiosum* **SFSA No. 31*;** *C. griseum* **SFSA No. 32*** and *C. indicum* **SFSA No. 33*** apparently do not occur here; only 1 species near our area.

7.1 *Chiloscyllium caerulopunctatum*

Pellegrin, 1914

Bluespotted catshark — Blouspikkel-kathaai

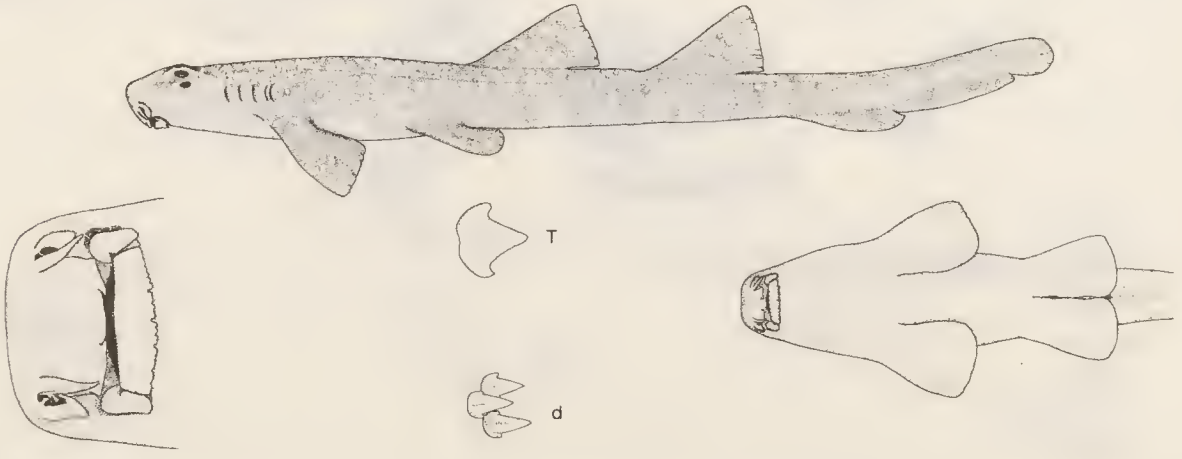
Chiloscyllium caerulopunctatum Pellegrin, 1914: 230 (Fort Dauphin, Madagascar); Bass et al., 1975: 49*.

Anal fin almost continuous with lower caudal.

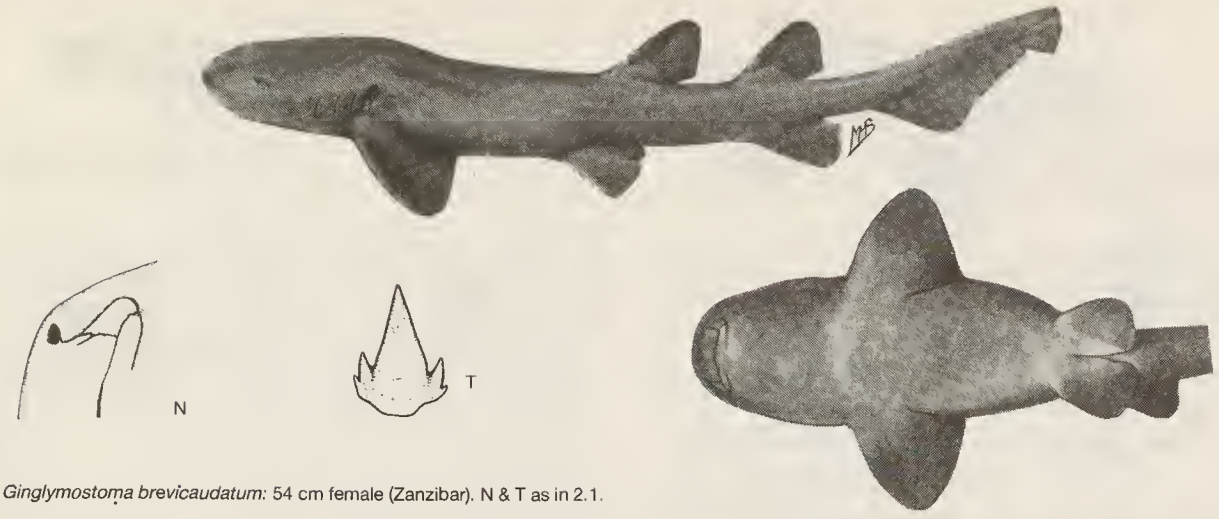
Light brown above, paler below, with blue-white spots. Known only from a 67-cm female from southern Madagascar.

Genus ***Ginglymostoma*** Müller & Henle, 1837

Two species; 1 from warm water of Atlantic and eastern Pacific and 1 may be found in our area.



7.1 *Chiloscyllium caeruleopunctatum:* 67 cm female (S. Madagascar). Ventral view of head; T = tooth, d = denticles.



7.2 *Ginglymostoma brevicaudatum:* 54 cm female (Zanzibar). N & T as in 2.1.

7.2 *Ginglymostoma brevicaudatum*
Günther, 1867

Nurse shark — Gryshaai

Ginglymostoma brevicaudatum Günther, *in* Playfair & Günther, 1867: 141, Pl. 21 (Zanzibar); Bass et al., 1975: 42*.

Dark brown above, slightly paler below. Tough skin, well adapted to lying amongst coral reefs. Attains 59 cm. Called "papa isingezi" (= sleepy shark) at Zanzibar. Known only from Zanzibar and central east African coast; lives for many hours out of water.

Genus ***Nebrius*** Rüppell, 1837

Two Indo-Pacific species, 1 in our area.

7.3 *Nebrius concolor*
Rüppell, 1837

Giant sleepy shark — Reuse-vaakhaai

Nebrius concolor Rüppell, 1837: 62, Pl. 17, Fig. 2 (Red Sea); Bass et al., 1975: 44*. *Nebrius doldi* Smith, 1953: 512, **No. 30a*** (S. Mozambique).

Brown above, paler below. Ovoviviparous; attains 3 m. Shallow water; occasionally taken by anglers. Tropical Indo-West Pacific, ranges south to Natal.

Genus ***Stegostoma*** Müller & Henle, 1837

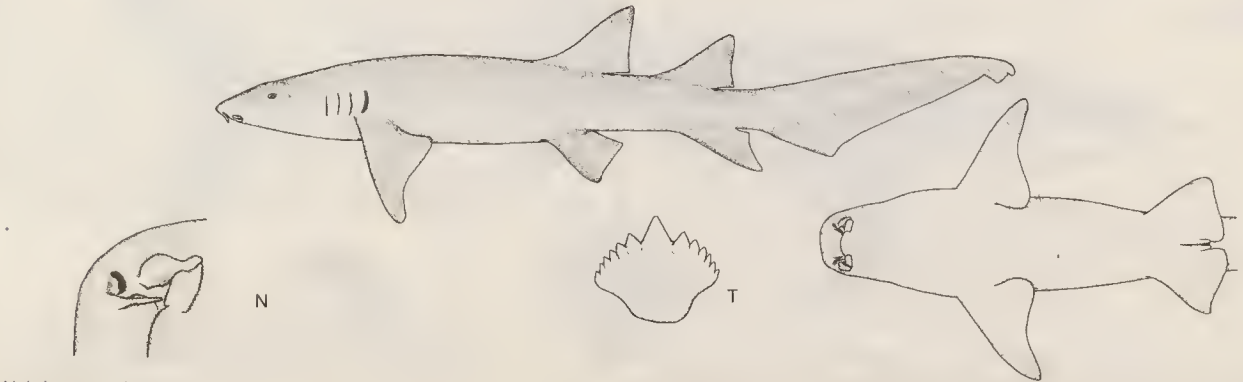
Probably monotypic.

7.4 *Stegostoma fasciatum*
(Hermann, 1783)
PLATE 4

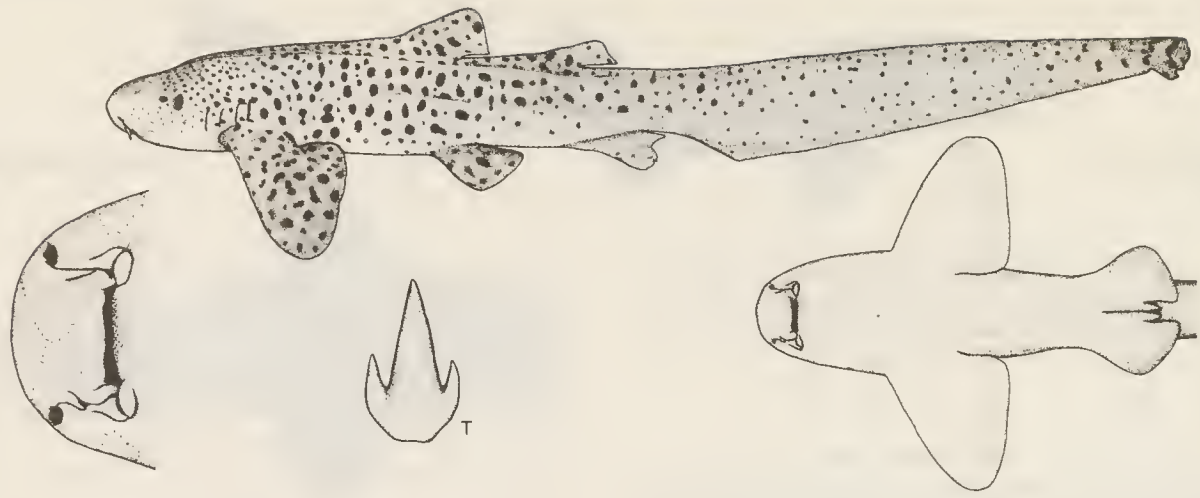
Zebra shark — Sebrahaai

Squalus fasciatus Hermann, 1783: 302 (on *Squalus varius* Seba, 1758: 105, Pl. 34, Fig. 1; Red Sea). *Stegostoma fasciatum:* Smith, **SFSA No. 30***; Bass et al., 1975: 46*. *Stegastoma (sic) varium:* van der Elst, 1981: 53*.

Yellow-brown with dark brown spots. Young with distinctive barred pattern, also lacking longitudinal skin ridges found in adults. Oviparous; attains 2.3 m. Mollusc eater, also consumes crustaceans and fish. A sluggish, shallow-water shark of the tropical Indo-West Pacific; south to Natal, rarely to eastern Cape.



7.3 *Nebrius concolor:* 118 cm immature male (N. Mozambique). N & T as in 2.1.



7.4 *Stegostoma fasciatum:* 128 cm immature male (off Durban). Ventral view of head; T = tooth.

Family No. 8: RHINCODONTIDAE

by A.J.Bass

Whale sharks **Walvishaaie**

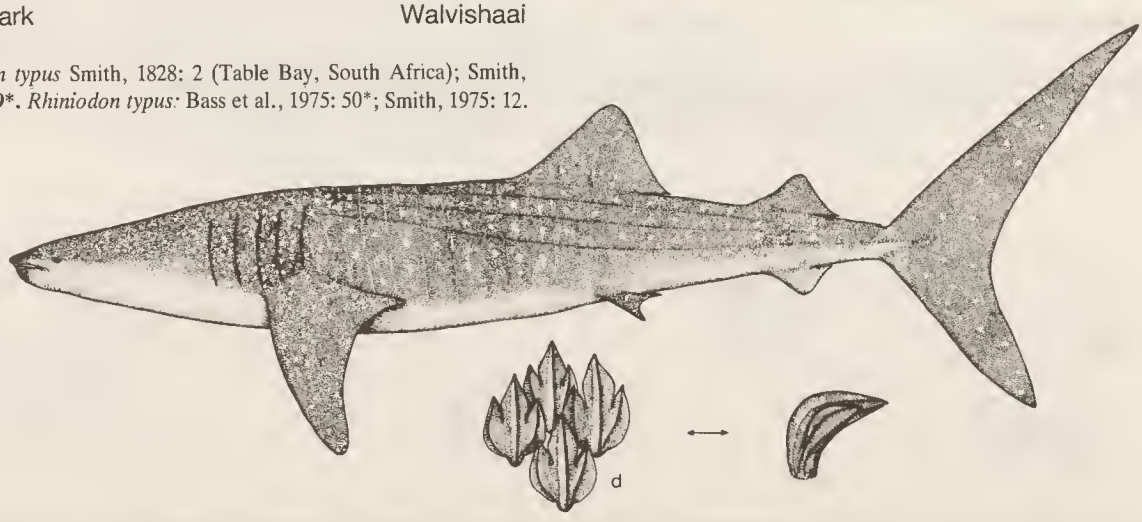
Largest of all living fishes. Filter-feeding, with terminal mouth and no definite snout. Eye behind corner of mouth. Last gill slit over pectoral base. No nictitans. Prominent skin ridges along back and sides. One world-wide species. In a scientific publication Andrew Smith described and named the first whale shark that was found at the Cape as *Rhincodon*. Earlier, in another more popular report, it was spelled *Rhiniodon*. We have kept the spelling given in the *Zoological Journal*.

8.1 *Rhincodon typus*
Smith, 1828
PLATE 1, p.00

Whale shark Walvishaai

Rhincodon typus Smith, 1828: 2 (Table Bay, South Africa); Smith, **SFSA No. 29*.** *Rhiniodon typus:* Bass et al., 1975: 50*; Smith, 1975: 12.

Brown or dark blue-grey with white spots and stripes above, white below. Oviparous: an egg case containing a 30 cm fully developed embryo was dredged off the Texas coast; attains at least 10-12 m, perhaps more. Plankton feeder, also eats small fish, sometimes doing this while swimming vertically with head upwards. (It is often accompanied by remoras (Family Echeneidae), and divers frequently swim with the whale shark off the Natal and Zululand coasts. They report that the only care they take is not inadvertently to enter the slipstream that flows into this huge shark's mouth! Normally docile, has been known to attack small boats when an angler in the boat is playing a large fish like a tuna. – M.M. Smith.) Common off Mozambique and northern Natal, occasionally found elsewhere in our area; occurs in all tropical/subtropical waters, both inshore and over deep water.



8.1 *Rhincodon typus:* 438 cm immature female (Cape St. Francis); d = denticles.

Order CARCHARHINIFORMES

Ground sharks — Grondhaaie

Typical sharks with 2 spineless dorsal fins, an anal fin, 5 pairs of gill slits on sides of head, a movable lower nictitating eyelid, mouth long and extending behind eyes. Intestinal valve of conico-spiral or scroll type, like a broad augur drill or a swiss roll or rolled pancake. Oviparous, eggs laid in small purse-like egg-cases with tendrils, or live-bearing, with or without placental attachment between young and mother. Adults 15 cm to possibly 7.4 m long; most species between 30 and 200 cm. The largest group of living sharks, with inshore, oceanic, and deep-water benthic species in all temperate to tropical seas, and a few species that enter freshwater. Five to 8 families, depending on the classification used; about 48 genera and 200 species.

Family No. 9: CARCHARHINIDAE

by A.J. Bass, P.C. Heemstra & L.J.V. Compagno

Requiem sharks — **Blouhaaie**

Two dorsal fins without spines. First dorsal base much shorter than upper caudal lobe, its origin well in front of pelvic fins. Anal fin well separated from caudal fin. Caudal fin with more or less distinct lower lobe, but not lunate, much less than half of total length. Spiracles small or absent. Nictitans present (rudimentary in *Mustelus*). Five gill slits, the last over or behind pectoral fin origin. Nasal barbels absent (except in *Leptocharias*); no grooves connecting nostrils and mouth (except in *Scylliogaleus*).

The family Carcharhinidae is here used in a broad sense to include as subfamilies the Triakinae, Leptochariinae and Hemigaleinae. The family is a diverse assemblage of sharks ranging in size from the 5.5 metre tiger shark to the diminutive 58 cm bigeye houndshark *(Iago omanensis)*. A few species are dangerous and known to attack man (e.g., tiger shark, Zambezi shark), but most carcharhinids are harmless. They occur in temperate and tropical waters of all oceans and are of considerable economic importance, either as food or as predators of more valuable crustaceans and fishes. About 24 genera with about 80 species; there are 36 species that occur or are likely to be found in our area.

KEY TO GENERA

1a Precaudal pits (distinct depression in skin of caudal peduncle at origin of upper and lower C lobes) present 2
1b Precaudal pits absent 10

2a Dermal ridge or keel on each side of caudal peduncle; long outer lip folds, reaching forward to below eye ..... *Galeocerdo*
2b No keel on side of caudal peduncle (weak keel present in *Prionace*); short outer lip folds, not reaching to below eye 3

3a Second D at least half as high as 1st D 4
3b Second D less than half as high as 1st D 7

4a Lip folds minute, virtually absent; snout short and broadly rounded, subequal to or less than internostril distance, half mouth width or less 5
4b Lip folds well developed, at least as long as orbit diameter; snout long and more narrowly rounded, much greater than internostril distance, half mouth width or more 6

5a D and C with white tips; 2nd D about half as high as 1st D; jaw teeth with side cusps (cusplets) ..... *Triaenodon*
5b D and C plain; 2nd D about as high as 1st D; teeth without side cusps ..... *Negaprion*

6a Upper teeth long, curved, distinctly serrated on both sides; V notably falcate, their anterior edge subequal to length of lower C lobe ..... *Hemipristis*
6b Upper jaw teeth relatively short, oblique, with several large lateral serrae (or cusplets), but the inner edge smooth; V subtriangular, their anterior edge distinctly less than length of lower C lobe ..... *Paragaleus*

7a Second D origin about over A axil; teeth mainly smooth (large adults of *Rhizoprionodon acutus* have weakly serrated teeth with a single oblique cusp) 8
7b Second D origin nearer to a vertical line at A origin than to vertical at axil; upper jaw teeth serrated (sometimes minutely) 9

8a Hind edge of orbit with a distinct notch; combined length of upper and lower lip folds less than nostril length ..... *Loxodon*
8b No notch on rear edge of orbit; length of upper + lower lip folds equal to or greater than nostril length ..... *Rhizoprionodon*

9a First D origin about midway between P and V origins ..... *Prionace*
9b First D origin closer to P origin than to V origin ..... *Carcharhinus*

10a Nostrils with anterior nasal flap in the form of a slender, pointed barbel; outer lip folds longer than half mouth width ..... *Leptocharias*
10b No barbel on front edge of nostrils; outer lip folds less than half mouth width 11

11a Nostrils joined to mouth by a groove; anterior nasal flaps enormous, joined together to form a "nasal curtain" that reaches the mouth ..... *Scylliogaleus*
11b No groove from nostrils to mouth; anterior nasal flaps short and well separated from one another 12

12a First D origin in front of P axil; 2nd D axil behind A axil ..... *Iago*
12b First D origin behind P axil; 2nd D axil in front of A axil 13

13a Teeth with single, large, oblique cusp and some smaller cusplets along lateral (posterior) edge; teeth in 2 or 3 functional series; front edge of 2nd D shorter than that of ventral C lobe 14
13b Teeth with a low bluntly rounded cusp or with narrow, erect cusp (juveniles of *Triakis* with a short cusplet on each side of main cusp); teeth in 4 or more functional series; front edge of 2nd D longer than that of ventral C lobe 15

14a Second D height about 1½ x A height and more than ½ length of C tip; 1st D origin behind inner corner of P ..... *Hypogaleus*
14b Second D height subequal to A height and less than ½ length of C tip; 1st D origin over inner corner of P . *Galeorhinus*

15a Teeth bluntly rounded, arranged in a quincunx forming a pavement-like crushing dentition, the tooth rows oblique to jaw axis; distance from A base to lower C lobe greater than 2nd D height ..... *Mustelus*
15b Teeth with a narrow, erect cusp (juveniles with a short cusplet on each side of main cusp), the tooth rows perpendicular to jaw axis; distance from A base to lower C lobe less than 2nd D height ..... *Triakis*

Genus ***Carcharhinus*** Blainville, 1816

Body cylindrical; no spiracles. Lip folds short to rudimentary. Teeth blade-like, unicuspid; upper teeth serrated (at least in adults), lower serrated or smooth. First D closer to P than to V; at least twice as high as 2nd D; 2nd D origin in front of middle of A base. No keels on caudal peduncle. Viviparous. Of the 25 species recognised by Garrick (1982), 17 occur in our area. *C. macloti* is included because it is known from Kenya and likely to be found in our area. Identification is difficult and it is often necessary to see the teeth and, in some cases, to obtain vertebral counts. The following key to the southern African species is based on those of Bass et al. (1973) and Garrick (1982); any identification made via the key should be checked by referring to the individual species accounts. Fin markings (if any), the presence or absence of an interdorsal ridge, and tooth shapes are vital to accurate identification. Because of intraspecific variation in some characters, three species are entered twice in the key.

KEY TO SPECIES

1a First D slightly tapered with broadly rounded apex; fins mottled with white (fins of juveniles may be black-tipped but these also have a black saddle on caudal peduncle) ..... *C. longimanus*
1b First D obviously tapered to a pointed or sharply rounded apex; fins not mottled with white; no black saddle on caudal peduncle 2

2a Second D with black tip, all other fins plain ..... *C. sealei*
2b Second D plain, white-tipped or, if black-tipped, then with dark markings on some of the other fins 3

3a C with conspicuous, wide, black trailing edge; 1st D without any dark markings 4
3b C without conspicuous, wide, black trailing edge or, if so, 1st D also has dark markings 5

4a First D with distinct white tip and trailing edge ..... *C. wheeleri*
4b First D without distinct white tip and trailing edge ..... *C. amblyrhynchos*

5a Interdorsal ridge present 6
5b Interdorsal ridge absent 15

6a First D, P, V and C with white tips and trailing edges ..... *C. albimarginatus*
6b First D, P, V and C plain or with dark markings 7

7a Second D, P and lower C lobe with black tips; 1st D with thin black trailing edge near apex; A usually plain ..... *C. sorrah*
7b Fins usually without any distinctive markings; if any fins are dark-tipped then A has a dark tip 8

8a Anal fin lobe more than twice 2nd D height 9
8b Anal fin lobe less than twice 2nd D height 10

9a First D origin behind P inner corner ..... *C. falciformis*
9b First D origin over P inner corner ..... *C. obscurus*

10a Snout to 1st D origin less than 2.2 x 1st D height ..... *C. plumbeus*
10b Snout to 1st D origin more than 2.2 x 1st D height 11

11a First D origin closer to P axil than to P inner corner 12
11b First D origin closer to P inner corner than to P axil 13

12a Mouth width less than 2.4 x distance from inner end of nostrils to mouth ..... *C. altimus*
12b Mouth width more than 2.4 x distance from inner end of nostrils to mouth ..... *C. galapagensis*

13a First D origin over P inner corner 14
13b First D origin in front of inner P corner ..... *C. galapagensis*

14a Upper teeth narrow, their lateral margins deeply concave or notched ..... *C. brachyurus*
14b Upper teeth broad, their lateral margins slightly concave but not notched ..... *C. obscurus*

15a Body pale brown, all fins with dark tips ..... *C. melanopterus*
15b Some or all fins without dark tips 16

16a Upper teeth broad, their lateral margins not notched 17
16b Upper teeth narrow or, if of moderate breadth, with clearly notched lateral margins 18

17a First D height more than 3.2 x 2nd D height ..... *C. amboinensis*
17b First D height less than 3.2 x 2nd D height ..... *C. leucas*

18a Upper teeth with large side cusps (cusplets); rear tip of 1st D elongated, about ⅔ of fin base; 2nd D origin well behind A origin, about opposite its midbase ..... *C. macloti*
18b Upper teeth without side cusps; rear tip of 1st D short, less than ½ fin base; 2nd D origin about opposite A origin 19

19a Distance between D bases less than 2.2 x 1st D height ..... *C. limbatus*
19b Distance between D bases more than 2.2 x 1st D height 20

20a Snout bluntly rounded; upper jaw teeth with oblique cusps ..... *C. brachyurus*
20b Snout sharply pointed; upper jaw teeth with narrow, erect cusps on broad bases ..... *C. brevipinna*

9.1 *Carcharhinus albimarginatus*
(Rüppell, 1837)

Silvertip shark — Silwertiphaai

Carcharias albimarginatus Rüppell, 1837: 64, Pl. 18, Fig. 1 (Red Sea). *Carcharhinus albimarginatus:* Bass et al., 1973: 17*; Smith, 1980: 173; Garrick, 1982: 116*.

Distinctive white tips and margins on otherwise dark fins. Interdorsal ridge present. Teeth $\frac{13\text{-}1 \text{ or } 2\text{-}13}{12\text{-}1 \text{ or } 2\text{-}12}$. Precaudal vertebrae 115-121.

Usually 5 or 6, sometimes up to 11 pups per litter, born at 70-80 cm; mature at 175 cm (males) and 2.0 m (females); attains 2.7 m. Eats fish; could be dangerous. Common in tropical parts of southwest Indian Ocean, ranges south to Cape Vidal. Usually found near offshore banks but also comes into shallow inshore waters and has been taken over deep water near offshore banks and islands. Occurs widely in tropical Indian Ocean and the western and eastern Pacific, but noticeably absent from Australia, central Pacific and Atlantic Ocean.

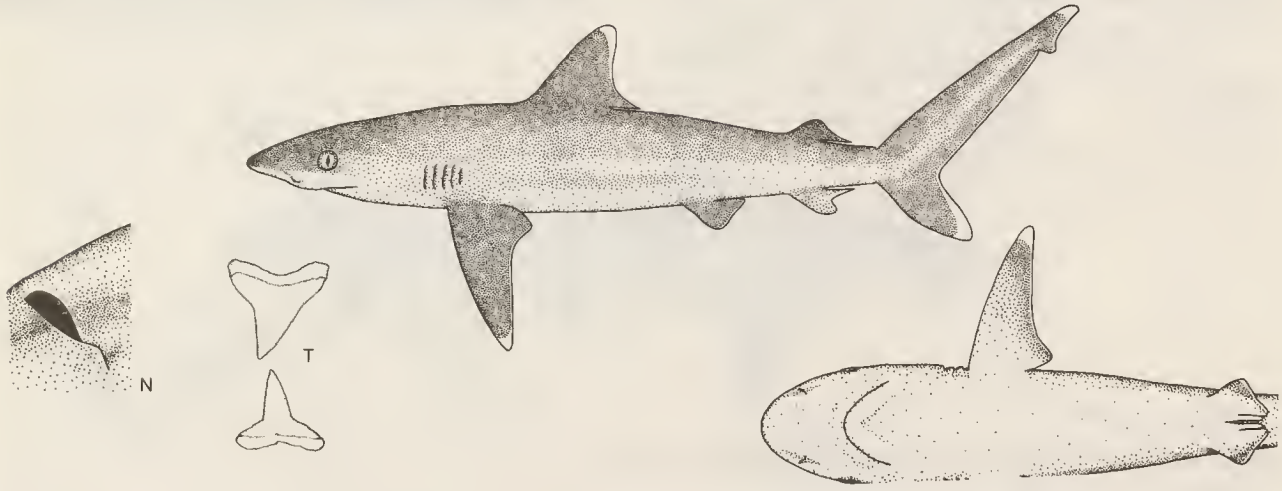
9.2 *Carcharhinus altimus*
(Springer, 1950)

Bignose shark — Grootneushaai

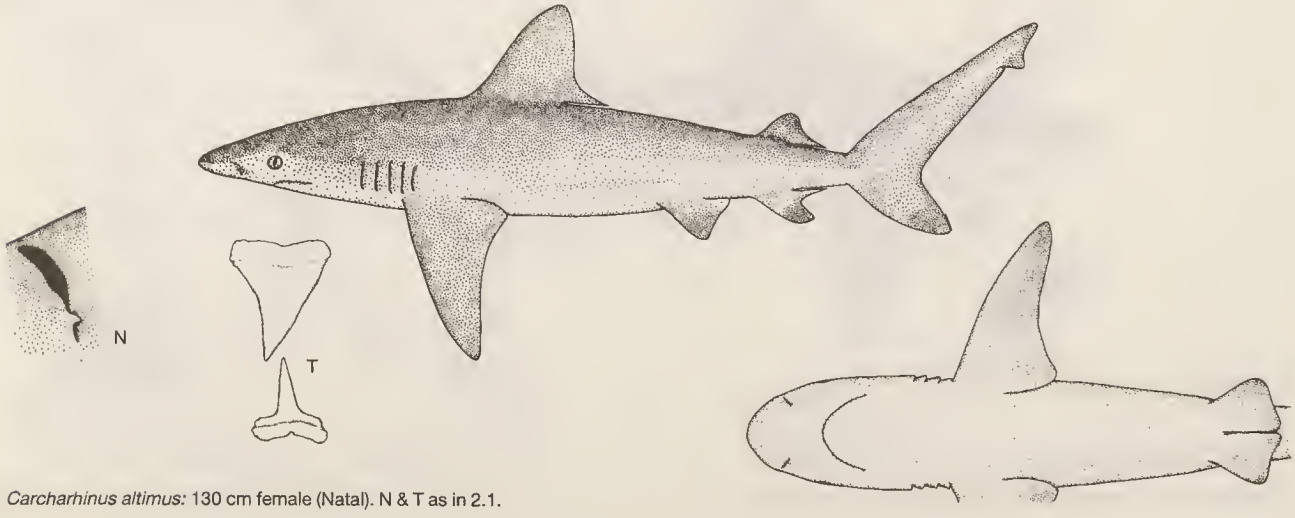
Eulamia altima Springer, 1950: 9 (Florida). *Carcharhinus altimus:* Bass et al., 1973: 20*; Garrick, 1982: 143*.

No distinct markings, although juveniles may have dusky tips to fins. Interdorsal ridge present. First D origin over or just behind P axil. Teeth $\frac{15\text{-}1 \text{ or } 2\text{-}15}{14\text{-}1\text{-}14}$. Noticeably long teeth near centre of upper jaws. Prominent lobe in nostril. Precaudal vertebrae 101-107.

Litter of 3-11 pups, born at about 75 cm; attains 2.8 m. Feeds near bottom in deep water, unlikely to be dangerous. A tropical species found on deeper parts of continental shelves. Recorded from Madagascar (adults) and Natal (juveniles). Also found in eastern and western Atlantic and the eastern and central Pacific.



9.1 *Carcharhinus albimarginatus:* 83 cm male (Beira). N & T as in 2.1.



9.2 *Carcharhinus altimus:* 130 cm female (Natal). N & T as in 2.1.

9.3 *Carcharhinus amblyrhynchos*
(Bleeker, 1856)

Grey reef shark — Grys rifhaai

Carcharias (Prionodon) amblyrhynchos Bleeker, 1856: 467 (Java Sea). *Carcharhinus amblyrhynchos:* Bass et al., 1973: 79*; Garrick, 1982: 106*.

Easily identified by the broad black trailing edge of C and the other fins without distinct dark or white markings.

Teeth $\frac{13\text{-}1\text{-}13}{12\text{-}1\text{-}13}$. Precaudal vertebrae 114.

Litter of 3-6 pups, born at 60 cm; mature at 130-140 cm; attains about 2.5 m. In our area known only from a single juvenile in shallow water off northwest Madagascar. A common inhabitant of coral reefs from the eastern Indian Ocean to central Pacific. Feeds on small fish and other animals near the bottom; can be aggressive.

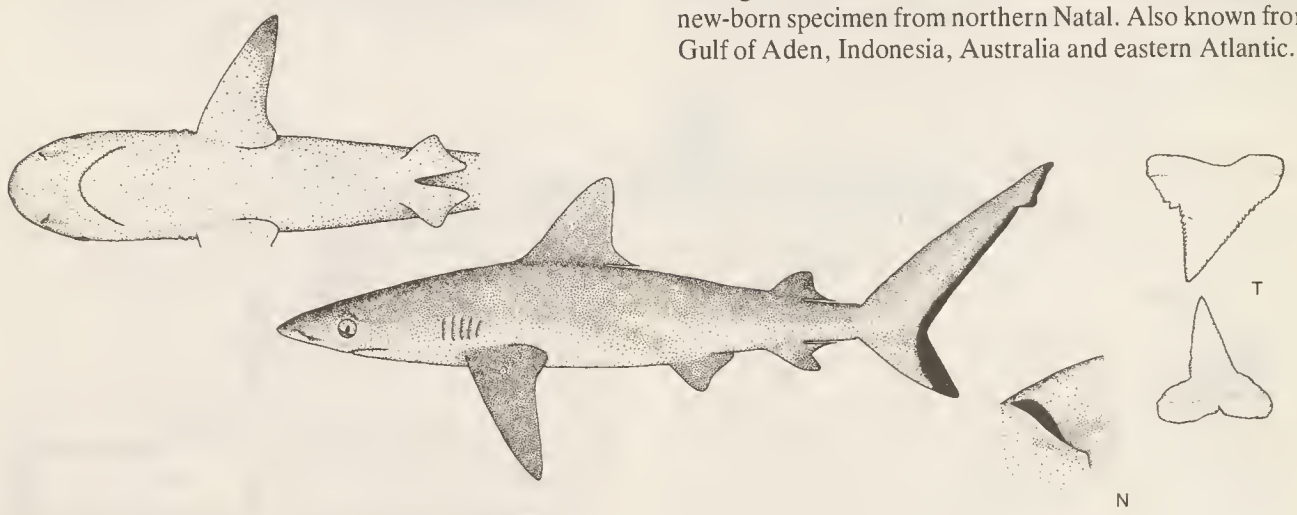
9.4 *Carcharhinus amboinensis*
(Müller & Henle, 1839)

Java shark — Javahaai

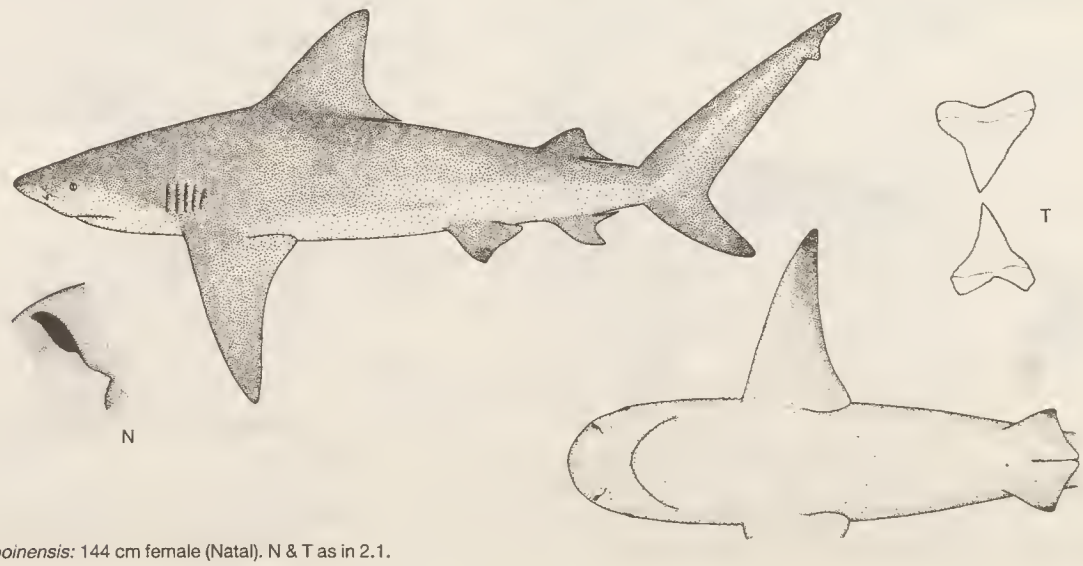
Carcharias (Prionodon) amboinensis Müller & Henle, 1839: 40, Pl. 19 (Amboina). *Carcharinus zambezensis (non* Peters): Smith, 1953: 42, **No. 9*.** *Carcharhinus amboinensis:* Bass et al., 1973: 44*; Garrick, 1982: 91*.

No interdorsal ridge. Juveniles with dusky tips to fins, adults plain. Teeth $\frac{12\text{-}1\text{-}12}{11\text{-}1\text{-}11}$. Upper teeth with broad, strongly serrated cusps. Short blunt snout, stocky body. Precaudal vertebrae 90-95.

Born at about 70 cm; males mature at 195 cm, recorded up to 223 cm, possibly attains 3 m. An inshore warm-water shark, recorded from Madagascar, Natal and eastern Cape. Found in somewhat deeper water than *C. leucas,* and does not normally occur in freshwater along east African coast but may enter into freshwater in other areas, including Madagascar. Natal *C. amboinensis* are mainly juveniles; 1 new-born specimen from northern Natal. Also known from Gulf of Aden, Indonesia, Australia and eastern Atlantic.



9.3 *Carcharhinus amblyrhynchos:* 68 cm female (NW Madagascar). N & T as in 2.1.



9.4 *Carcharhinus amboinensis:* 144 cm female (Natal). N & T as in 2.1.

9.5 *Carcharhinus brachyurus*
(Günther, 1870)
PLATE 2

Copper shark — Koperhaai

Carcharias brachyurus Günther, 1870: 369 (New Zealand). *Carcharinus improvisus* Smith, 1952: 761, Fig. 1 (Algoa Bay); 1953: 41, **No. 6a***. *Carcharhinus brachyurus:* Bass et al., 1973: 23*; van der Elst, 1981: 34*; Garrick, 1982: 171*.

Usually no interdorsal ridge. Fins plain or with slightly dusky tips. Usually dark brownish grey. Teeth $\frac{15\text{-}1\text{-}15}{15\text{-}1\text{-}15}$. Upper teeth with oblique cusps. First D origin in front of V inner corner. Precaudal vertebrae 96-103.

Litter of 13-20 pups, born at 60-70 cm; males mature at 2 m, females at 2.4 m; attains 2.9 m. Feeds on or near the seabed; has been blamed for several attacks on man. A worldwide coastal species found primarily in warm-temperate waters. Common from Namibia to Port Elizabeth; ranges north to Durban during winter. Often taken by shore anglers and by trawlers in depths of less than 100 m.

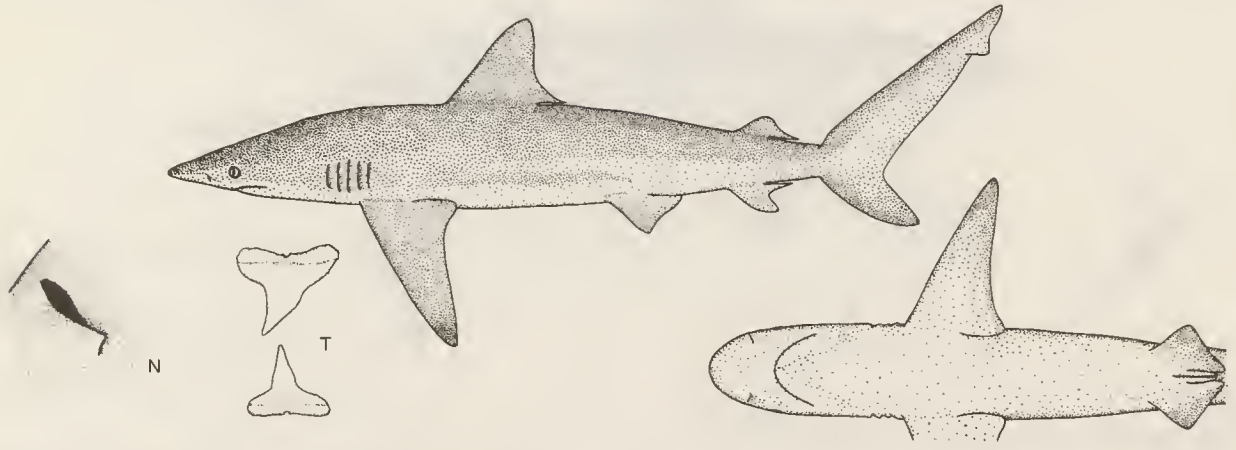
9.6 *Carcharhinus brevipinna*
(Müller & Henle, 1838)
PLATE 2

Spinner shark — Spinnerhaai

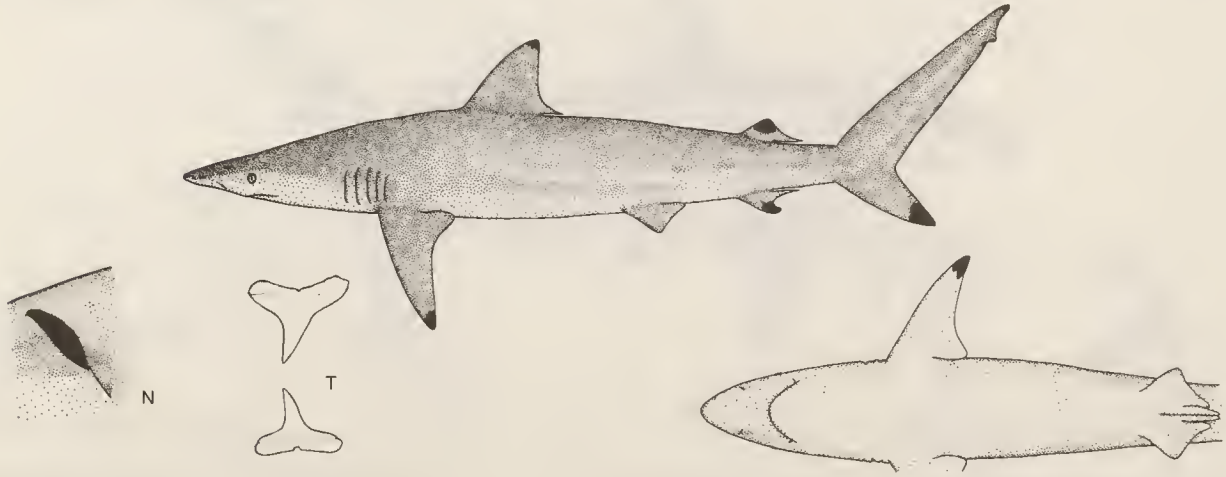
Carcharias (Aprion) brevipinna Müller & Henle, 1838: 31, Pl. 9 (Java) *Carcharinus johnsoni* Smith, 1951: 88, Fig. 1, 2 (East London to Mossel Bay, Durban); 1953: 41, **No. 5a***. *Carcharhinus brevipinna:* Bass et al., 1973: 26*; Garrick, 1982: 41*.

No interdorsal ridge. Sharply pointed snout. Juveniles often with plain fins or, like adults, all fins with clearly demarcated black tips except possibly upper C lobe (which may be plain) and V which have at most slightly dusky tips. Teeth $\frac{16\text{-}2\text{-}16}{16\text{-}1\text{-}16}$. Upper teeth with narrow, erect cusps on broad bases. Precaudal vertebrae 83-91. *C. limbatus* has similar teeth but has plain A and distinct black V tips.

Litter of 6-15 pups, born in autumn at 65-75 cm; males mature at 180-190 cm, females at 2 m; attains about 2.7 m. Feeds on relatively small fish and unlikely to be dangerous to man. A tropical shallow-water species of the Red Sea and all major oceans; extends southward to Mossel Bay. Pups are dropped along Natal coast and somewhat older juveniles are caught off eastern Cape.



9.5 *Carcharhinus brachyurus:* 143 cm male (Algoa Bay). N & T as in 2.1.



9.6 *Carcharhinus brevipinna:* 179 cm male (Natal). N & T as in 2.1.

9.7 *Carcharhinus falciformis*
(Bibron, 1839)

Silky shark — Syhaai

Carcharias (Prionodon) falciformis Bibron, *in* Müller & Henle, 1839: 47 (Cuba). *Carcharhinus falciformis:* Bass et al., 1973: 29*; Garrick, 1982: 159*.

Interdorsal ridge present. Fins plain or with slightly dusky tips. First D origin behind inner P corner; and 2nd D with distinctive long lobes. Teeth $\frac{16\text{-}2\text{-}16}{16\text{-}1\text{-}16}$. Upper teeth moderately broad, somewhat oblique with a strong lateral notch. Precaudal vertebrae 98-106.

In our area, litter of 9-14 pups, born at about 80-85 cm; attains 3 m. An oceanic warm-water species of all major oceans, also found over continential shelf areas. Recorded from Madagascar and from Zanzibar to Durban. Feeds inshore as well as in deep water, and could be dangerous to man.

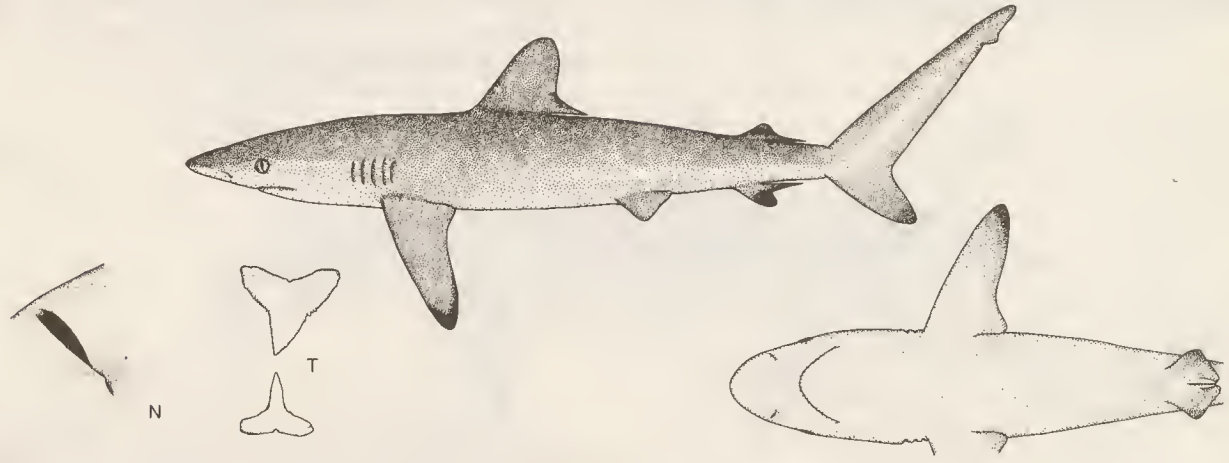
9.8 *Carcharhinus galapagensis*
(Snodgrass & Heller, 1905)

Galapagos shark — Galapagoshaai

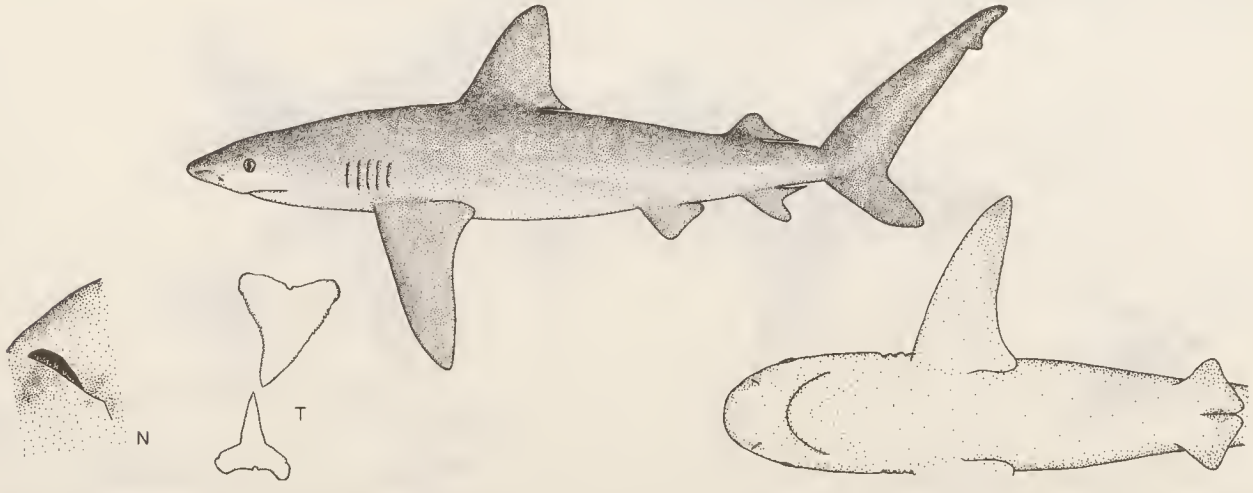
Carcharias galapagensis Snodgrass & Heller, 1905: 343 (Galapagos Islands). *Carcharhinus galapagensis:* Bass et al., 1973: 32*; Smith, 1975: 10; Garrick, 1982: 126*.

Interdorsal ridge present. Fins plain or with slightly dusky tips. Teeth $\frac{14\text{-}1\text{-}14}{14\text{-}1\text{-}14}$. Upper teeth with broad triangular cusps. *C. obscurus* and *C. galapagensis* are difficult to distinguish, but *C. galapagensis* has a taller 1st D (11.2% or more of total length) compared to *C. obscurus* (less than 11.2%). Vertebral counts give a positive identification – precaudal numbers are 103-109 in *C. galapagensis* and 86-97 in *C. obscurus*.

Litter of 6-16 pups, born at 70-80 cm; attains about 2.7 m, possibly more. Tends to feed near the bottom, but will take baits at the surface; suspected in at least one fatal attack. A circumglobal, warm-water species associated with oceanic islands; in our area known only from Walters Shoal south of Madagascar.



9.7 *Carcharhinus falciformis:* 94 cm male (S. Mozambique). N & T as in 2.1.



9.8 *Carcharhinus galapagensis:* 114 cm female (south of Madagascar). N & T as in 2.1.

9.9 *Carcharhinus leucas*
(Valenciennes, 1839)
PLATE 2

Bull shark — Bulhaai

Carcharias (Prionodon) leucas Valenciennes, *in* Müller & Henle, 1839: 42 (Antilles). *Eulamia lamia:* Smith (1949 only), **SFSA No. 9*.** *Carcharhinus vanrooyeni* Smith, 1958: 12, pls. (Zululand); 1961: 565, **No. 9a*.** *Carcharhinus leucas:* Bass et al., 1973: 37*; van der Elst, 1981: 35*; Garrick, 1982: 81*.

No interdorsal ridge. Juveniles with dusky tips to fins, adults plain. Teeth $\frac{13\text{-}2\text{-}13}{12\text{-}2\text{-}12}$. Upper teeth with broad, strongly serrated cusps. Short blunt snout; stocky body. Precaudal vertebrae 112-123.

In our area litters contain 10-12 pups, born at 60-70 cm; mature at 2.3 m; attains 3 m. Often feeds on relatively large prey, and a proven maneater. An inshore warm-water shark known from all major oceans; the young often going into rivers, sometimes many kilometres from the sea. In Natal adults occur in shallow inshore waters, often in the surf; a 2.9 m, 196 kg female was caught at Fish River mouth in December 1983.

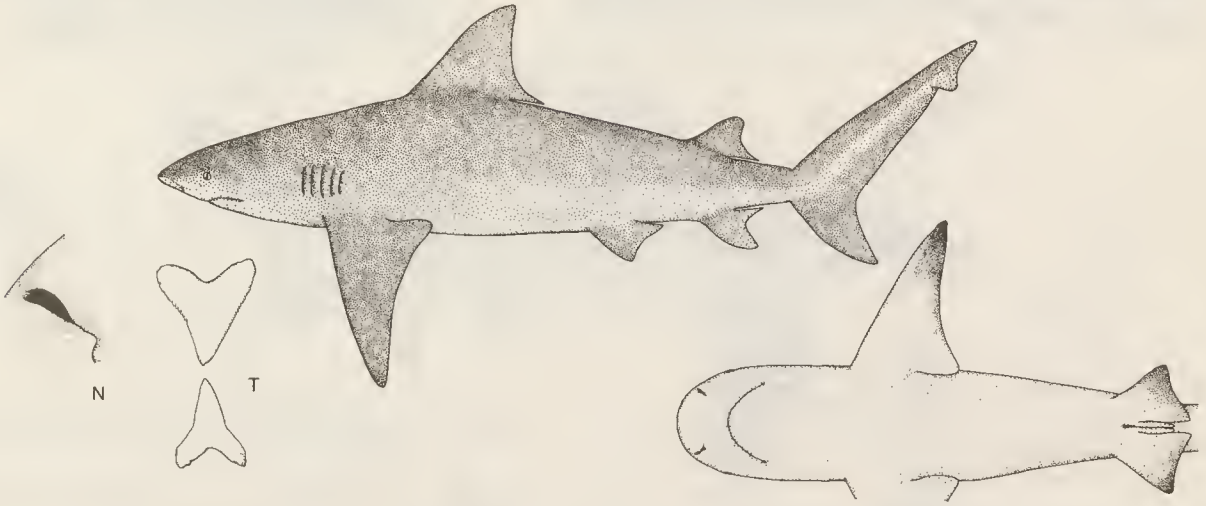
9.10 *Carcharhinus limbatus*
(Müller & Henle, 1839)
PLATE 2

Blacktip shark — Swarttiphaai

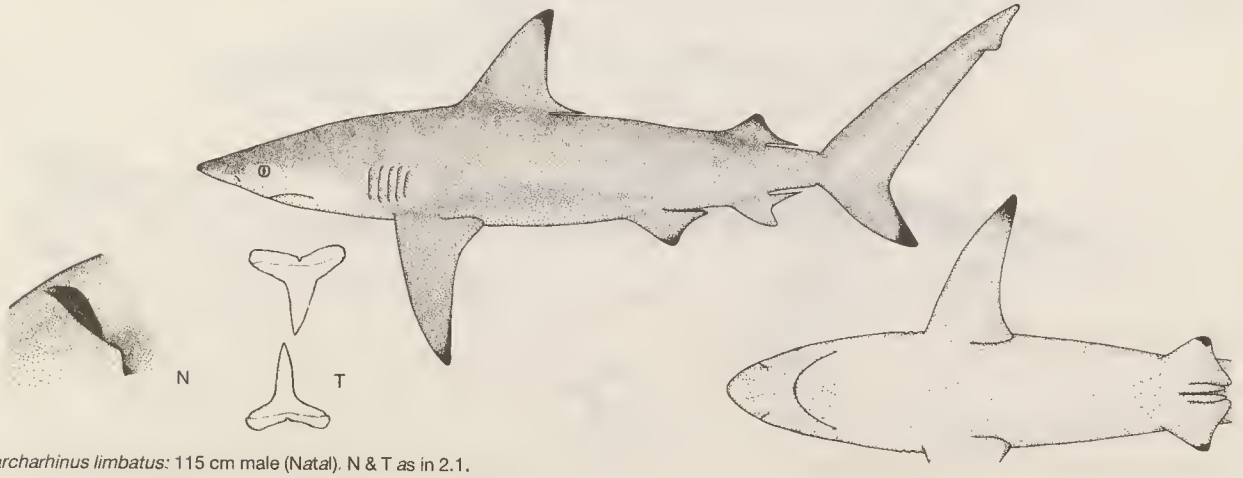
Carcharias (Prionodon) limbatus Müller & Henle, 1839: 49, Pl. 19 (West Indies). *Eulamia limbata:* Smith, **SFSA No. 5*.** *Carcharinus limbatus:* Smith, 1953: 40, **No. 5.** *Carcharhinus limbatus:* Bass et al., 1973: 46*; van der Elst, 1981: 36*; Garrick, 1982: 28*.

No interdorsal ridge. Juveniles often plain or, like adults, with all fins (except possibly the anal) black-tipped; these markings not clearly demarcated except for those on V. Teeth $\frac{15\text{-}2 \text{ or } 3\text{-}15}{15\text{-}1\text{-}15}$. Upper teeth with narrow, erect cusps on broad bases. Precaudal vertebrae 94-102.

In our area usually 8 pups per litter, born in summer at 60-65 cm; males mature at 160-180 cm, females at 190 cm; attains 2.5 m. An active hunter in midwater; nervous but sometimes aggressive toward spearfishermen. Widely distributed throughout tropical seas; found around Madagascar and offshore islands and along the coast to Natal and, in summer, the eastern and southern Cape coasts. Often taken by shore anglers.



9.9 *Carcharhinus leucas:* 166 cm male (Natal). N & T as in 2.1.



9.10 *Carcharhinus limbatus:* 115 cm male (Natal). N & T as in 2.1.

9.11 *Carcharhinus longimanus*
(Poey, 1861)

Oceanic whitetip shark — Opesee-wittiphaai

Squalus (Carcharias) maou Lesson, 1830: 91, Pl. 1 (Paumotu Archipelago; Garrick (1982) notes that *longimanus* is used in preference to *maou* in accordance with well-established usage and rulings of the International Commission on Zoological Nomenclature). *Squalus longimanus* Poey, 1861: 338, Pl. 19, Figs. 9, 10 (Cuba). *Pterolamiops magnipinnis* Smith, 1958b: 131, Fig. 1c, Pl. 1 (Port Elizabeth); 1961: 565, **No. 10a*.** *Carcharhinus longimanus:* Bass et al., 1973: 49*; Garrick, 1982: 150*.

Interdorsal ridge usually present. Distinguished by the broadly rounded fins, usually mottled with white. V and A have dark tips (in specimens of more than 130 cm); juveniles often have dark tips to the fins, but also have a distinctive dark saddle on caudal peduncle. Teeth $\frac{14\text{-}2\text{-}14}{14\text{-}2\text{-}14}$. Precaudal vertebrae 123-131.

Usually 6-8, up to 15, pups per litter, born at 60-65 cm; mature at about 190 cm; attains 3 m, occasionally more. An abundant shark of tropical seas, found in all major oceans, usually away from continental shelves. Common off Natal; juveniles have been taken off the southeastern Cape Province. A dangerous shark, but normally unlikely to come into contact with man.

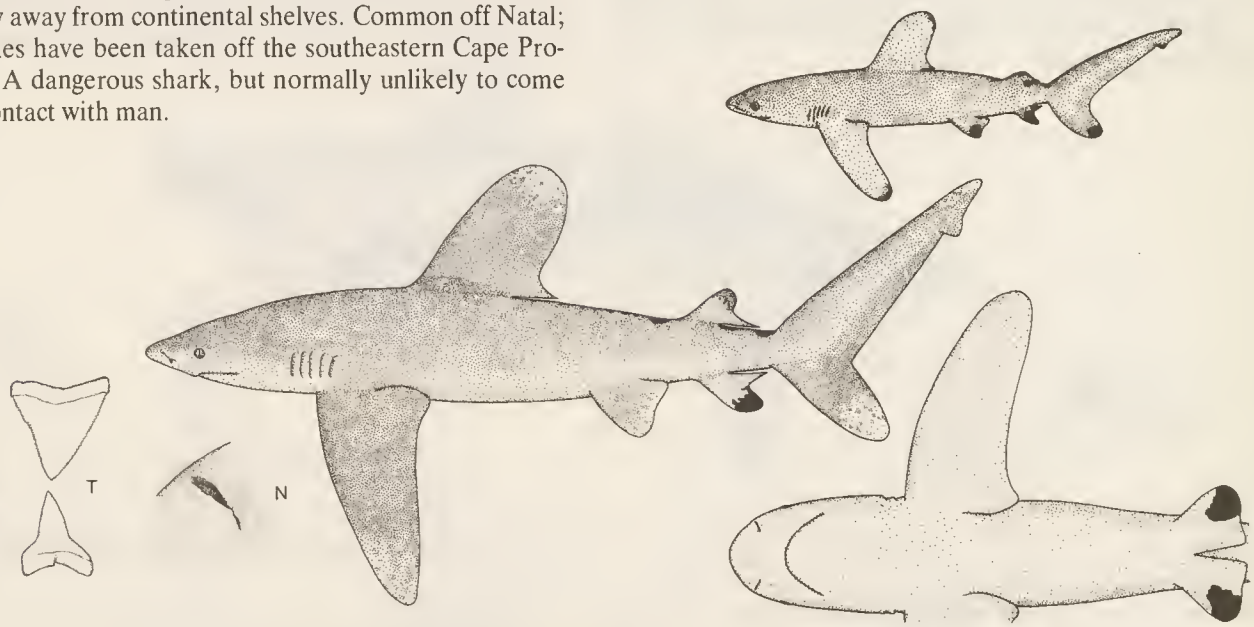
9.12 *Carcharhinus macloti*
(Müller & Henle, 1839)

Hardnose shark — Hardeneushaai

Carcharias (Hypoprion) macloti Müller & Henle, 1839: 34, Pl. 10 (New Guinea).

No interdorsal ridge; sharply pointed, long, narrow snout with internal rostral cartilages expanded and hypercalcified, easily felt by pinching snout. Upper teeth with narrow oblique, smooth main cusps and small side cusps on broad bases, but without serrations; teeth $\frac{14\text{-}2\text{-}14}{10\text{-}1\text{-}10}$. Fins plain, the rear margins lighter.

Litter of 1-2 pups; males mature at 69-91 cm, adult females 76-89 cm; maximum probably below 1 m. Diet unrecorded, probably small fish, squids and crustaceans; harmless to man. A tropical shallow-water species ranging from Kenya and Tanzania east to China and New Guinea; not recorded from our area but to be expected.



9.11 *Carcharhinus longimanus:* 150 cm female and (top) 61 cm embryo (both Natal). N & T as in 2.1.

9.12 *Carcharhinus macloti:* 77 cm mature female (Kenya).

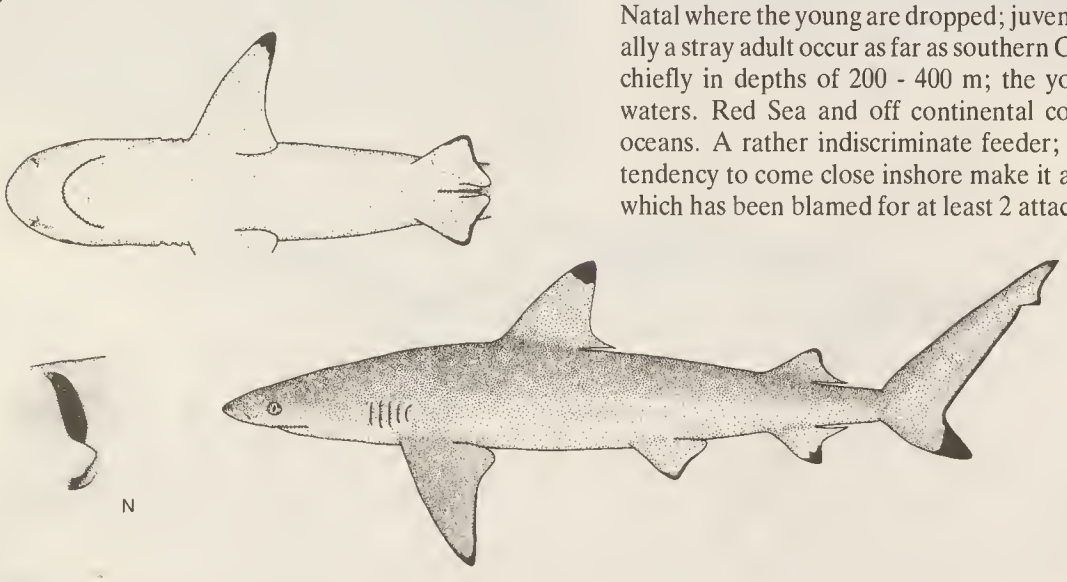
9.13 *Carcharhinus melanopterus*
(Quoy & Gaimard, 1824)

Blackfin reef shark — Swartvin-rifhaai

Carcharias melanopterus Quoy & Gaimard, 1824: 194, Pl. 43, Figs. 1, 2 (New Guinea). *Carcharhinus melanopterus:* Smith, **SFSA No. 7*;** Bass et al., 1973: 55*; Garrick, 1982: 96*.

No interdorsal ridge. Easily identified by the lemon-brown colour and distinct dark markings on all fins. Teeth $\frac{12\text{-}1 \text{ or } 2\text{-}12}{11\text{-}1\text{-}11}$. Precaudal vertebrae 111-117.

Few pups per litter, born at about 60 cm; attains about 160 cm. A roving scavenger of coral reef areas, often occurring in less than 1 m; can be aggressive and has attacked man. Red Sea to central Pacific and to southern Mozambique.



9.13 *Carcharhinus melanopterus:* 70 cm male (north of Mauritius). N = nostril.

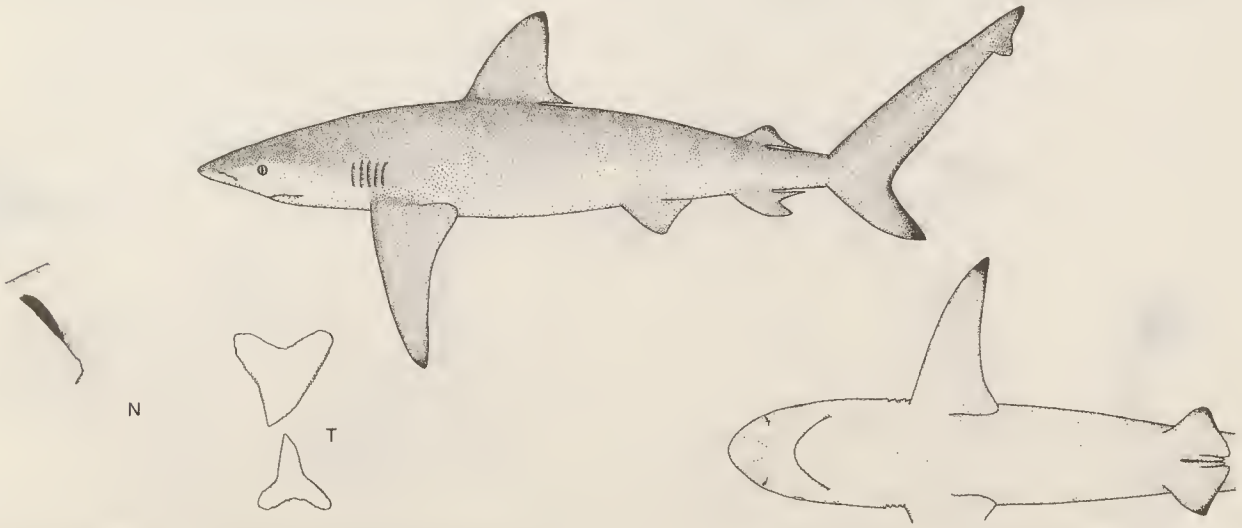
9.14 *Carcharhinus obscurus*
(Lesueur, 1818)
PLATE 2

Dusky shark — Donkerhaai

Squalus obscurus Lesueur, 1818: 223, Pl. 9 ("North America"). *Eulamia obscura:* Smith, **SFSA No. 6*.** *Carcharinus obscurus:* Smith, 1953: 41, **No. 6*.** *Carcharhinus obscurus:* Bass et al., 1973: 58*; van der Elst, 1981: 37*; Garrick, 1982: 120*.

Interdorsal ridge present. Fins dusky-tipped or plain. Teeth $\frac{14 \text{ or } 15\text{-}2\text{-}14 \text{ or } 15}{14\text{-}1\text{-}14}$. Upper teeth with broad, almost erect cusps. First D origin over P inner corner. Precaudal vertebrae 175-191.

Litter of 6-14 pups, born chiefly in early winter at 80-90 cm; males mature at 2.8 m, females at 2.6-3.0 m; attains 3.5 m. A common shark off southeast Africa, adults ranging to Natal where the young are dropped; juveniles and occasionally a stray adult occur as far as southern Cape coast. Adults chiefly in depths of 200 - 400 m; the young in shallower waters. Red Sea and off continental coasts of all major oceans. A rather indiscriminate feeder; its large size and tendency to come close inshore make it a dangerous shark which has been blamed for at least 2 attacks.



9.14 *Carcharhinus obscurus:* 165 cm male (Natal). N & T as in 2.1.

9.15 *Carcharhinus plumbeus*
(Nardo, 1827)

Sandbar shark — Sandbankhaai

Squalus plumbeus Nardo, 1827: 477 (no specimens mentioned). *Carcharhinus plumbeus:* Bass et al., 1973: 65*; Garrick, 1982: 132*.

Interdorsal ridge present. Pale in colour; fins plain or with slightly dusky tips. High, erect 1st D with its origin over or in front of P axil. Upper teeth with broad, triangular cusps. Teeth $\frac{14\text{-}1 \text{ or } 2\text{-}14}{14\text{-}1\text{-}14}$. Precaudal vertebrae 89-96.

Born at 60-65 cm during midsummer; mature at 160-170 cm; attains almost 220 cm. A bottom-feeder, never recorded attacking man but potentially dangerous. Shallow coastal waters from Mozambique and Madagascar to southern Natal. Young probably born in Mozambique; juveniles in Natal; adults chiefly further north. Worldwide in tropical/subtropical waters.

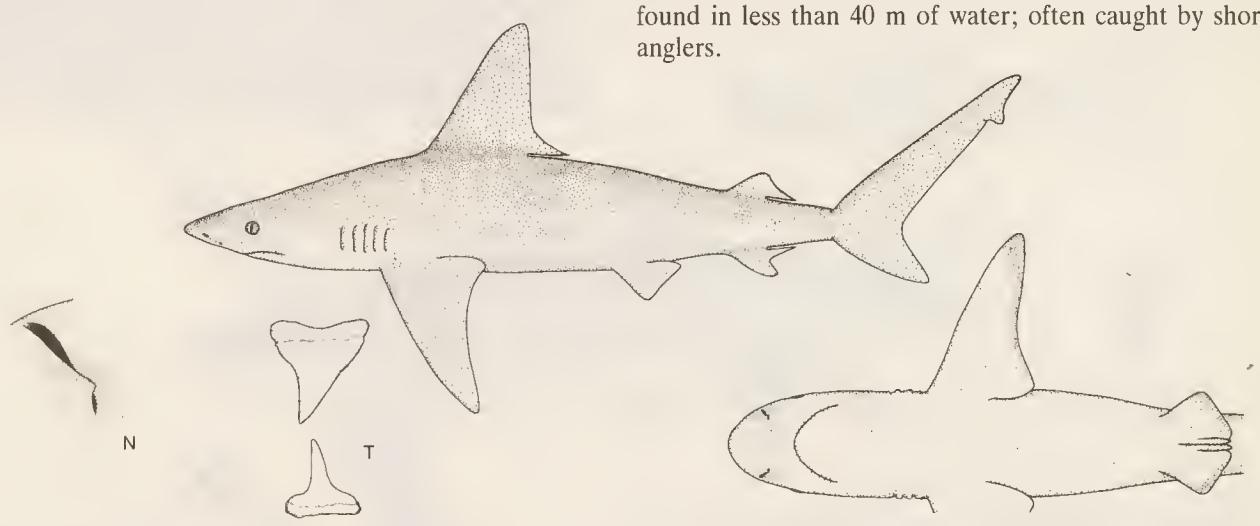
9.16 *Carcharhinus sealei*
(Pietschmann, 1913)

Blackspot shark — Swartkolhaai

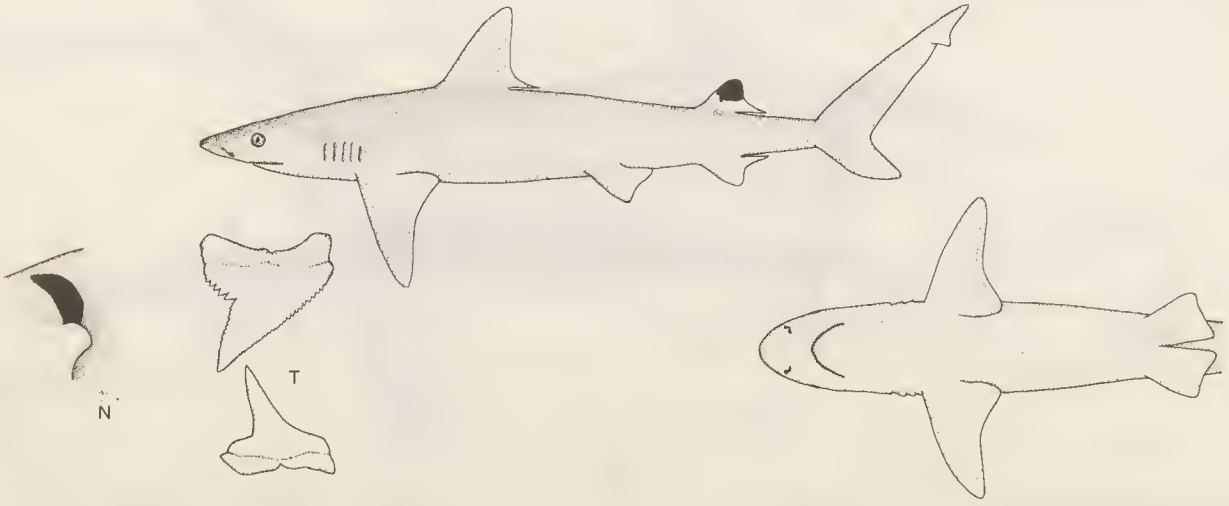
Carcharias sealei Pietschmann, 1913: 172 (replacement name for *Carcharias borneensis* Seale, 1910: 263, Pl. 1, Figs. 1-4 (Borneo)). *Eulamia dussumieri (non* Valenciennes): Smith, **SFSA No. 8*.** *Carcharinus dussumieri:* Smith, 1953: 42, **No. 8*.** *Carcharhinus sealei:* Bass et al., 1973: 70*; van der Elst, 1981: 38*; Garrick, 1982: 48*.

Interdorsal ridge reduced or absent. Immediately identified by the combination of otherwise plain fins with a conspicuous black tip covering ½ or more of 2nd D. Teeth $\frac{12\text{-}2\text{-}12}{12\text{-}1\text{-}12}$. Precaudal vertebrae 74-85.

One or 2 pups per litter, born at 35-45 cm; mature at 70-80 cm; attains about 100 cm. Eats fish and squid; too small to be dangerous to man. Seychelles, Mauritius, Madagascar, Zanzibar and east African coast southwards to Natal. Also known from eastern Indian Ocean and western Pacific. Not recorded from African coast north of equator. Usually found in less than 40 m of water; often caught by shore anglers.



9.15 *Carcharhinus plumbeus*: 118 cm male (Natal). N & T as in 2.1.



9.16 *Carcharhinus sealei:* 91 cm female (Natal). N & T as in 2.1.

9.17 *Carcharhinus sorrah*
(Valenciennes, 1839)

Spot-tail shark — Kolsterthaai

Carcharias (Prionodon) sorrah Valenciennes, *in* Müller & Henle, 1839: 45, Pl. 16 (India, Java, Madagascar). *Carcharhinus sorrah;* Bass et al., 1973: 72*; Garrick, 1982: 165*.

Interdorsal ridge present. Easily identified by the combination of plain P, upper C & A, dark tips to lower C lobe and P, and thin but definite dark tip and trailing edge to 1st D. Teeth $\frac{12\text{-}1\text{-}12}{12\text{-}1\text{-}12}$. Precaudal vertebrae 76-79.

Born at 50-60 cm; mature at 100 cm (males), 110-115 cm (females); attains about 160 cm. Eats fish; not known to be dangerous. Tropical areas from Red Sea to western Pacific. Ranges to southern Mozambique (approximately 25°S) and may extend into northern Natal; only 2 specimens recorded from African coast. An inhabitant of coral reef areas, usually found at depths of 20 - 75 m.

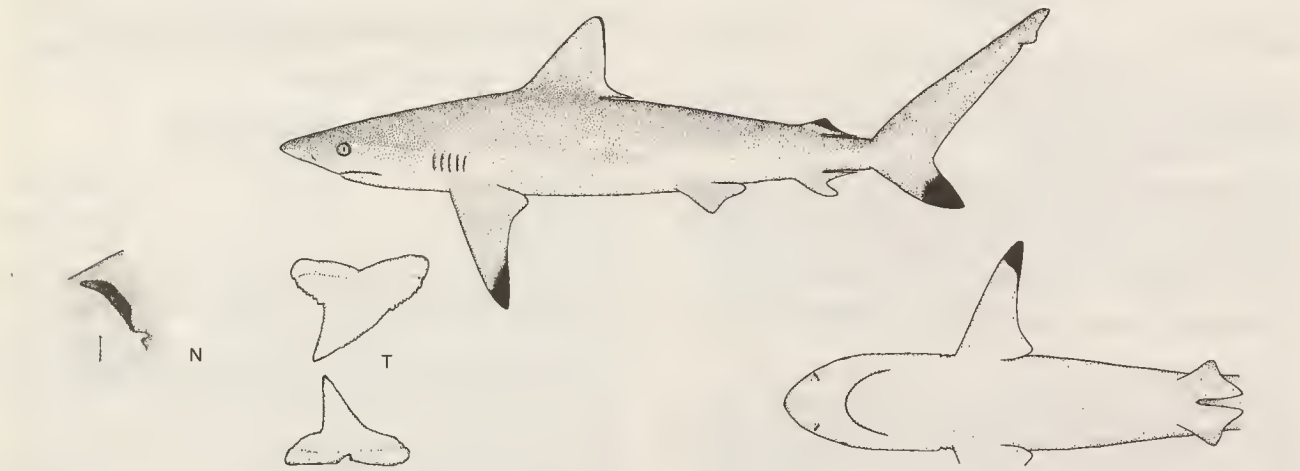
9.18 *Carcharhinus wheeleri*
Garrick, 1982

Shortnose blacktail shark — Kortneus-swartsterthaai

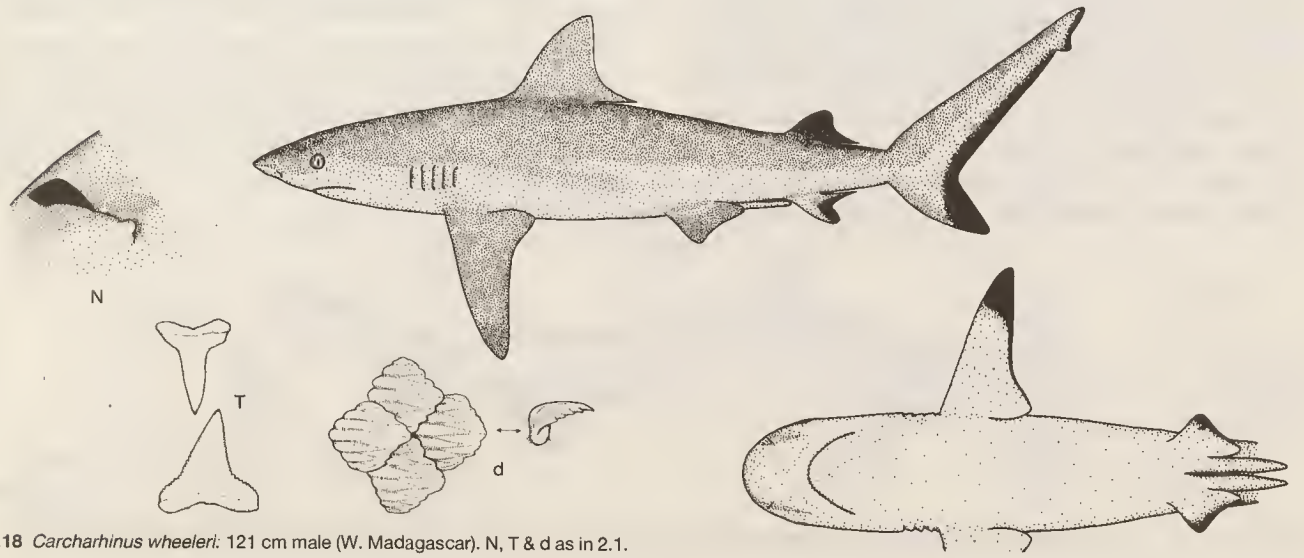
Eulamia melanoptera (non Quoy & Gaimard): Smith, **SFSA No. 7*.** *Carcharinus melanopterus (non* Quoy & Gaimard): Smith, 1953: 41, **No. 7*.** *Carcharhinus spallanzani (non* Lesueur): Bass et al., 1973: 77*. *Carcharhinus wheeleri* Garrick, 1982: 111, Figs. 50, 51 (Red Sea).

No interdorsal ridge. Easily identified by broad black trailing edge of C, the other fins without distinct dark markings, and the 1st D with definite white edging to tip and trailing margin. Teeth $\frac{13\text{-}1 \text{ or } 2\text{-}13}{12 \text{ or } 13\text{-}12 \text{ or } 13}$. Precaudal vertebrae 110-117.

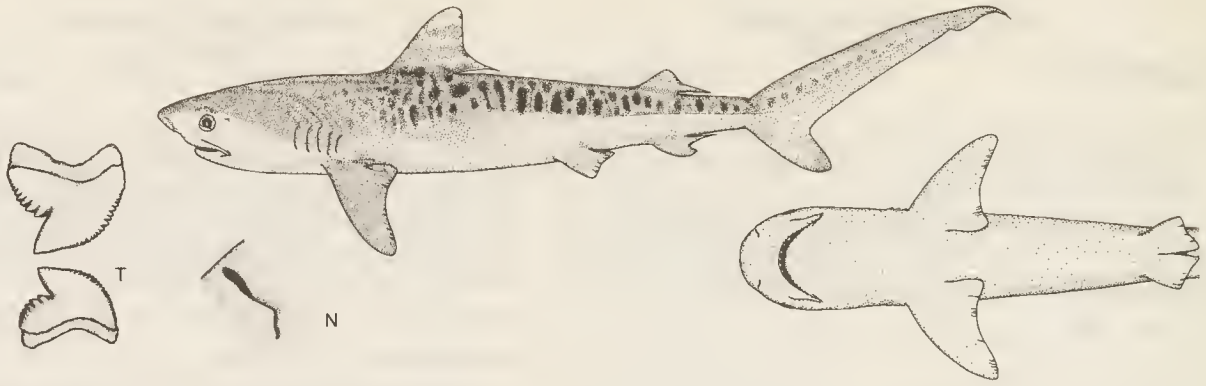
Litter of 1-4 pups, born at 65-75 cm; males mature at 110-130 cm, females at 120 cm; attains about 170 cm. Red Sea and western to central Indian Ocean, south to Natal. Juveniles in shallow inshore waters, adults usually in deeper waters of about 80 m. Eats fish; often aggressive towards skindivers with speared fish.



9.17 *Carcharhinus sorrah:* 111 cm female (W. Madagascar). N & T as in 2.1.



9.18 *Carcharhinus wheeleri:* 121 cm male (W. Madagascar). N, T & d as in 2.1.



9.19 *Galeocerdo cuvier:* 107 cm immature female (S. Mozambique). N & T as in 2.1.

Genus ***Galeocerdo*** Müller & Henle, 1837

One species.

9.19 *Galeocerdo cuvier*
(Peron & Lesueur, 1822)
PLATE 2

Tiger shark — Tierhaai

Squalus cuvier Peron & Lesueur, *in* Lesueur, 1822: 351 (Australia). *Galeocerdo cuvier:* Smith, **SFSA No. 14*.** *Galeocerdo cuvieri:* Bass et al., 1975: 35*; van der Elst, 1981: 39*.

Spiracles and interdorsal ridge present. Long upper and lower lip folds. Upper C lobe with long tapering tip. Juveniles with prominent "tiger" stripes which fade in adults. Lateral keels on caudal peduncle. Teeth $\frac{10 \text{ or } 11\text{-}1\text{-}10 \text{ or } 11}{11\text{-}1\text{-}11}$; distinctively cockscomb-shaped, with large serrations and alike in upper and lower jaws. Precaudal vertebrae 100-112.

Viviparous, 23-46 pups per litter. Born at about 70 cm; males mature at 2.7 m; attains 4.1 m in our area; longest definite record elsewhere about 5.5 m. Scavenger/predator noted for indiscriminate feeding habits. The fearsome dentition, powerful jaws and huge size of tiger sharks make them a formidable predator easily able to bite through the bony shell of a sea turtle or cut a large shark in half. Their usual food is sharks, rays and various fishes, but they also consume sea birds, turtles, marine mammals, and a variety of the miscellaneous rubbish that man dumps in the sea. May attack man and is greatly feared by men wrecked beyond the reefs, but is more likely to feed on humans already dead from other causes. A tropical species found in all major oceans; ranges south to Natal (chiefly juveniles and adolescents) and rarely to the eastern Cape. An embryo from a large female caught at Cape St. Francis is in the Natal Museum.

Genus ***Galeorhinus*** Blainville, 1816

Two or 3 species, 1 in our area.

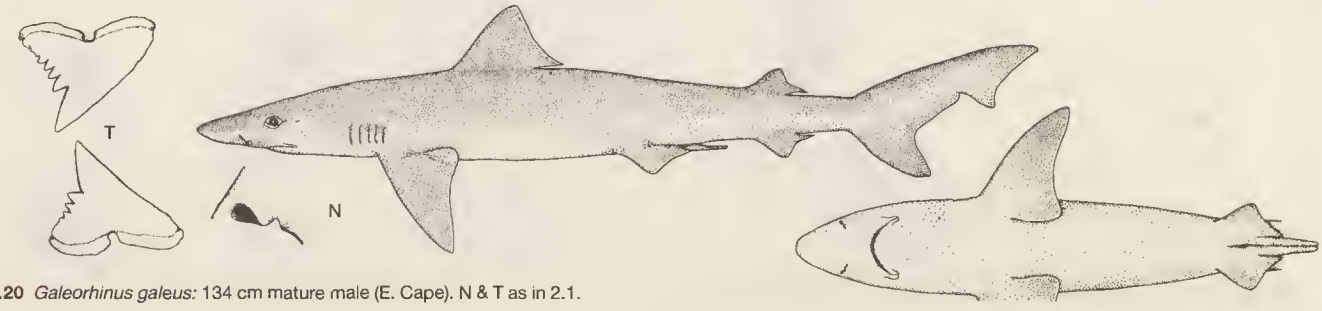
9.20 *Galeorhinus galeus*
(Linnaeus, 1758)
PLATE 2

Soupfin shark — Sopvinhaai

Squalus galeus Linnaeus, 1758: 234 ("European Ocean"). *Galeorhinus galeus:* Smith, **SFSA No. 15*;** Smith & Smith, 1965: 21*; Bass et al., 1975: 20*.

Spiracles present; long terminal sector on upper C lobe (distance from C notch to tip about equal to half of upper C lobe). No interdorsal ridge. Transitional nictitans in late embryos, internal in adults.

Dark grey above, paler below; fins plain, sometimes with pale trailing edges. Snout milky when viewed from below. Viviparous; males mature at about 120 cm; attains about 160 cm. Bottom-feeder, not dangerous. Probably the most abundant shark of the southern and western Cape, but virtually nothing is known of its biology. Shallow inshore waters down to about 200 m; Angola to East London but rarely, if ever, into Natal waters. Common in eastern North Atlantic and Mediterranean, also reported from Pacific Ocean.



9.20 *Galeorhinus galeus:* 134 cm mature male (E. Cape). N & T as in 2.1.

9.21 *Hemipristis elongata:* 137 cm immature female (Zanzibar). T = teeth.

Genus ***Hemipristis*** Agassiz, 1843

The genus *Hemipristis* was first described on the basis of fossil teeth. One living species.

9.21 *Hemipristis elongata*
(Klunzinger, 1871)

Snaggletooth — Lostandhaai

Dirrhizodon elongatus Klunzinger, 1871: 665 (Red Sea). *Hemipristis elongatus:* Bass et al., 1975: 29*.

Interdorsal ridge sometimes present. Spiracles present. Definite upper and lower lip grooves. Teeth $\frac{14\text{-}14}{18\text{-}18}$; upper teeth with distinctive, long, slightly curved cusps strongly serrated on both sides.

Viviparous, 6-8 pups per litter; born at 45-55 cm; attains about 2.4 m. Common in shallow waters of northern Indian Ocean; Vietnam to Red Sea. Also Madagascar and Mozambique; 1 specimen from southern Natal.

Genus ***Hypogaleus*** Smith, 1957

One species.

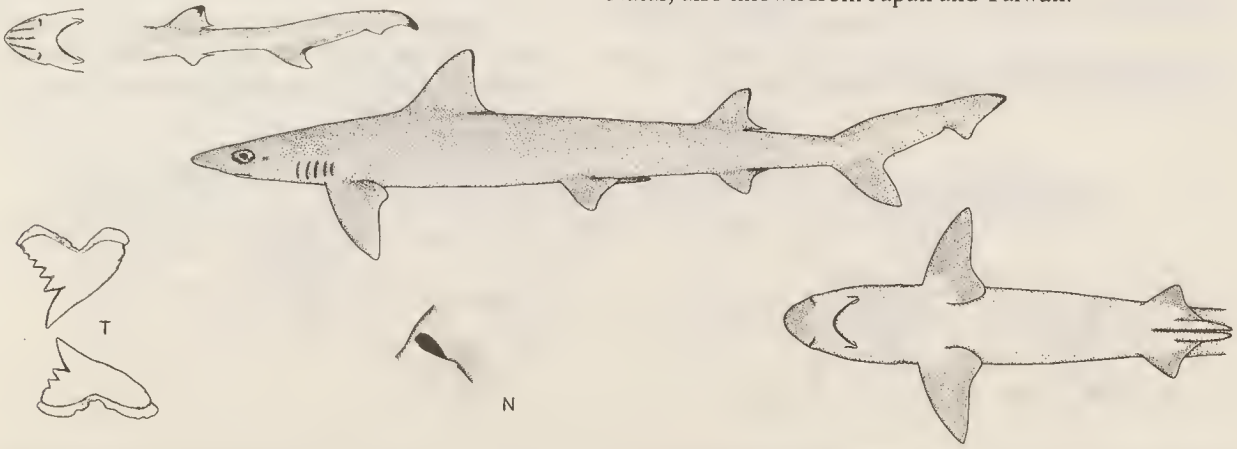
9.22 *Hypogaleus hyugaensis*
(Miyosi, 1939)

Lesser soupfin shark — Kleiner sopvinhaai

Eugaleus hyugaensis Miyosi, 1939: 91, Fig. 1 (Papas). *Hypogaleus zanzibarensis* Smith, 1957: 589, Fig. 2, Pl. 19 (Zanzibar). *Hypogaleus hyugaensis:* Bass et al., 1975: 22*.

Internal nictitans. No interdorsal ridge. Teeth smooth-edged, in 2 or 3 functional series. Tooth count about $\frac{50}{44}$.

Dull grey, paler below; front part of snout slightly dusky. Late embryos have A plain, D and C with black tips and transparent trailing edges, C also with dark mark in angle of trailing edge, and underside of snout with longitudinal dark bands. Viviparous, about 11 pups per litter, born at 35 cm; attains about 130 cm. Eats fish; too small to be dangerous. Taken at depths of 65 - 230 m off Zanzibar, Kenya and Natal; also known from Japan and Taiwan.



9.22 *Hypogaleus hyugaensis:* 127 cm mature male (Natal). Tail and ventral view of head of juvenile (above). N & T as in 2.1.

9.23 *Iago omanensis:* 57 cm mature female (Arabian Sea; after Compagno & Springer, 1971).

Genus ***Iago*** Compagno & Springer, 1971

One species.

9.23 *Iago omanensis*
(Norman, 1939)

Bigeye houndshark — Grootoog-hondhaai

Eugaleus omanensis Norman, 1939: 11, Fig. 3 (Gulf of Oman). *Iago omanensis:* Compagno & Springer, 1971: 619*; Bass et al., 1975: 18*.

Interdorsal ridge present. Transitional nictitans. Teeth unicuspid, smooth-edged, in 2 or 3 functional rows.

Attains 58 cm. Brown or grey above, lighter below; tips and leading edges of D and C may have a darker colour. Known only from Red Sea, Gulf of Oman, Arabian Sea and India; may appear in our area. Occurs in 110 - 2 195 m.

Genus ***Leptocharias*** Smith, 1838

A single species found inshore off the west African coast between latitudes 20°N and 20°S.

9.24 *Leptocharias smithii*
(Müller & Henle, 1839)

Barbelled houndshark — Baard-hondhaai

Triaenodon smithii Müller & Henle, 1839: 56, Pl. 21 (Cabinda, Angola). *Leptocharias smithii:* Krefft, 1968: 41; Compagno, 1981: (1)*.

A small shark similar in appearance to species of *Mustelus* but distinguishable by the nostrils with anterior flaps formed into distinct barbels. Teeth small and numerous, mostly having a single smooth oblique cusp with 1 or more smaller cusplets on each side.

Viviparous; up to 7 pups per litter; attains 80 cm. Eats crustaceans, small fish and cephalopods. Not recorded from our area, but the odd stray might yet turn up.

Genus ***Loxodon*** Müller & Henle, 1838

One species.

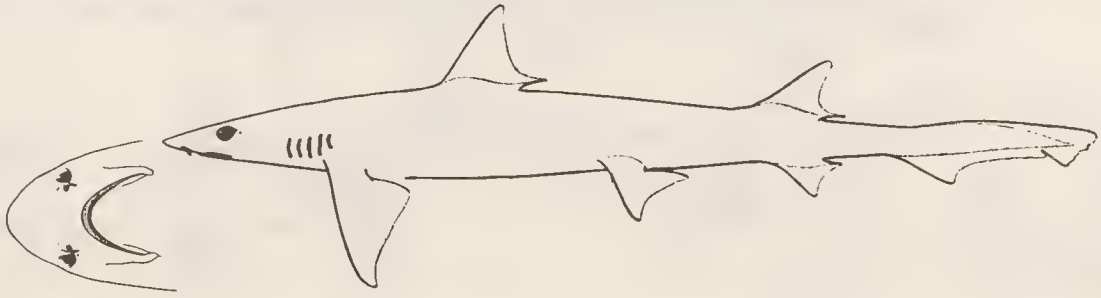
9.25 *Loxodon macrorhinus*
(Müller & Henle, 1839)

Sliteye shark — Sleetooghaai

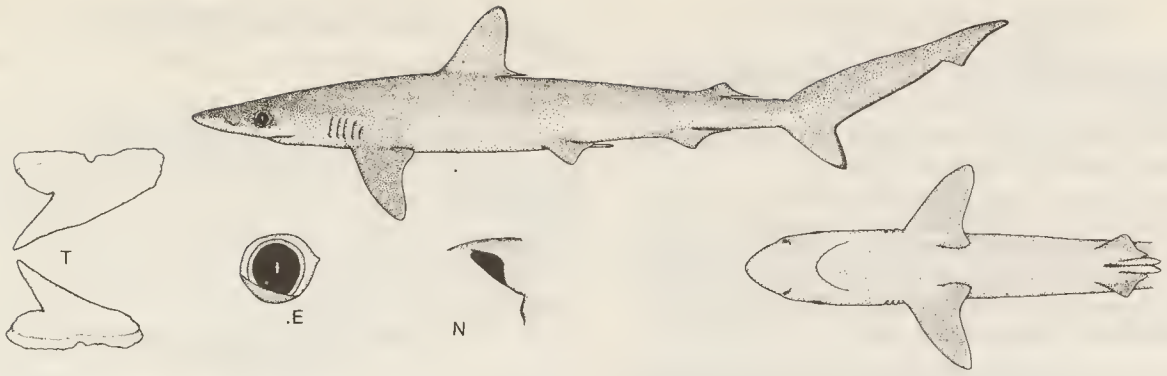
Loxodon macrorhinus Müller & Henle, 1839: 61, Pl. 25 (no locality); Springer, 1964: 588*; Smith, 1961, **No. 15a***; Bass et al., 1975: 37*.

First D & C with thin dark trailing edges. Second D origin over A axil. Spiracles minute, often invisible. Usually no interdorsal ridge. Teeth $\frac{12\text{-}1\text{-}12}{12\text{-}1 \text{ or } 2\text{-}12}$. Precaudal vertebrae 83-85.

Viviparous; 2 pups per litter, born at 40-45 cm; attains almost 100 cm. Fish eater. Shallow waters of tropical west Pacific and Indian Ocean south to central Natal.



9.24 *Leptocarcharias smithii:* 80 cm female (W. Africa; after Poll, 1951).



9.25 *Loxodon macrorhinus:* 75 cm immature male (S. Mozambique). E = eye; N & T as in 2.1.

Genus ***Mustelus*** Linck, 1790

Body cylindrical, the anterior part flattened ventrally; head distinctly flattened ventrally, so that lower jaw is not visible in lateral view when mouth is closed and eyes are not visible in ventral view of head. Second D larger than A and almost as big as 1st D; dorsal caudal lobe with subterminal notch. Spiracles distinct. Precaudal pits absent; mid-dorsal ridge between D present. Teeth with a single, low, bluntly rounded cusp; small juveniles may have 1 or 2 small accessory cusps at sides of each main cusp; teeth arranged in a quincunx, forming a pavement with more than 3 functional series, the tooth rows oblique to the jaw axis. Precaudal vertebrae in this genus are defined as those vertebrae that lack hypochordal radials which support the ventral C lobe.

Sharks of the genus *Mustelus* are called "smooth-hounds" in allusion to their lack of D spines (which are well developed in the spiny dogfishes, Family Squalidae) and smooth, bluntly rounded teeth. In Australia they are known as "gummy sharks" because their teeth are inconspicuous. They feed primarily on crustaceans (crabs, prawns, lobsters, etc.) and less commonly on molluscs (including squid) and fishes; in some areas, smooth-hounds are important predators of commercially valuable crustaceans. They are moderate-sized sharks (less than 2 m total length) occurring in temperate and tropical waters over the continental shelves of all oceans. In Australia and the U.K., smooth-hounds are commonly sold as the "fish" of "fish & chips". Some species of *Mustelus* have a well-developed placental connection between the foetus and the oviduct of the mother, but in the white-spotted species the unborn pups are nourished entirely from their own yolk-sac. This genus comprises at least 25 species, of which 5 are as yet undescribed (Heemstra, MS.); we have 3 species in our area.

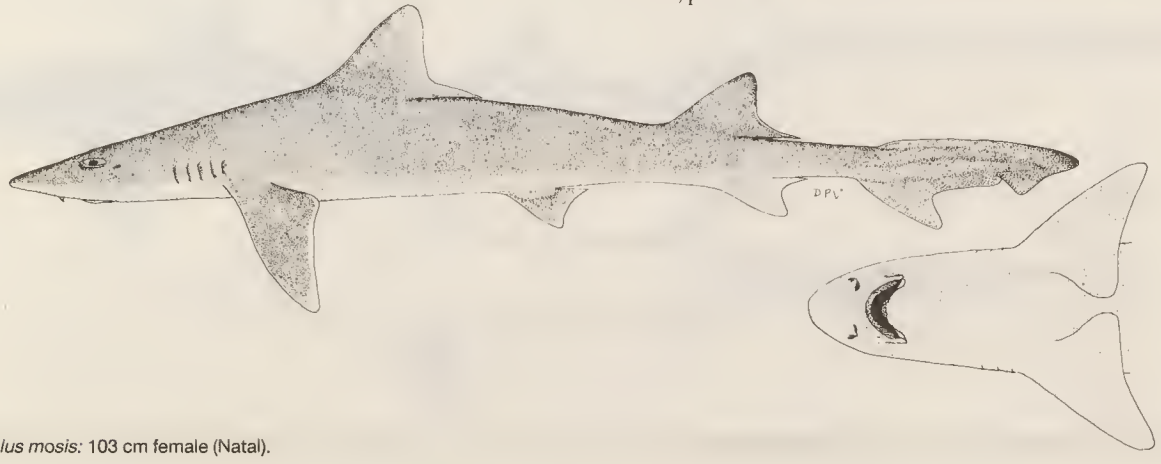
KEY TO SPECIES

1a Small white spots usually visible (sometimes faint or absent) on dorso-lateral part of body; upper lip folds long, 2.0-2.4% TL, their length contained 1.0-1.4 times in distance between nostrils; P length 15-18% TL ..... *M. palumbes*

1b No white spots on body; upper lip folds shorter, 1.5-2.0% TL, their length contained 1.3-2.0 times in distance between nostrils; P length 12-17% TL 2

2a Denticles on tongue extend to level of lower limb of 1st gill arch; denticles on roof of mouth extend back past spiracles; distance from 2nd D base to C origin contained 1.7-2.0 times in length of dorsal C lobe; precaudal vertebrae 62-76 ..... *M. mosis*

2b Denticles on tongue not reaching level of lower limb of 1st gill arch; denticles on roof of mouth not extending posteriorly past spiracles; distance from 2nd D base to C origin contained 1.9-2.4 times in length of dorsal C lobe; precaudal vertebrae 81-95 ..... *M. mustelus*



9.26 *Mustelus mosis:* 103 cm female (Natal).

9.26 *Mustelus mosis*
Hemprich & Ehrenberg, 1899

Hardnosed smooth-hound — Hardeneus-hondhaai

Mustelus mosis Hemprich & Ehrenberg, 1899: Pl. 7, Fig. 3 (Red Sea). *?Mustelus canis (non* Mitchill): van der Elst, 1981: 41*.

Internostril distance 2.5-2.8% TL; rear margin of P 10-12% TL; upper and lower lip folds subequal. Adults with hypercalcification of rostral cartilages at tip of snout, scapulocoracoid tips, radial cartilages in axil of 2nd D_1, preorbital processes of skull, 6th-8th hypochordal radials of C, hyomandibulars and proximal radials of P. These sites of hypercalcification are often visible externally as hard lumps.

Colour immaculate tan or greyish tan dorsally; trailing edge of 1st D and P pale. Attains at least 130 cm; males mature at 83-85 cm, females at 95-100 cm, and pups are born at 26-28 cm. Red Sea and western Indian Ocean, extending south to Durban.

9.27 *Mustelus mustelus*
(Linnaeus, 1758)

Smooth-hound — Hondhaai

Squalus mustelus Linnaeus, 1758: 235 (European seas). *?Mustelus mustelus:* Smith, **SFSA No. 20** (in part).

Internostril distance 2.4-3.2% TL; rear margin of P 10-14% TL; upper lip folds longer than lower. Large adults without hypercalcification of skeleton, except for scapulocoracoid tips of some specimens. Placentae well developed during latter part of gestation period. The number of precaudal vertebrae of *M. mustelus* in South African waters (81-95) is usually more than in specimens from the Mediterranean and west coast of Africa (70-89).

Generally uniform greyish dorsally, some specimens with a few irregular darker spots. Attains at least 150 cm; males mature at 110-115 cm, females at 120-130 cm, and the young are born at 35-39 cm. Mediterranean and west coast of Africa south to Namibia and round our south coast to the Fish River. Commonly caught by shore anglers.

9.28 *Mustelus palumbes*
Smith, 1957
PLATE 4

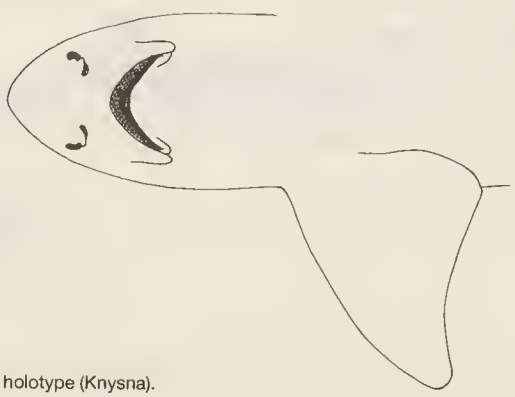
Whitespotted smooth-hound — Witkol-hondhaai

?Mustelus manazo (non Bleeker): Smith, **SFSA No. 17*** (in part). *?Mustelus canis (non* Mitchill): Smith, **SFSA No. 19*** (in part). *?Mustelus mustelus (non* Linnaeus): Smith, **SFSA No. 20** (in part). *Mustelus palumbes* Smith, 1957: 358, Fig. 1 (Knysna); 1961: 565, **No. 19.**

Internostril distance 2.4-2.9% TL; rear margin of P 12-15% TL; upper lip folds distinctly longer than lower. Buccopharyngeal cavity mostly covered by denticles. No hypercalcification of skeleton. Precaudal vertebrae 74-88. *M. manazo* Bleeker (of the northern Indian Ocean and western Pacific) has P length 11-15% TL and A height 2.2-3.4% TL (versus 15-18% and 3.2-4.1% in *M. palumbes).*

Colour variable, the small white spots are distinct on some sharks, faint white specks on others, and not discernible on a few. Attains 110 cm; males mature at 75-79 cm, females at 79-83 cm, and pups are born at about 25 cm. Known only from Walvis Bay to Algoa Bay.

9.27 *Mustelus mustelus:* 142 cm female (Algoa Bay).



9.28 *Mustelus palumbes:* 88 cm mature male holotype (Knysna).

Genus ***Negaprion*** Whitley, 1940

Two species; 1 in Atlantic and 1 in our area.

9.29 *Negaprion acutidens*
(Rüppell, 1837)

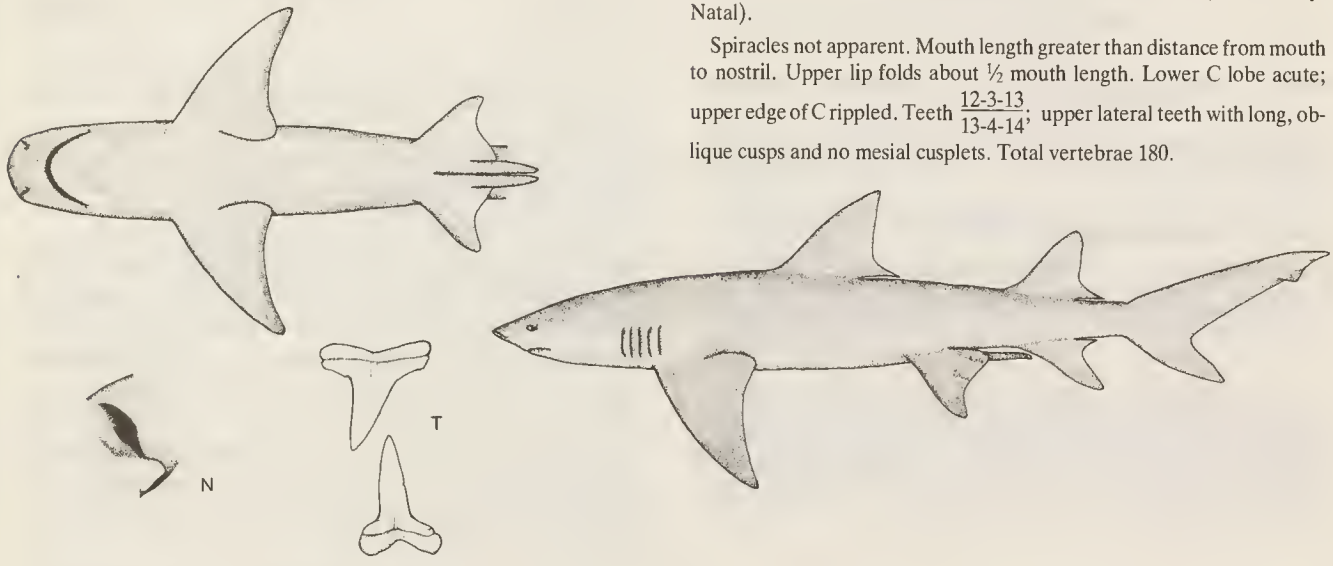
Lemon shark — Geelhaai

Carcharias acutidens Rüppell, 1837: 65, Pl. 18, Fig. 3 (Red Sea). *Negaprion acutidens:* Smith, 1961: 565, **No. 10b*;** Bass et al., 1975: 27*.

Spiracles minute or absent. No interdorsal ridge. Minute lip grooves. Second D almost as large as 1st; 1st D set midway between P and V. Generally yellowish brown, paler below, with plain fins.

Teeth $\frac{14\text{-}1 \text{ or } 2\text{-}14}{14\text{-}1 \text{ or } 2\text{-}14'}$; similar in both jaws; cusps narrow, smooth, almost erect on broad bases. Precaudal vertebrae 139.

Viviparous; 13 pups per litter, born at 70-80 cm; mature at about 2.2 m; attains 3.1 m. A slow-swimming shark found in warm shallow waters of the Indian and Pacific Oceans; ranges south to Natal. Regarded as potentially dangerous to man.



9.29 *Negaprion acutidens:* 243 cm mature male (Natal). N & T as in 2.1.

Genus ***Paragaleus*** Budker, 1935

Precaudal pits present. Nictitans freely movable. Compagno and Smale (1985) recognise 4 species in this genus; 1 species is known from our area, and another may be found here.

KEY TO SPECIES

1a Apex of 2nd D with prominent black blotch, other fins with conspicuous white posterior margins; mouth long, the lower jaw symphysis well anterior to upper lip folds ..... *P. leucolomatus*

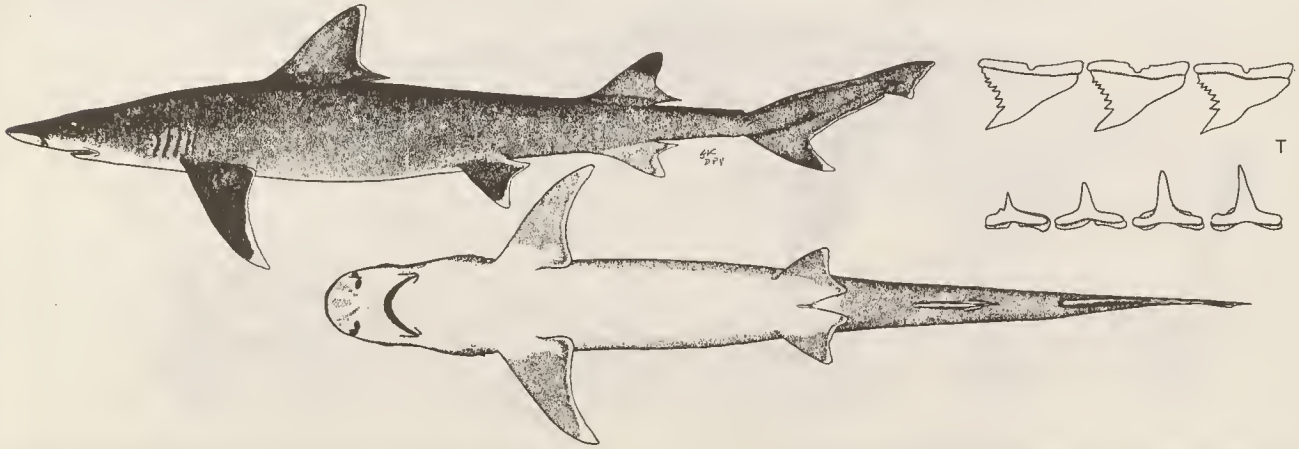
1b No black blotch on 2nd D, other fins without conspicuous white margins; mouth short, the lower jaw symphysis not much anterior to upper lip folds ..... *P. pectoralis*

9.30 *Paragaleus leucolomatus*
Compagno & Smale, 1985

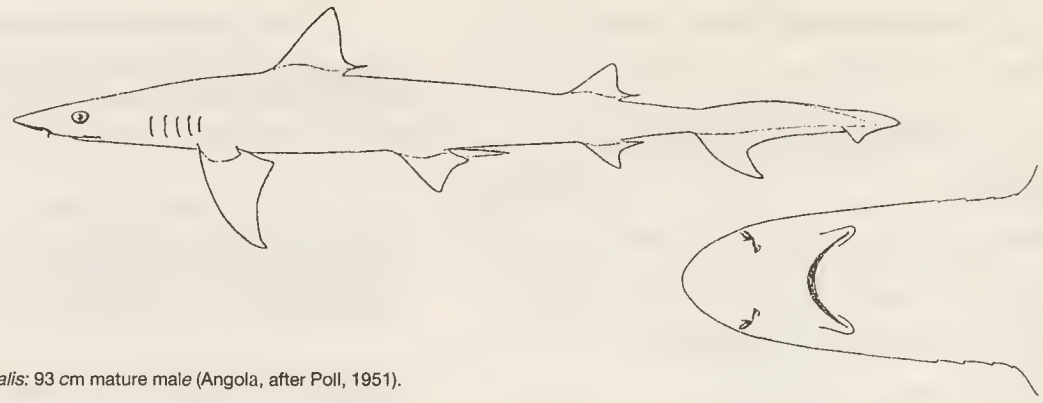
Whitetip weasel shark — Wittip weselhaai

?*Paragaleus pectoralis* (*non* Garman): Fourmanoir, 1961: 49*. *Paragaleus leucolomatus* Compagno & Smale, 1985: 9, Figs. 2-8 (off Kosi Bay, Natal).

Spiracles not apparent. Mouth length greater than distance from mouth to nostril. Upper lip folds about ½ mouth length. Lower C lobe acute; upper edge of C rippled. Teeth $\frac{12\text{-}3\text{-}13}{13\text{-}4\text{-}14}$; upper lateral teeth with long, oblique cusps and no mesial cusplets. Total vertebrae 180.



9.30 *Paragaleus leucolomatus:* gravid female, 95.5 cm (Natal). T = upper and lower teeth from middle of right side of jaw.



9.31 *Paragaleus pectoralis*: 93 cm mature male (Angola, after Poll, 1951).

Viviparous, with one foetus in each uterus. Attains at least 96 cm. Dark grey above, white below; prominent black blotch on apex of 2nd D, the other fins with conspicuous white tips and margins. Known only from a gravid female caught off Kosi Bay.

9.31 *Paragaleus pectoralis*
(Garman, 1906)

Atlantic weasel shark — Atlantiese weselhaai

Hemigaleus pectoralis: Garman, 1906: 203 (?Massachusetts, Rhode Island). *Paragaleus pectoralis:* Krefft, 1968: 42; Compagno, 1981: Hemig Para 1*.

Spiracles small. Upper lip folds at least ½ as long as mouth length. Lower C lobe acute, upper edge of C rippled. Teeth about $\frac{30}{31}$; upper teeth with smooth oblique cusps, the bases strongly denticulated laterally. Total vertebrae 135-150.

Grey-brown above, white below, with horizontal yellow stripes on flanks (fading after death); underside of snout tip with a pair of short longitudinal black stripes. *P. pectoralis* is a tropical eastern Atlantic species, possibly ranging south to northern Namibia.

Genus ***Prionace*** Cantor, 1849

One species.

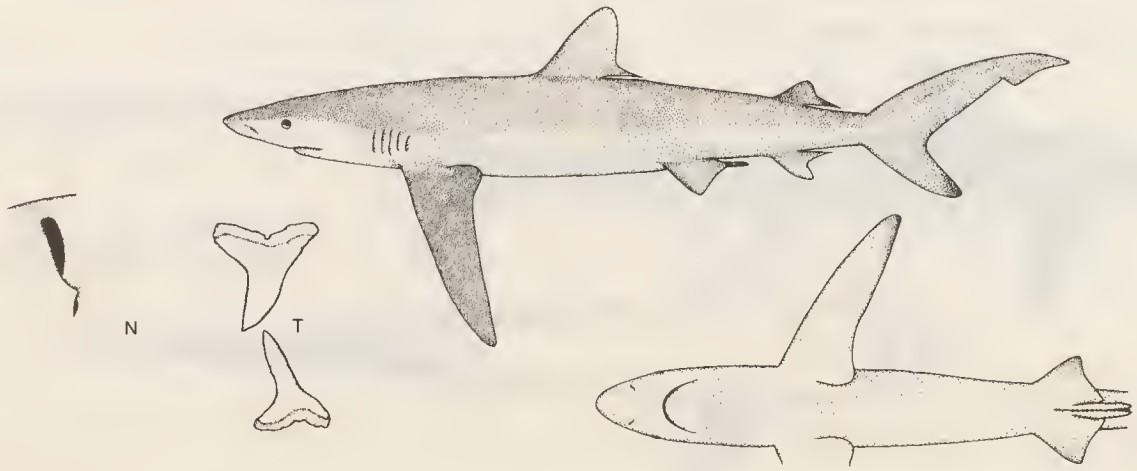
9.32 *Prionace glauca*
(Linnaeus, 1758)
PLATE 1

Blue shark — Blouhaai

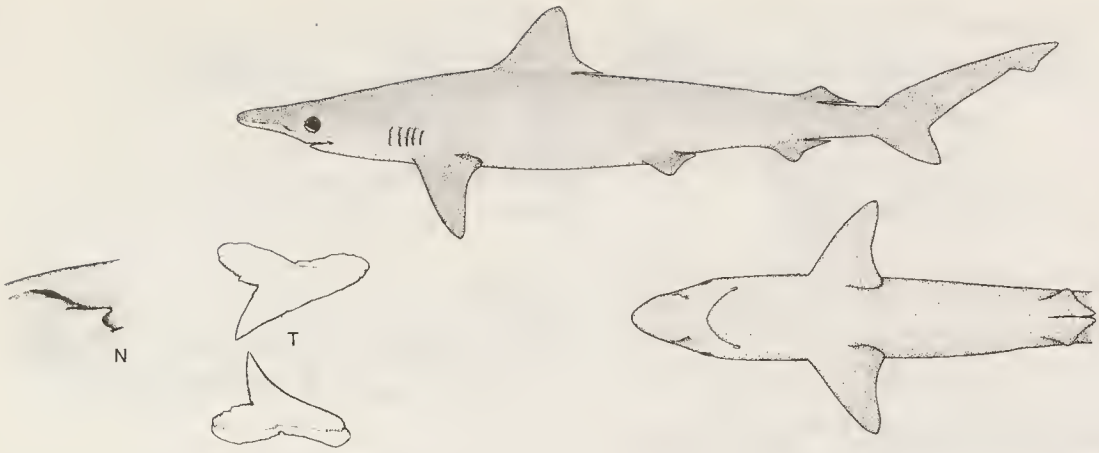
Squalus glaucus Linnaeus, 1758: 235 ("European Ocean"). *Glyphis glaucus:* Smith, **SFSA No. 10*.** *Prionace glauca:* Bass et al., 1975: 32*.

Elongate body and snout; 1st D just in front of V; P long, falcate. No spiracles or interdorsal ridge. Minute lip folds. Teeth unicuspid, strongly serrated, broadly triangular and curved in upper jaw, narrower in lower jaw. Precaudal vertebrae 146-150.

Brilliant dark blue above, white below (fades to grey after death). Viviparous; the most fecund of all sharks with 35-135 pups per litter; born at 50 cm; mature at 2.2 m; attains 3.5 m. Scavenger/predator; can be dangerous to man. Widespread throughout all major oceans, favours waters with a temperature of 12-16 °C. In tropical areas found offshore at some depth (80 - 220 m), but occurring close to shore and near surface in warm-temperate areas e.g. off southwestern Cape coast.



9.32 *Prionace glauca*: 279 cm mature male (Natal). N & T as in 2.1.



9.33 *Rhizoprionodon acutus*: 99 cm mature female (Natal). N & T as in 2.1.

Genus ***Rhizoprionodon*** Whitley, 1929

Seven species; 1 in our area.

9.33 *Rhizoprionodon acutus*
(Rüppell, 1837)

Milkshark — Melkhaai

Carcharias acutus Rüppell, 1837: 65, Pl. 18, Fig. 4 (Djetta). *Scoliodon vagatus:* Smith, **SFSA No. 11.** *Scoliodon walbeehmi:* Smith, **SFSA No. 12*.** *Scoliodon palasorrah:* Smith, **SFSA No. 13.** *Rhizoprionodon acutus:* Springer, 1964: 594*; Bass et al., 1975: 39*; van der Elst, 1981: 42*.

Second D origin just in front of A axil. No spiracles or interdorsal ridge. Teeth $\frac{12\text{-}1\text{-}12}{11\text{-}2\text{-}11}$. Precaudal vertebrae 64-70. Snout milky when viewed from below.

Viviparous; 2-8 pups per litter, born at 30-35 cm; males mature at 80 cm; attains just over 100 cm. Eats fish, squid and crustaceans. An inshore species often taken by anglers; sometimes found in brackish water. Tropical eastern Atlantic, Indo-West Pacific to southern Natal.

Genus ***Scylliogaleus*** Boulenger, 1902

Monotypic; endemic to South Africa.

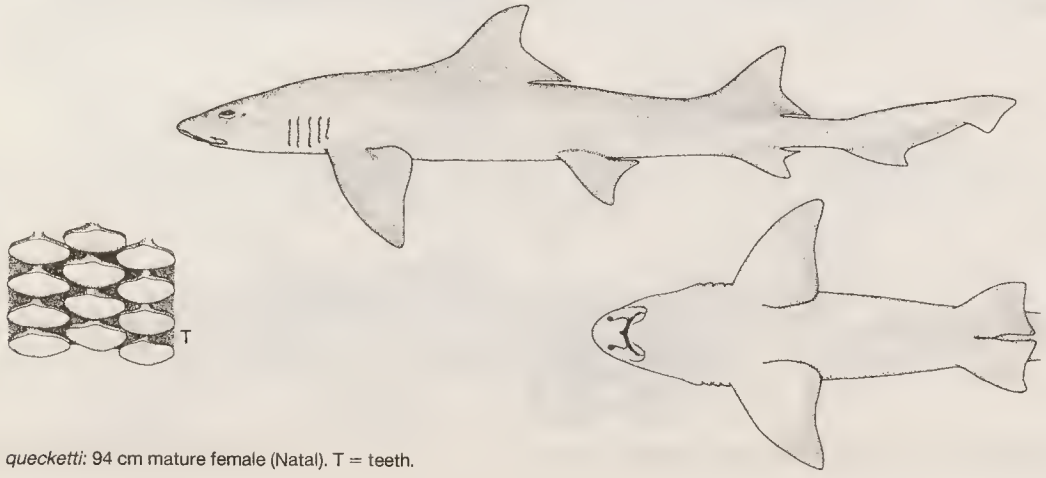
9.34 *Scylliogaleus quecketti*
Boulenger, 1902

Flapnose houndshark — Flapneus-hondhaai

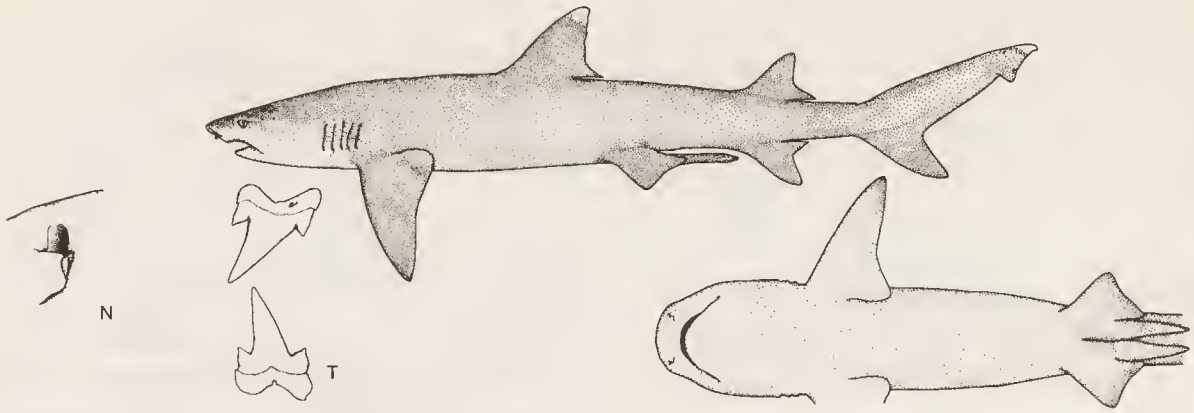
Scylliogaleus quecketti Boulenger, 1902: 52, Pl. 4 (Umkomaas, Natal); Bass et al., 1975: 13*. *Scylliogaleus queketti:* Smith, **SFSA No. 16*.**

Immediately distinguished by the large nasal flap covering deep grooves joining the nostrils to the mouth. Teeth small, bluntly rounded, in a mosaic pattern with several functional series. Transitional nictitans. Interdorsal ridge present.

Grey above, white below; fins plain. Viviparous, 2-4 pups per litter, born at about 34 cm; attains just over 100 cm. Eats crustaceans. Shallow water from central Natal to northeastern Cape.



9.34 *Scylliogaleus quecketti*: 94 cm mature female (Natal). T = teeth.



9.35 *Triaenodon obesus:* 139 cm male (Natal). N & T as in 2.1.

Genus ***Triaenodon*** Müller & Henle 1837

Monotypic.

9.35 *Triaenodon obesus*
(Rüppell, 1837)

Blunthead shark — Stompkophaai

Carcharhinus obesus Rüppell, 1837: 64, Pl. 18, Fig. 2 (Djetta). *Triaenodon obesus:* Smith, 1953: 511, **No. 13a*;** Bass et al., 1975: 24*; Randall, 1977: 143*.

Spiracles usually present. No interdorsal ridge. Minute lip folds. Teeth $\frac{47\text{-}50}{44\text{-}46}$; in at least 2 functional rows; similar in upper and lower jaws; each with an oblique central cusp flanked by 1 or more large denticles on each side. Precaudal vertebrae 128.

Viviparous; 1-5 pups per litter, born at about 45 cm; males mature at 80-85 cm; females at about 100 cm; attains 160 cm. Characteristic colour pattern of greyish brown above, white below with fins plain except for distinct white tips to 1st D and upper C lobe. A sluggish inhabitant of coral reef areas; often found resting on bottom of caves; enter crevices and holes to feed on fish, octopus or crustaceans; occasionally aggressive to man when fish have been speared. Widely distributed in tropical Indo- Pacific, ranges south to Natal.

Genus ***Triakis*** Müller & Henle, 1838

Second D more than ½ height of 1st D. Mouth broadly arcuate, its length distinctly less than ½ its width; snout short, subequal to or less than mouth width. Teeth with a narrow erect cusp.

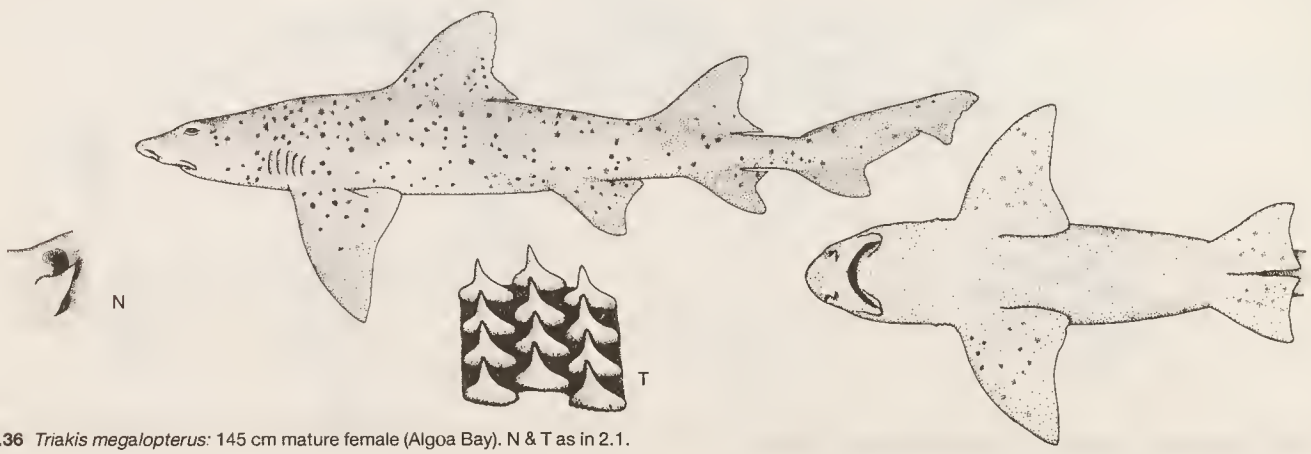
Moderate sized sharks (less than 2 m) of shallow waters. Four species in Pacific Ocean; 1 endemic species in our area.

9.36 *Triakis megalopterus*
(Smith, 1839)

Spotted gullyshark — Gespikkelde sloothaai

Mustelus megalopterus Smith, 1839: Pl. 2 (Cape seas); Smith, 1957: 357*; 1961: 565, **No. 18a.** *Mustelus natalensis* Steindachner, 1866: 482, Pl. 1 (Port Natal = Durban); Smith, 1957: 357*; 1961: 565, **No. 17a.** *Mustelus punctulatus (non* Risso): Smith, **SFSA No. 18*** (in part). *Mustelus nigropunctatus* Smith, 1952: 223, Pl. 13 (Keiskamma River mouth, eastern Cape Province); 1953: 45, **No. 18*** (in part); 1957: 357*. *Triakis megalopterus:* Bass et al., 1975: 16*; van der Elst, 1981: 43*. *Triakis natalensis:* Bass et al., 1975: 17*.

A heavy-bodied shark with large fins, blunt snout and wide mouth; snout length distinctly less than mouth width; P length 15-19% TL. Precaudal vertebrae 103-107. Interdorsal ridge present.



9.36 *Triakis megalopterus:* 145 cm mature female (Algoa Bay). N & T as in 2.1.

Colour generally grey overlaid with numerous black spots; on some specimens the spots may be sparse or absent, and new-born sharks generally have fewer black spots than do adults. Attains 165 cm and about 20 kg. Pups are 30-31 cm at birth; males mature at 120-140 cm and females at 130-150 cm. Commonly caught by shore anglers. Known only from Walvis Bay to East London, perhaps into southern Natal.

Family No. 10: PROSCYLLIIDAE

by A.J. Bass & L.J.V. Compagno

A small group of sharks intermediate between the Scyliorhinidae and Triakidae. Rudimentary nictitans. Minute lip grooves. All teeth with erect cusps, usually several functional rows. First dorsal fin closer to pelvics than to pectorals. No fin spines. Second dorsal fin subequal to first dorsal, its origin over or behind anal fin origin. Caudal fin without distinct lower lobe. Four genera, one recorded from our area, with a second known from Somalia and included here.

KEY TO SPECIES

1a Body with clear pattern of saddles and large spots; C short and broad ..... *Ctenacis fehlmanni*
1b Body plain with at most faint suggestion of saddles and spots; C long and narrow 2

2a D with blackish margins; preoral snout less than 1.5 times mouth length; labial furrows rudimentary or absent ..... *Eridacnis radcliffei*
2b D with light margins; preoral snout over twice mouth length; labial furrows very short ..... *Eridacnis sinuans*

Genus ***Ctenacis*** Compagno, 1973

One species, known only from Somalia, may reach our area.

10.1 *Ctenacis fehlmanni*
(Springer, 1968)

Triakis fehlmanni Springer, 1968: 614, Figs. 1-5 (Somalia). *Ctenacis fehlmanni:* Bass et al., 1975: 11*.

Head length 23% TL. "Gill-rakers" are short papillae interdigitating across internal gill openings; teeth $\frac{86}{88}$. Precaudal vertebrae 64.

Ovoviviparous, 2 pups per litter. Only known specimen: 46 cm adult female from 70 - 170 m off Somalia.

Genus ***Eridacnis*** Smith, 1913

Three species, 1 in our area; *E. radcliffei* has recently been found off Tanzania and probably also occurs in our area.

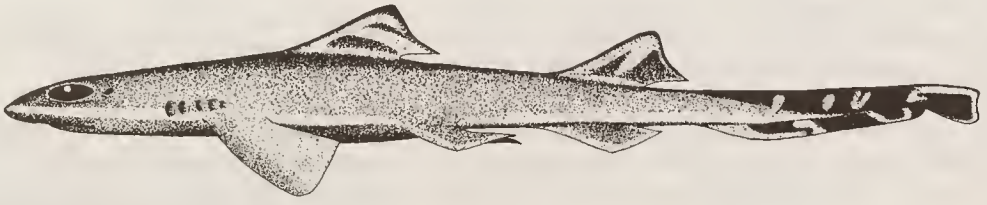
10.2 *Eridacnis radcliffei*
Smith, 1913

Eridacnis radcliffei Smith, 1913: 599, Figs. 1-3 (Philippine Ids.).

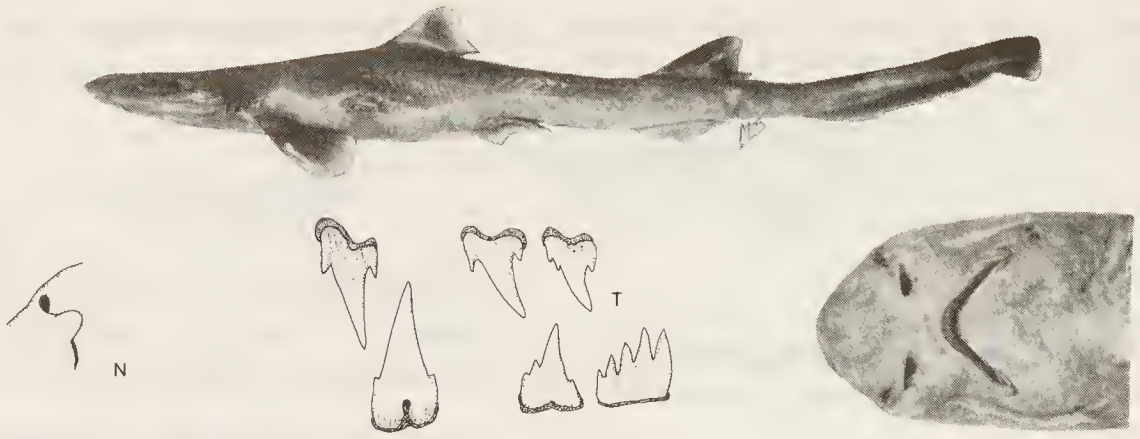
Teeth $\frac{72\text{-}78}{65\text{-}77}$. Precaudal vertebrae 77.

Ovoviviparous; 1-2 pups per litter, born at about 11 cm; males mature below 18 cm, females at 15-16 cm; attains 24 cm; 1 of the 2 smallest species of sharks. Tanzania and Gulf of Aden east to Philippines, in 71 - 766 m.

10.1 *Ctenacis fehlmanni:* 46 cm adult female (Somalia; after Springer, 1968 reversed).



10.2 *Eridacnis radcliffei:* 19 cm male (Philippines).



10.3 *Eridacnis sinuans:* 32 cm female holotype (Natal). N & T (from 28 cm male) as in 2.1.

10.3 *Eridacnis sinuans*
(Smith, 1957)

Neotriakis sinuans Smith, 1957: 262, Fig. 2 (Natal); Smith, **SFSA No. 13b.** *Eridacnis sinuans:* Bass et al., 1975: 12*.

Teeth $\frac{64}{50}$; those near centre of jaws relatively long and lanceolate with 1 large central cusp and a pair of smaller side cusps; the lateral teeth broad and comb-like with 4 or 5 equal cusps. Precaudal vertebrae 82-88.

Ovoviviparous; 2 pups per litter, born at about 15 cm; males mature at 30 cm; attains at least 37 cm. Known only from Natal, southern Mozambique and Tanzania, in 230 - 480 m.

Family No. 11: SCYLIORHINIDAE

by A.J. Bass

Catsharks **Kathaaie**

Two dorsal fins, without spines, first dorsal axil over or behind pelvic origin. Anal fin present. No precaudal pits. Spiracles present. Rudimentary nictitans. Caudal fin not lunate, much less than half total length. Nasal barbels absent or, if present, nostrils not connected to mouth by grooves. Five gill slits, the last over or behind pectoral origin. Teeth usually multicuspid, in several functional series, alike in upper and lower jaws.

Mostly small harmless sharks not exceeding a length of 100 cm; predominantly bottom or near bottom dwelling fishes. The most recent major revision is by Springer (1979) who recognises 17 genera and 86 species of which 8 genera and about 16 species occur in our area. All of these are fairly well defined except for the genus *Apristurus* which is in dire need of revision — 2 species of this genus are tentatively included here.

KEY TO GENERA

1a Nostrils with conspicuous barbels ..... *Poroderma*
1b Nostrils without conspicuous barbels 2

2a Lip grooves absent 3
2b Lip grooves present 4

3a Base of A underneath 2nd D base ..... *Cephaloscyllium*
3b At least half of A base in front of 2nd D base ..... *Holohalaelurus*

4a Only lower lip grooves present ..... *Scyliorhinus*
4b Upper and lower lip grooves present 5

5a Nostrils connected to mouth by grooves ..... *Haploblepharus*
5b Nostrils entirely separate from mouth 6

6a Origin of A behind tip of 1st D ..... *Halaelurus*
6b Origin of A under or in front of tip of 1st D 7

7a Spiny crest of enlarged denticles along upper edge of C ..... *Galeus*
7b Upper edge of C without a crest of enlarged denticles .... *Apristurus*

Genus *Apristurus* Garman, 1913

Distinguished from other scyliorhinids by uniform dark coloration, broad flattened heads, and particularly long A, with end of A base almost coincident with lower C origin. About 22 species, 2 in our area.

KEY TO SPECIES

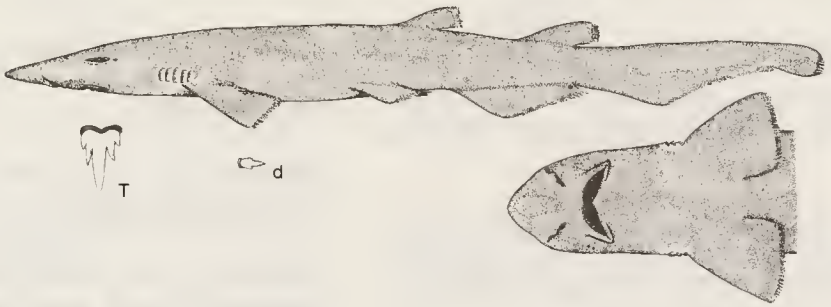
1a Distance between D bases less than 2nd D base ..... *A. microps*
1b Distance between D bases more than 2nd D base ..... *A. saldanha*

11.1 *Apristurus microps*
(Gilchrist, 1922)

Scylliorhinus microps Gilchrist, 1922: 46, Pl. 7, Fig. 1 (off Cape Town in 1 446 m). *Pentanchus microps:* Smith, **SFSA No. 41*.** *Apristurus microps:* Bass et al., 1975: 7; Springer, 1979: 23.

Interdorsal distance less than length of 2nd D base. The holotype is lost, and only recently have 3 specimens (33-47 cm) been reported from deep water in the southeast Atlantic. As yet no descriptions of these sharks are available.

11.1 *Apristurus microps*: length unknown, probably female (off Table Bay in about 1 450 m; redrawn after Gilchrist, 1922).



11.2 *Apristurus saldanha*: 44 cm immature male (SW Cape). T & d as in 2.1.

11.2 *Apristurus saldanha*
(Barnard, 1925)

Scylliorhinus saldanha Barnard, 1925: 44 (Saldanha Bay). *Apristurus saldanha:* Bass et al., 1975: 8*; Springer, 1979: 29.

Springer (1979) points out that the shark illustrated here differs from the original description of *A. saldanha* in the D interspace, and notes that the puzzle may be resolved when specimens recently caught by a research vessel of the U.S.S.R. are described. Any specimens of *Apristurus* from our area should be kept for further investigation.

Genus ***Cephaloscyllium*** Gill, 1862

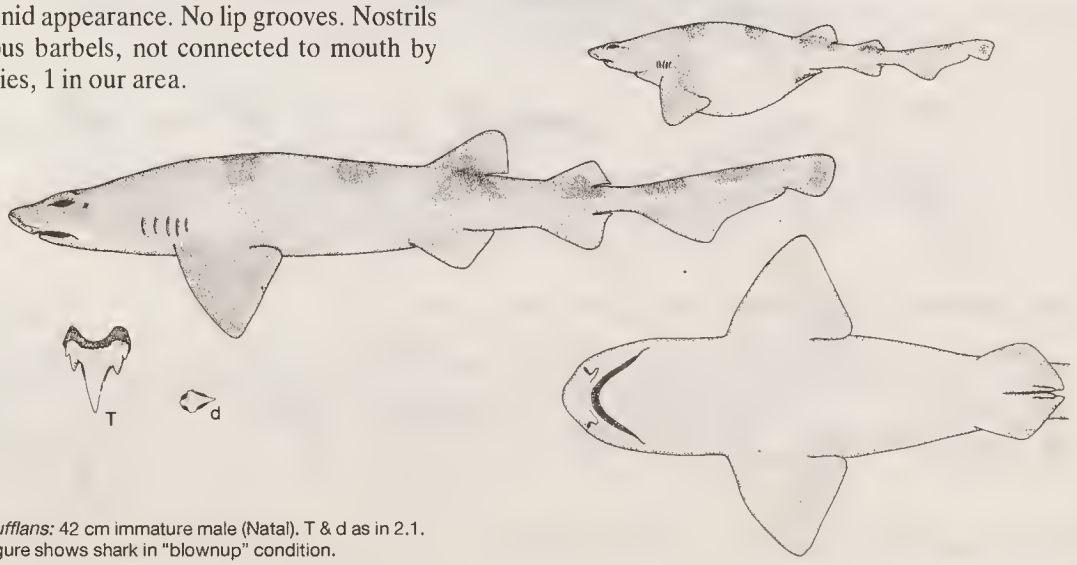
Sharks of this genus are able to distend their abdomens by swallowing air or water. When not disturbed they present a "normal" scyliorhinid appearance. No lip grooves. Nostrils without conspicuous barbels, not connected to mouth by grooves. Five species, 1 in our area.

11.3 *Cephaloscyllium sufflans*
(Regan, 1921)

Swell shark Blaasophaai

Scyliorhinus (Cephaloscyllium) sufflans Regan, 1921: 413 (Natal). *Cephaloscyllium sufflans:* Smith, **SFSA No. 34*;** Bass et al., 1975: 9*; Springer, 1979: 41.

Basic colour pale grey-brown, slightly paler below with about 6 slightly darker saddles. These fade in adults, which are virtually unmarked. Oviparous; 2 egg-cases produced at a time, hatching at about 20 cm; mature at 70-80 cm; attains slightly over 100 cm. Kenya and possibly Gulf of Aden to central Natal; trawled in depths of 40 - 440 m; usually on sand or mud bottoms. Eats crustaceans, cephalopods and fish.



11.3 *Cephaloscyllium sufflans:* 42 cm immature male (Natal). T & d as in 2.1. Upper righthand figure shows shark in "blownup" condition.

11.4 *Galeus polli:* 30 cm female (W. Africa; after Poll, 1951).

Genus ***Galeus*** Rafinesque, 1810

Prominent lip grooves. Nostrils without barbels, not connected to mouth by grooves. About 9 species, 1 in our region.

11.4 *Galeus polli*
Cadenat, 1959

Galeus polli Cadenat, 1959: 395, Figs. 1-18 (Senegal); Springer, 1979: 65.

Pale brown, paler below; dark saddles prominent in young, faint in adults. Ovoviviparous; 4-10 pups per litter, born at 11-12 cm; mature at 30-35 cm; attains 42 cm. Outer continental shelf from Spanish Morocco to northern Namibia.

Genus ***Halaelurus*** Gill, 1862

Nine species, 3 in our area.

KEY TO SPECIES

1a Snout tip rounded, not turned upward ..... *H. lutarius*
1b Snout tip pointed and turned upward 2

2a Distance between D bases more than 3 × 1st D height; lower edge of C deeply indented ..... *H. lineatus*
2b Distance between D bases 2.5-3 x 1st D height; lower edge of C fin almost straight ..... *H. natalensis*

11.5 *Halaelurus lineatus*
Bass, D'Aubrey & Kistnasamy, 1975

Banded catshark — Band-kathaai

Halaelurus lineatus Bass, D'Aubrey & Kistnasamy, 1975: 12, Fig. 8 (Durban); Springer, 1979: 79*; van der Elst, 1981: 58*. *Halaelurus natalensis:* Smith, **SFSA No. 40** (part).

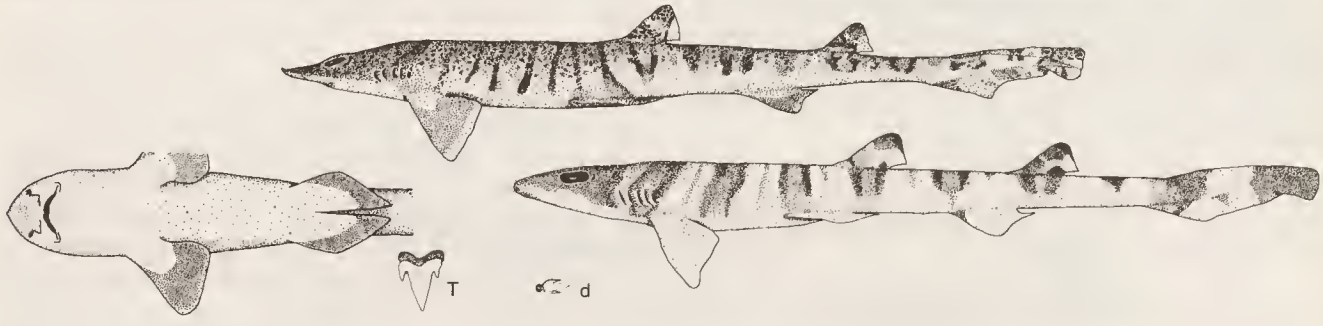
Basic colour pale brown, cream below, with dark brown markings. Oviparous; up to 16 egg-cases per female, hatching about a month after deposition; mature at 35-40 cm; attains 56 cm. Feeds chiefly on crustaceans. Durban to Beira, Mozambique; from shore down to at least 290 m.

11.6 *Halaelurus lutarius*
Springer & D'Aubrey, 1972

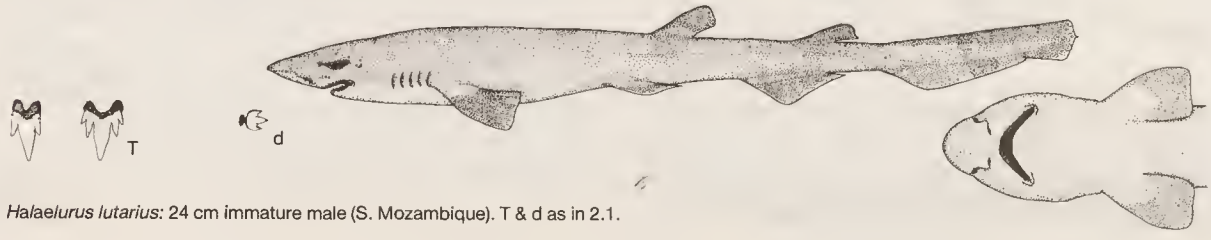
Brown catshark — Bruin kathaai

Halaelurus lutarius Springer & D'Aubrey, 1972: 6, Figs. 1A, 1 (Delagoa Bay, Somalia); Bass et al., 1975: 11*; Springer, 1979: 82*.

Colour pattern of a dull grey-brown, paler below, with a few poorly defined dorsal saddles sometimes visible. Ovoviviparous; 2 pups per litter; mature at 30 cm; attains 39 cm. Somalia and southern Mozambique; in depths of 338 - 766 m.



11.5 *Halaelurus lineatus:* top: 48 cm mature female; bottom: 13 cm immature male paratype (both Natal). T & d as in 2.1.



11.6 *Halaelurus lutarius:* 24 cm immature male (S. Mozambique). T & d as in 2.1.

11.7 *Halaelurus natalensis:* 44 cm mature female (Algoa Bay). T & d as in 2.1.

11.7 *Halaelurus natalensis*
(Regan, 1904)
PLATE 3

Tiger catshark — Tier-kathaai

Scyllium natalense Regan, 1904: 128 (Natal). *Halaelurus natalensis:* Smith, **SFSA No. 40*** (part); Smith & Smith, 1966: 26*; Bass et al., 1975: 14*; Springer, 1979: 83*.

Basic colour yellow-brown, cream below, with dark brown dorsal saddles. Oviparous; up to 11 egg-cases per female; mature at 35-40 cm; attains 47 cm. Eats crustaceans and fish. Known only from Saldanha Bay to Algoa Bay from the shore out to at least 125 m. The type-locality appears to have been in error, for no further specimens have been found in Natal waters.

Genus ***Haploblepharus*** Garman, 1913

The 3 species of the genus *Haploblepharus* are difficult to distinguish except by the colour patterns described in the key. All are endemic to our area. They are distinguished from all other local sharks except *Scylliogaleus quecketti* (Family Carcharhinidae) by the presence of deep grooves connecting the nostrils to the mouth, together with an absence of nasal barbels. *S. quecketti* is easily separated by having a plain coloration and a first dorsal set far forward in comparison to that of *Haploblepharus* species.

KEY TO SPECIES

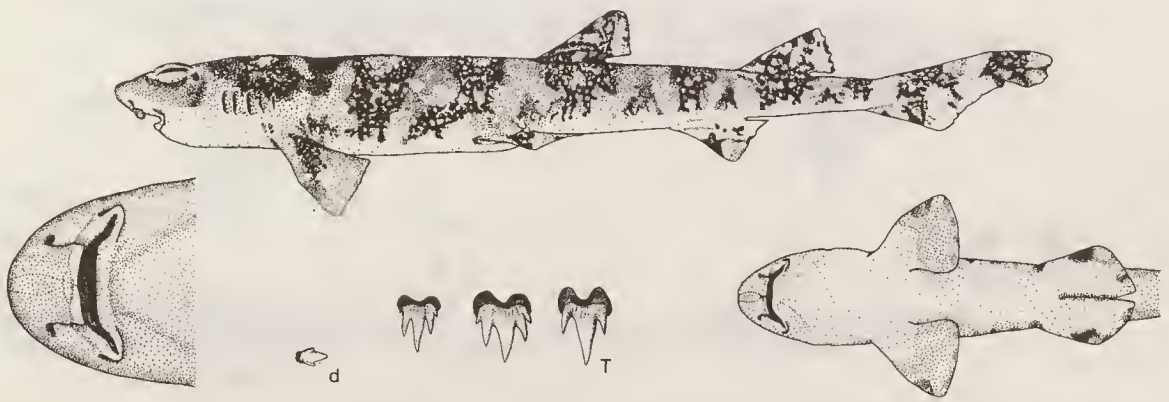
1a Pale brown, virtually plain, at most a faint suggestion of dorsal saddles ..... *H. fuscus*
1b Body and head with distinct series of dark saddles, sometimes obscured by a dark background colour 2

2a Saddles with noticeably darker margins at front and back; numerous pale spots on saddles, most of these no larger than spiracles; overall colour pale yellow-brown, saddles always clearly visible ..... *H. edwardsii*
2b Saddles not bordered front and back with darker margins; pale spots on saddles not numerous, mostly larger than spiracles; overall colour dark brown, sometimes obscuring the saddles ..... *H. pictus*

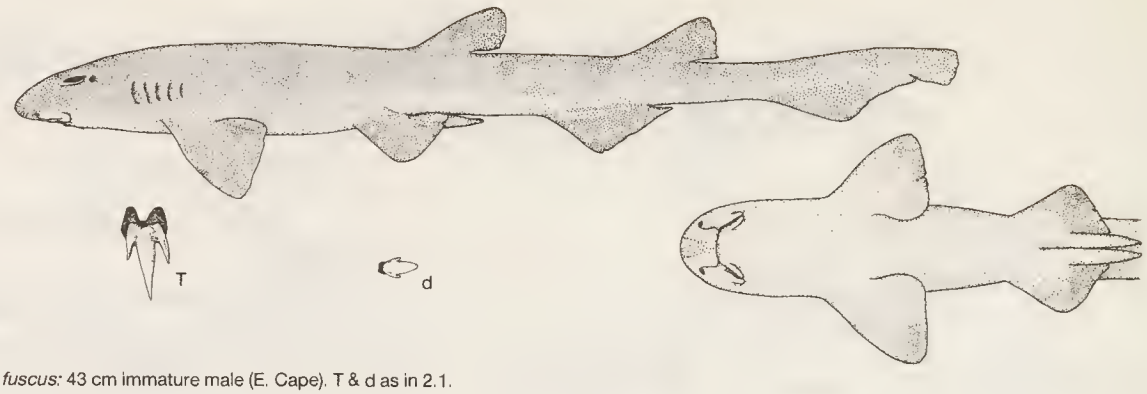
11.8 *Haploblepharus edwardsii*
(Voight, 1832)
PLATE 3

Puffadder shyshark — Pofadder-skaamoog

Scyllium D'Edwards Cuvier, 1816: 124 (Cape). *Scyllium edwardsii* Voight, 1832: 504. *Haploblepharus edwardsii:* Smith, 1953: 512, **No. 39a***; Smith & Smith, 1966: 27*; Bass et al., 1975: 17*; Springer, 1979: 88*.



11.8 *Haploblepharus edwardsii:* 48 cm mature female (Natal). T & d as in 2.1.



11.9 *Haploblepharus fuscus:* 43 cm immature male (E. Cape). T & d as in 2.1.

Oviparous; 2 egg-cases at a time, becoming free-swimming at about 10 cm; mature at 40-50 cm; attains 60 cm. Specimens from the southwestern Cape may be somewhat smaller than those from Algoa Bay. Rare or absent on our west coast, but common in shallow inshore waters of False Bay and eastwards. Rarely taken from shore in the eastern Cape, but often trawled in 40 - 130 m. Two specimens, possibly a new species, taken in shallow water on northern Natal coast.

11.9 *Haploblepharus fuscus*
Smith, 1950
PLATE 3

Brown shyshark — Bruin skaamoog

Haploblepharus edwardsii (non Cuvier): Smith, **SFSA No. 39*.** *Haploblepharus fuscus* Smith, 1950: 883, Fig. 2 (East London, Knysna); Smith, 1953: **No. 39*;** Smith & Smith, 1966: 27*; Bass et al., 1975: 19*; Springer, 1979: 89*.

Like other species in this genus, *H. fuscus* rolls into a circle when caught, covering the head and especially the eyes with the tail, thus giving rise to the common name of "shysharks". Nothing is known of reproduction in *H. fuscus*. Matures at about 50-60 cm; attains 69 cm. Recorded from southern Natal to Bredasdorp in the southern Cape; in shallow water amongst rocks.

11.10 *Haploblepharus pictus*
(Müller & Henle, 1838)

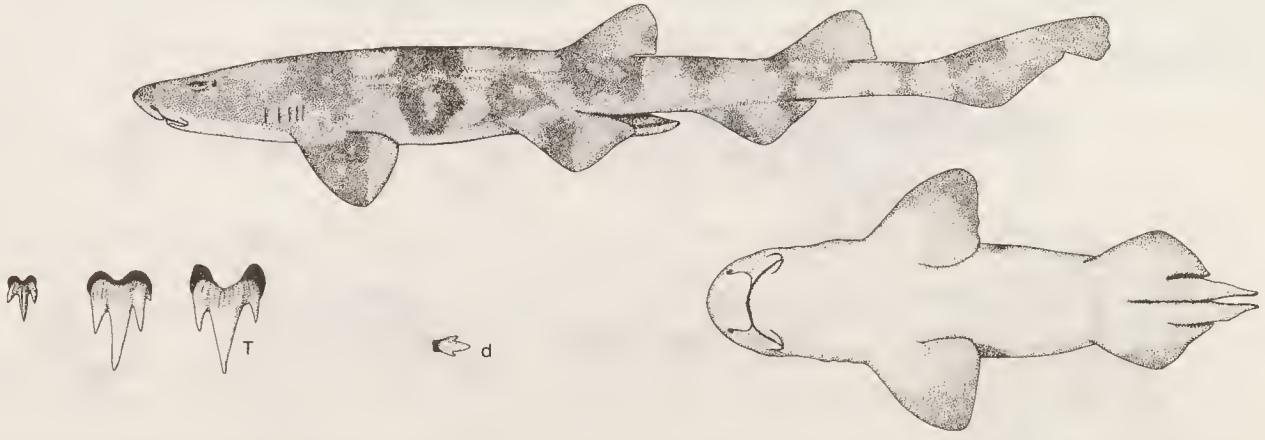
Dark shyshark — Donker skaamoog

Scyllium pictum Müller & Henle, 1838: 4 (Cape of Good Hope). *Haploblepharus pictus:* Bass et al., 1975: 21*; Springer, 1979: 91*.

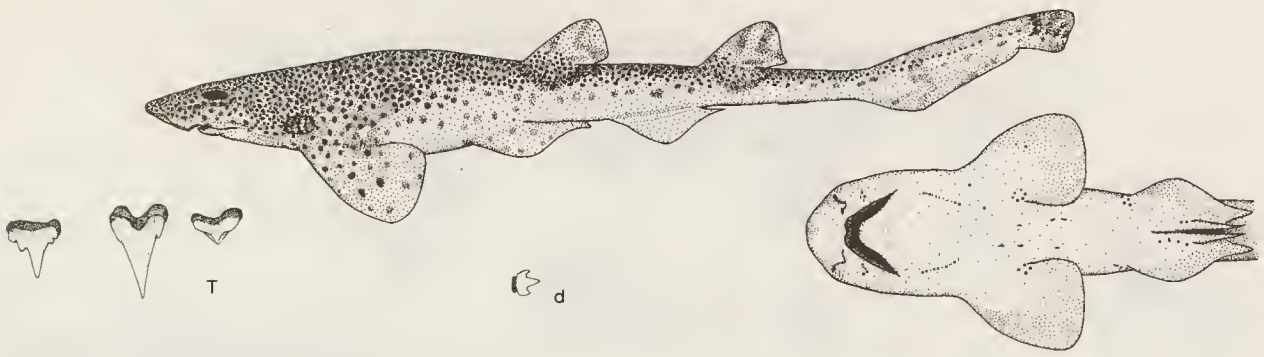
Oviparous; 2 egg-cases at a time, hatching at about 11 cm; mature at about 40 cm; attains about 60 cm. Shallow waters of western Cape and Namibian coasts, also found in False Bay.

Genus ***Holohalaelurus*** Fowler, 1933

Only 2 species of small, rather flattened catsharks with broad heads; they have a patch of naked skin around the gill slits and are exceptional in that males grow to a greater size than females.



11.10 *Haploblepharus pictus:* 56 cm mature male (Saldanha Bay). T & d as in 2.1.



1.11 *Holohalaelurus punctatus:* 24 cm immature male (Natal). T & d as in 2.1

KEY TO SPECIES

1a Anal base not more than 3½ A height; denticles on back and top of head uniform in size ..... *H. punctatus*
1b Anal base more than 3½ A height; a series of large denticles on back and top of head ..... *H. regani*

11.11 *Holohalaelurus punctatus*
(Gilchrist, 1914)
PLATE 3

Spotted catshark — Spikkel-kathaai

Scylliorhinus punctatus Gilchrist, 1914: 129, Fig. (Cape Point). *Holohalaelurus punctatus:* Smith, **SFSA No. 42*;** Springer, 1979: 92*.

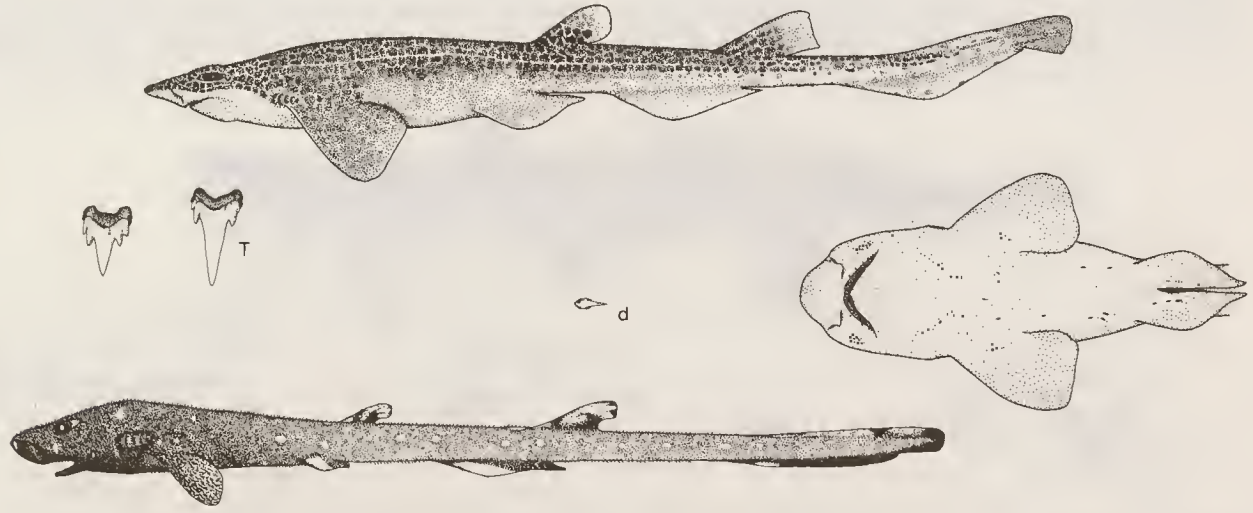
Mustard brown in colour, overlaid with darker spots plus a series of white spots along sides of body; ventral surface pale with a characteristic pattern of dark dots and dashes. Oviparous; 2 egg-cases at a time; males mature at about 25 cm, females at about 23 cm; males attain about 35 cm, females not much over 26 cm. A common shark of trawls between 220 and 440 m off Natal and southern Mozambique; ranges north to Kenya. The type was recorded as being taken off Cape Point but is the only specimen ever found south of Natal.

11.12 *Holohalaelurus regani*
(Gilchrist, 1922)
PLATE 3

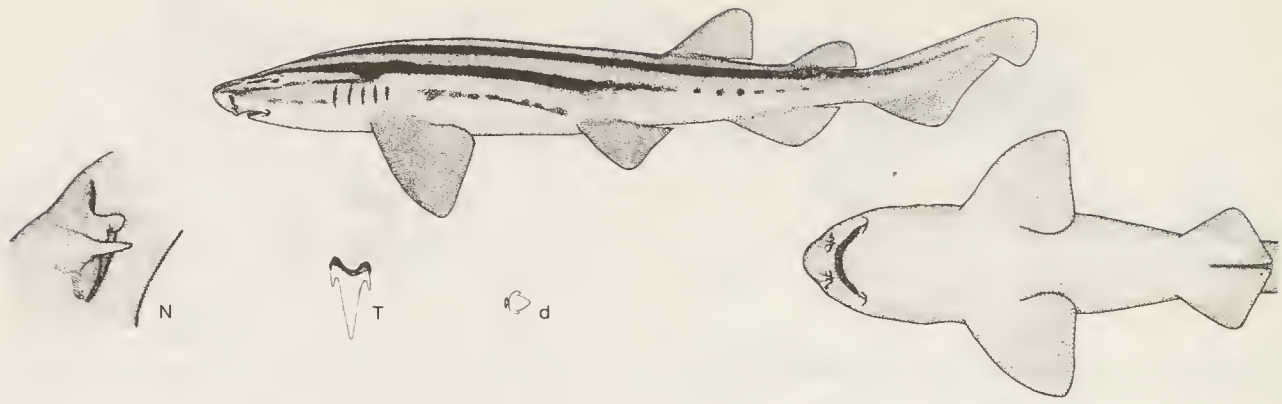
Izak — Izak

Scylliorhinus regani Gilchrist, 1922: 45 (Cape Seas). *Holohalaelurus regani:* Smith, **SFSA No. 43*;** Bass et al., 1975: 25*; Springer, 1979: 93*.

Dark brown, paler below with the dark dots and dashes characteristic of this genus. A 13 cm juvenile is dark black above and below with a row of white spots along each side. Oviparous; 2 egg-cases at a time; males mature at about 45 cm (Natal) or 55 cm (Cape), attain 57 cm; females mature at 38-39 cm (Natal), attain 44 cm. Southwestern Cape (160 - 460 m) through Natal (200 - 400 m) to southern Mozambique (240 - 740 m) and Zanzibar (238 - 658 m). Juveniles apparently live in deeper water than the adults.



11.12 *Holohalaelurus regani:* top: 39 cm mature female; bottom: 13 cm immature female (both Natal). T & d as in 2.1.



11.13 *Poroderma africanum:* 72 mature female (Algoa Bay). N, T & d as in 2.1.

Genus ***Poroderma*** Smith, 1837

Three species endemic to our area. They are easily distinguished from other local sharks by long nasal barbels and the lack of grooves from the nostrils to the mouth.

KEY TO SPECIES

1a Free part of nasal barbel short, less than ½ of nostril length; colour pattern of dark longitudinal stripes ..... *P. africanum*

1b Free part of nasal barbel long, almost equal to nasal length; colour pattern of solid spots or rings, not always in longitudinal stripes 2

2a Colour pattern of pale-centred spots or open rings, broken up in sharks longer than 30 cm to form "rosettes" ..... *P. pantherinum*

2b Colour pattern of solid spots without a pronounced tendency for these to break up into "rosettes" ..... *P. marleyi*

11.13 *Poroderma africanum*
(Gmelin, 1789)
PLATE 3

Striped catshark — Streep-kathaai

Squalus africanus Gmelin, 1789: 144 (African seas). *Poroderma africanum:* Smith, **SFSA No. 37*;** Bass et al., 1975: 28*; Springer, 1979: 112*; van der Elst, 1981: 59*. *Conoporoderma africanum:* Smith & Smith, 1966: 25*.

Background colour cream with dark brown, almost black, horizontal bands with pale centre stripes; juveniles may have solid bands of colour. Precaudal vertebrae 77-85. Oviparous; hatches at about 14 cm; mature at 60-70 cm; attains 95 cm. Abundant in shallow water down to 100 m in southwestern Cape. Less common in Algoa Bay where it is rarely taken from shore but trawled in 50 - 100 m. Scarce at East London and not recorded from Natal.

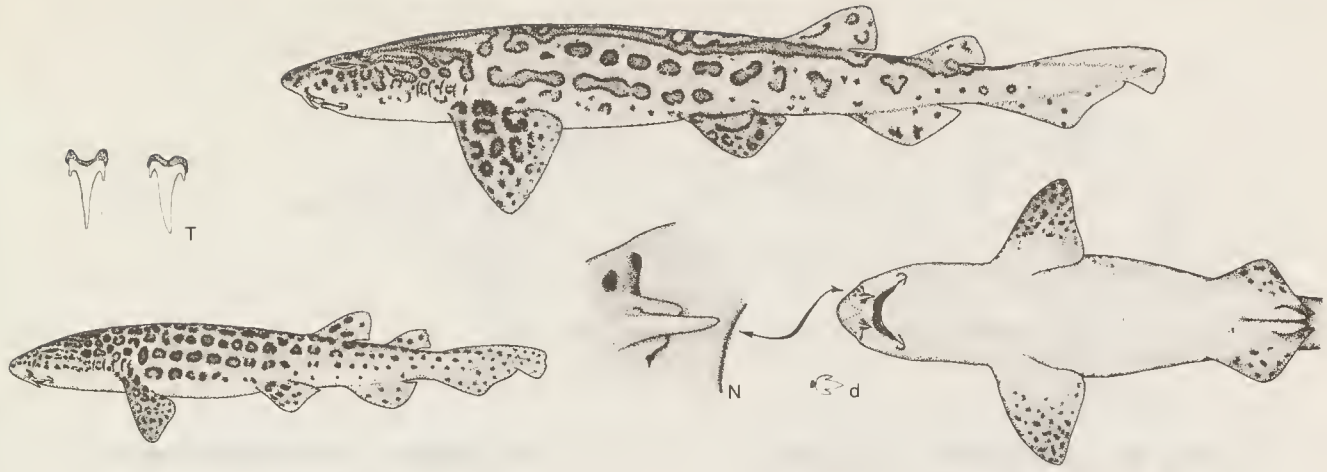
11.14 *Poroderma marleyi*
Fowler, 1933

Blackspotted catshark — Swartkol-kathaai

Poroderma marleyi Fowler, 1933: 234 (Natal); Smith, **SFSA No. 35*;** Bass et al., 1975: 29*; Springer, 1979: 114.

Colour (in formalin) greyish or brown dorsally, with brown to black spots. Attains 58 cm. Known only from 4 specimens from Natal and 1 from Port St. Johns, Transkei.

11.14 *Poroderma marleyi:* 43 cm female (Port St. Johns). Ventral view of head etc. of 58 cm mature male (Natal). N, T & d as in 2.1.



11.15 *Poroderma pantherinum:* top: 56 cm immature female (SW Cape); bottom right: ventral view of head of 53 cm immature male (Algoa Bay); bottom left: 34 cm immature male (Algoa Bay). N, T & d as in 2.1.

11.15 *Poroderma pantherinum*
(Smith, 1838)
PLATE 3

Leopard catshark — Luiperd-kathaai

Poroderma pantherinum Smith, 1837: 85 (name only; Cape of Good Hope); Smith, **SFSA No. 36***; Bass et al., 1975: 30*; Springer, 1979: 114*. *Scyllium pantherinum* Smith, in Müller & Henle, 1838: 13 (Cape of Good Hope). *Conoporoderma pantherinum:* Smith & Smith, 1966: 25*.

The basic striped pattern of *P. africanum* is present in *P. pantherinum,* particularly in specimens from the extremes of the range, but breaks up with growth into small rosettes. In the largest specimens virtually all trace of the original stripes may disappear. Precaudal vertebrae 75-80. Presumably oviparous; matures at 54-58 cm (males) and 58-61 cm (females); attains 71 cm. Abundant in Algoa Bay where it is caught by shore-anglers and by trawlers in depths of up to 150 m. Also fairly common in East London but only 2 records from Natal. In the other direction, *P. pantherinum* is found in shallow waters of the southwest Cape where it is less common than *P. africanum.*

Genus ***Scyliorhinus*** Blainville, 1816

Of the 13 species in this genus, only 1 occurs in our area.

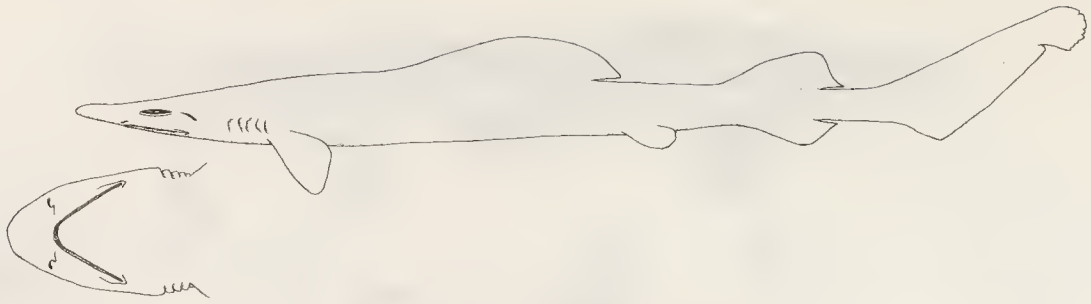
11.16 *Scyliorhinus capensis*
(Smith, 1838)
PLATE 3

Yellowspotted catshark — Geelspikkel-kathaai

Scyllium capense: Smith, 1837: 85 (name only); Smith, *in* Müller & Henle, 1838: 11 (Cape of Good Hope). *Scyliorhinus capensis:* Smith, **SFSA No. 38***; Bass et al., 1975: 32*; Springer, 1979: 132*.

Grey above, cream below, with dark saddles and pale yellow spots. Precaudal vertebrae 91-95. Oviparous; 2 egg-cases at a time, hatches at about 30 cm; mature at about 60-70 cm; attains at least 95 cm. Southwestern Cape, where it is a common species in depths of 26 - 290 m, to Natal where a single specimen was trawled at a depth of 420 m.

11.16 *Scyliorhinus capensis:* 86 cm mature male (Algoa Bay). N, T & d as in 2.1.



12.1 *Pseudotriakis microdon:* 93 cm immature specimen (Atlantic; after Bigelow & Schroeder, 1948).

Family No. 12: PSEUDOTRIAKIDAE

by A.J. Bass

False catsharks **Vals kathaaie**

Large deep-water sharks resembling the Scyliorhinidae but with a long first dorsal fin (its base about as long as upper caudal fin), its axil over or in front of pelvic origin. A single genus, *Pseudotriakis* Capello, 1868, with 1 or 2 species.

12.1 *Pseudotriakis microdon*
Brito Capello, 1867

Pseudotriakis microdon Brito Capello, 1867: 316, Pl. 5 (Setubal, Portugal); Bass et al., 1975: 35*.

Teeth in several functional series, arranged diagonally in upper jaws, perpendicularly in lower jaws.

Uniform dark brownish-grey. Found near bottom of deep water in North Atlantic and equatorial western Indian Ocean. Live-bearing; 2 pups per litter, born at about 90 cm; attains almost 3 m.

Family No. 13: SPHYRNIDAE

by A.J. Bass

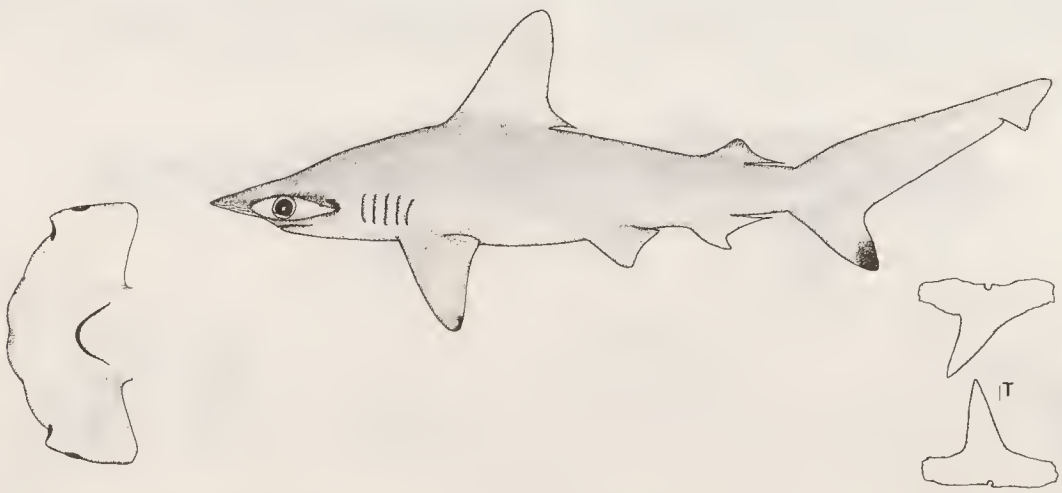
Hammerhead sharks **Hamerkophaaie**

Head flattened and greatly expanded laterally with the eyes on the ends of the lateral expansions. Otherwise similar to the genus *Carcharhinus* (Carcharhinidae). Body grey dorsally, paler below. One genus, *Sphyrna* Rafinesque, 1810, with several species, 3 in our area.

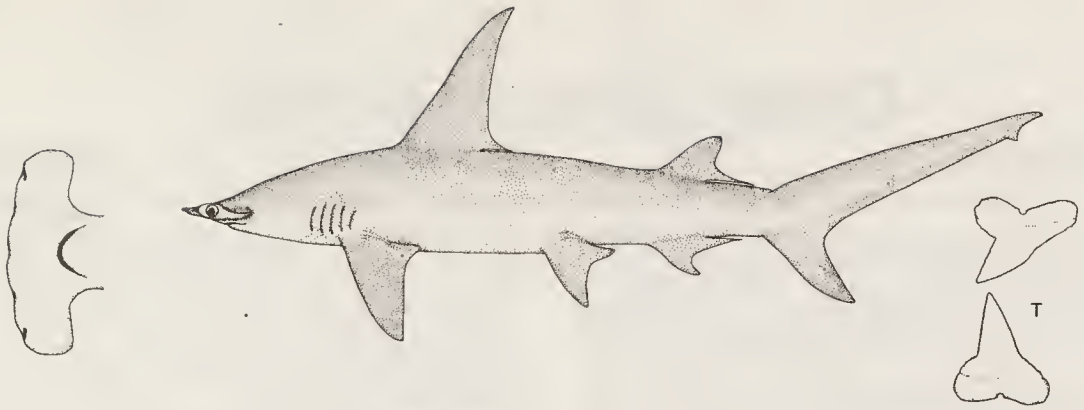
KEY TO SPECIES

1a Front edge of head without a median indentation or "scallop" ..... *S. zygaena*
1b Front edge of head with a median indentation or scallop 2

2a Rear margin of V markedly concave; teeth with definite serrations easily visible to the naked eye; 2nd D higher than length of 3rd gill slit ..... *S. mokarran*
2b Rear margin of V almost straight, at most only slightly concave; teeth with smooth or at most weakly serrated cusps; 2nd D not higher than length of 3rd gill slit ..... *S. lewini*



13.1 *Sphyrna lewini:* 47 cm immature female (Natal). Ventral view of head; T = teeth.



13.2 *Sphyrna mokarran:* 187 cm immature male (Natal). Ventral view of head; T = teeth.

13.1 *Sphyrna lewini*
(Griffith & Smith, 1834)
PLATE 2

Scalloped hammerhead — Skulprand-hamerkop

Zygaena lewini Griffith & Smith, 1834: 640, Pl. 50 ("New Holland"); Bass et al., 1975: 42*.

Teeth $\frac{15\text{-}2\text{-}15}{15\text{-}1\text{-}15}$; cusps not serrated. Precaudal vertebrae 91-96.

Viviparous; 30 pups per litter, born at 40-50 cm; males mature at 160 cm; attains 3 m. Feeds on small fish and squid; rarely dangerous to man. Adults in Mozambique and northwards; young dropped in Mozambique; juveniles and adult males in Natal; ranges widely in tropical waters, often found close inshore. Some specimens are bright gold in colour.

13.2 *Sphyrna mokarran*
(Rüppell, 1837)

Great hammerhead — Groot hamerkop

Zygaena mokarran Rüppell, 1837: 66, Pl. 17 (Red Sea); Bass et al., 1975: 44*.

Leading edge of hammer straight in adults, curved back in young.

Teeth $\frac{17\text{-}2\text{-}17}{17\text{-}1\text{-}17}$; clearly serrated. Precaudal vertebrae 94-96.

Viviparous; 20 pups per litter; attains 5 m, possibly more. Eats fish, crustaceans and small sharks; may be dangerous to man. In tropical waters on our east coast, extending south to Natal; ranges widely in tropical seas, both inshore and over deep water.

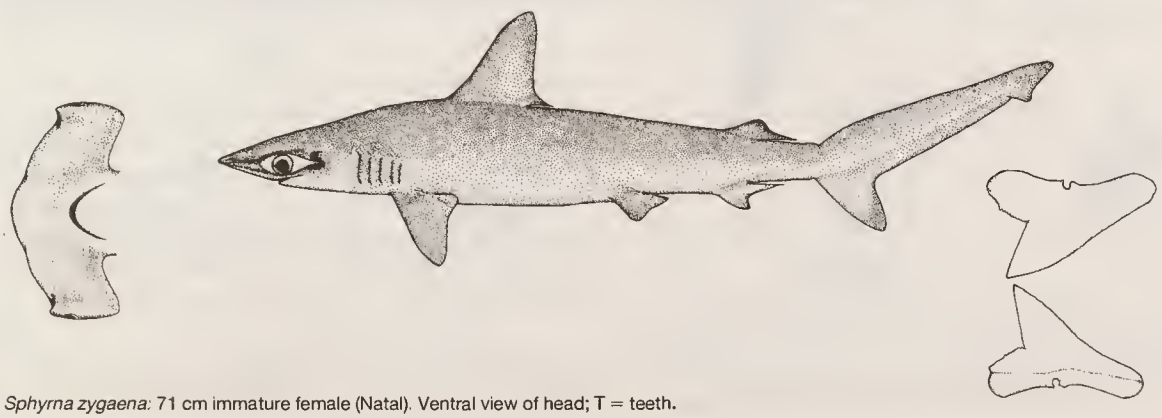
13.3 *Sphyrna zygaena*
(Linnaeus, 1758)
PLATE 2

Smooth hammerhead — Gladde hamerkop

Squalus zygaena Linnaeus, 1758: 234 ("Europe and America"). *Sphyrna zygaena:* Smith, **SFSA No. 21***; Smith & Smith, 1966: 22*; Bass et al., 1975: 45*; van der Elst, 1981: 60*.

Teeth $\frac{14\text{-}1\text{-}14}{14\text{-}1\text{-}14}$; definitely serrated. Precaudal vertebrae 94-102.

Viviparous; over 30 pups per litter, born at 60 cm; attains over 3 m, possibly 3.5 m. Eats small fish and squid; possibly dangerous when attracted by speared fish. Juveniles common in south and southeastern Cape where it sometimes enters estuaries, ranges to Natal and southern Mozambique, occasionally found on our west coast; occurs in warm temperate waters in both hemispheres, rarely found in the tropics.



13.3 *Sphyrna zygaena:* 71 cm immature female (Natal). Ventral view of head; T = teeth.

Order LAMNIFORMES

Mackerel sharks — Haringhaaie

Typical sharks with 2 spineless dorsal fins, an anal fin, 5 pairs of gill slits on sides of head, no movable nictitating eyelid, mouth long and extending behind eyes. Spiral valve in intestine of ring type, with close-packed turns and a central opening, resembling a stack of washers. Live-bearing; some and possibly all species with uterine cannibalism, i.e. developing young eat fertilised eggs and younger embryos while inside the mother. Adults 74 cm to possibly 15 m, most large and reaching at least 3 m. Inshore, oceanic, and deep-water benthic sharks found in all seas, with a fringe distribution in the Antarctic and Arctic oceans. Seven families (6 in our area), with 10 genera and 15 or 16 species.

Family No. 14 : LAMNIDAE

by A.J. Bass

Mackerel sharks — **Haringhaaie**

Fast pelagic sharks with lunate caudal fins. Caudal peduncle flattened with marked lateral keels. Teeth large; lanceolate or serrated. No nictitans. Pectoral origin behind last gill slit. No dorsal fin spines. Anal and second dorsal fins minute in size compared to first dorsal. Distinct upper and lower precaudal pits. Three genera with 5 or more species, 4 found in our area.

KEY TO GENERA

1a C with a short secondary keel on each side below primary keel of C peduncle; A origin clearly in front of 2nd D axil, usually about under 2nd D origin ..... *Lamna*

1b C without keels except that of C peduncle; A origin under or behind 2nd D axil 2

2a First D origin in front of P inner corner; teeth either flattened with serrated edges or (in sharks of less than 150 cm) a few of the teeth lanceolate with small basal denticles ..... *Carcharodon*

2b First D origin behind or over P inner corner; teeth lanceolate, without small basal denticles ..... *Isurus*

Genus ***Carcharodon*** Smith, 1849

One worldwide species.

14.1 *Carcharodon carcharias*

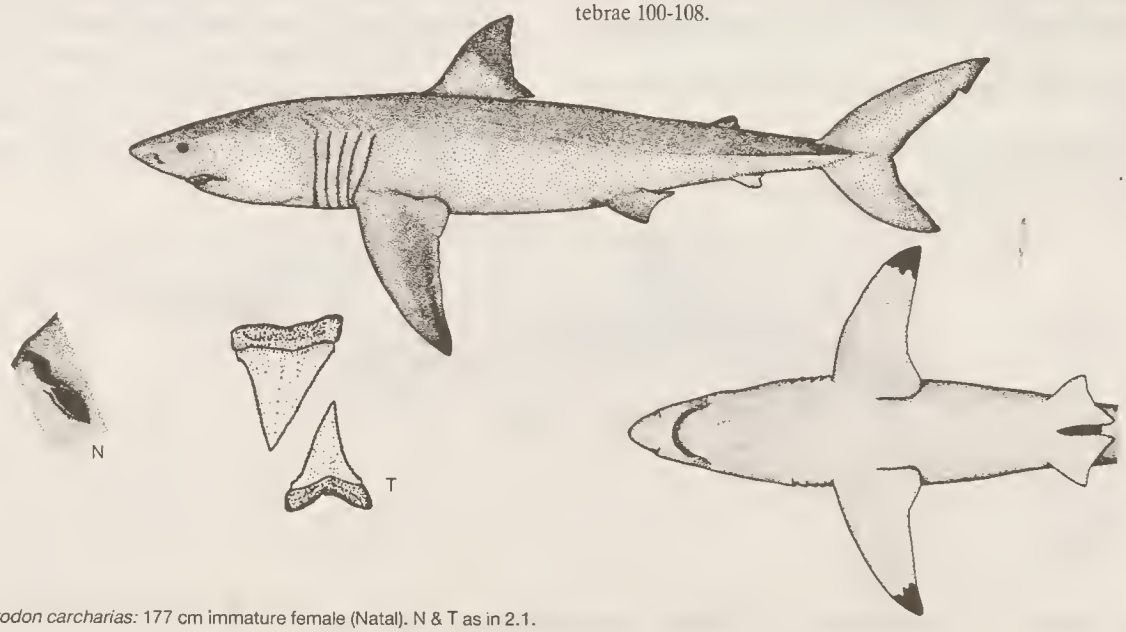
(Linnaeus, 1758)

PLATE 1

Great white shark — Witdoodshaai

Squalus carcharias Linnaeus, 1758: 235 (Europe). *Carcharodon capensis* Smith, 1849: Pl. 4 (Cape Seas). *Carcharodon carcharias:* Smith, **SFSA No. 26***; Smith & Smith, 1966: 24*; Bass et al., 1975: 22*; van der Elst, 1981: 48*.

Snout relatively short as compared to *Isurus* species. Adults with large, triangular serrated teeth, but juveniles of less than 150 cm may have some teeth lanceolate and smooth-edged with basal denticles. Precaudal vertebrae 100-108.

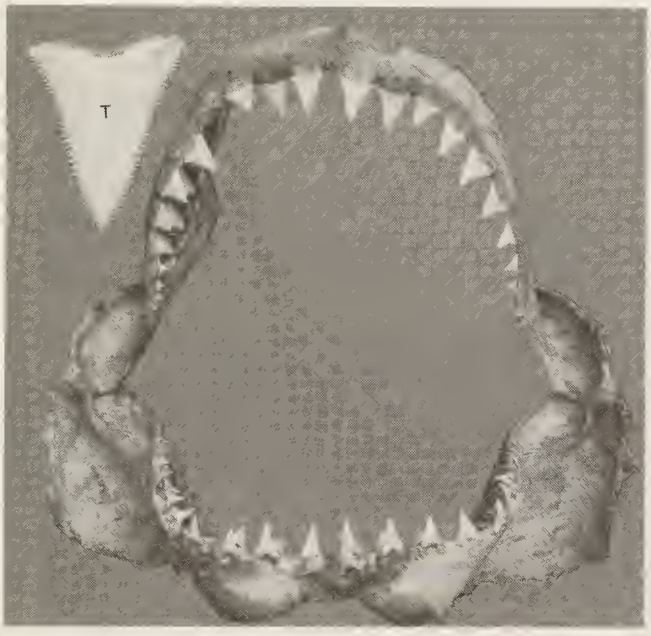


14.1 *Carcharodon carcharias:* 177 cm immature female (Natal). N & T as in 2.1.

Dark grey or blue-grey above, white below. All oceans, probably anti-equatorial, in our area concentrated in temperate areas of western and southern Cape. Young (less than 3 m) move north to Natal in winter and spring while adults are found there in small numbers throughout year. Inshore, rarely in the open ocean. Live-bearing; born at less than 140 cm; mature at about 3 m (males) and about 4 m (females); usual maximum about 6 m. Larger sharks up to 7.5 or 8 m may exist, but largest reliable record is 6.4 m. Extremely dangerous, has attacked boats and bathers in our region.

(Note by M.M. Smith) This is the shark most feared by man, particularly because of the hyperbole about it in films such as *Jaws*. It often eats sea mammals like seals and small dolphins. Divers report it to be ferocious, and it must be treated with respect, as the large teeth and powerful jaws enable adults to sever a limb in one bite.

When Durban still had its whaling station, great whites used to follow the huge carcasses in, and many of these sharks were caught by anglers fishing with just a short stout rod from the breakwater on the southern side of the Bay.



14.1 *Carcharodon carcharias:* jaws of large specimen, T = tooth.

In the first edition of *The Sea Fishes of Southern Africa* Professor Smith writes: "An old sailor has told of an 18 ft (5.4 m) monster caught near the coast during a calm in a fog following heavy rains ashore, which was hooked and finally shot by the captain. Dragged aboard it was cut open and found to have in its stomach the foot of a native, half a small goat, 2 pumpkins, a wicker-covered scent bottle, 2 large fishes quite fresh, a small shark and unidentifiable oddments."

Carcharodon teeth, the enamel part measuring about 13 cm, have been recovered from fossil deposits. It has been estimated recently that the shark from which they came, named *Carcharodon megalodon,* once reached about 14.5 m in length. We can but hope that these sharks really are extinct. William Travis, in his book *Shark for Sale,* recounts collecting the night's catch from a long line of baited hooks set out the previous evening near the edge of the large Seychelles Plateau. Among the fishes caught during the night was the remains of a large shark, but the shark that had bitten it left bite marks so large that Travis cut it loose. He was not prepared to frighten the crew by letting them judge the size of the monster that obviously lived nearby.

Genus ***Isurus*** Rafinesque, 1810

Among the fastest of sharks, well known as gamefish. Two species, both found in our area.

KEY TO SPECIES

1a P markedly shorter than distance from snout to P origin ..... *I. oxyrinchus*
1b P about equal to distance from snout to P origin ..... *I. paucus*

14.2 *Isurus oxyrinchus* Rafinesque, 1810

PLATE 1

Shortfin mako — Kortvin-mako

Isurus oxyrinchus Rafinesque, 1810: 12, Pl. 13 (Sicily); Smith, 1953: **No. 28a***; Bass et al., 1975: 27*. *Isurus bideni* Phillipps, 1932: 227, Fig. 2 (South Africa). *Isurus glaucus:* Smith, **SFSA No. 28***. *Isurus tigris africanus* Smith, 1958: 134 (South Africa). *Isurus africanus:* Smith, 1961: p 565, **No. 28b***.

Juveniles have a lower, more rounded first dorsal than that of adults. Large specimens may have minute basal denticles on the outer side of the lateral teeth. Precaudal vertebrae 107-112.

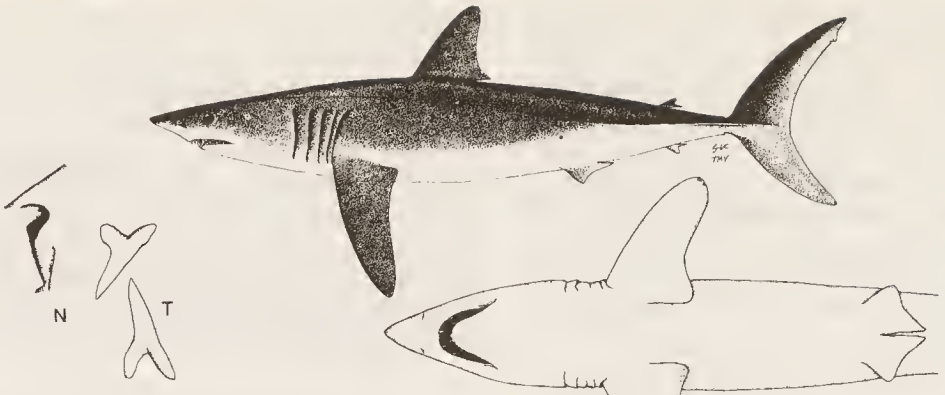
Dark blue above, white below. Live-bearing, 6 pups per litter; born about 70 cm; males mature at about 2.0 m, females at about 2.7 m; attains at least 3.8 m and 500 kg but usual maximum is about 3.0 m. Warm-temperate and temperate oceans, found regularly but not commonly all over our region, inshore and in the open ocean where it can be seen jumping out of the water. Dangerous, has attacked boats as well as bathers; a well-known gamefish.

14.3 *Isurus paucus* Guitart Manday, 1966

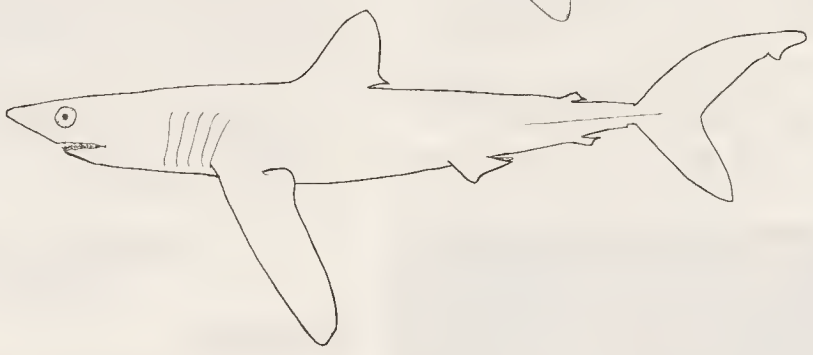
Longfin mako — Langvin-mako

Isurus paucus Guitart Manday, 1966: 3, Figs. 1, 2a, 3a, 3c (Cuba); Bass et al., 1975: 29*.

Colour as for *I. oxyrinchus* but with dusky markings on underside of snout, around mouth. Males adult at 254 cm, attains at least 4.1 m. Tropical oceans, an unconfirmed record in our area from west of Madagascar.



14.2 *Isurus oxyrinchus:* 250 cm female (Algoa Bay). Ventral view of head of 98 cm immature female. N & T as in 2.1.



14.3 *Isurus paucus:* 123 cm immature male (New Zealand; after Garrick, 1967).

Genus ***Lamna*** Cuvier, 1816

Two species, 1 in our area.

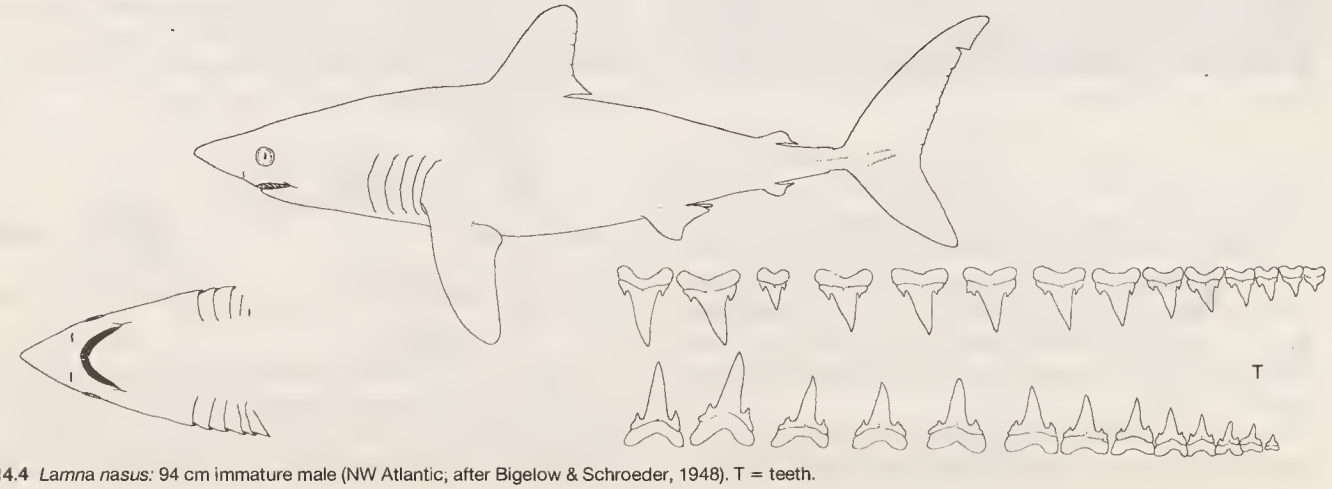
14.4 *Lamna nasus*
(Bonnaterre, 1788)
PLATE 1

Porbeagle — Haringhaai

Squalus nasus Bonnaterre, 1788: 10, Pl. 85, Fig. 350 (Wales). *Lamna nasus:* Smith, **SFSA No. 27*;** Bass et al., 1975: 21*.

Distance from snout to front of eye at least half as long as that from eye to 1st gill slit; 4th upper tooth almost erect. Teeth of juveniles may lack basal denticles.

Dark grey above, lower surface white, without dark blotches. Oviphagous; litters usually 2-4, born at about 75 cm; attains about 3.0 m, occasionally longer. An opportunistic feeder, potentially dangerous to man. Temperate oceans, in our area recorded once from False Bay and once (doubtfully) from Knysna.



14.4 *Lamna nasus:* 94 cm immature male (NW Atlantic; after Bigelow & Schroeder, 1948). T = teeth.

Family No. 15: CETORHINIDAE

by A.J. Bass

Basking sharks **Koesterhaaie**

Large, filter-feeding sharks with a definite snout and long gill-rakers. Eyes in front of mouth corners. Teeth minute, numerous. First gill slits almost meeting ventrally; last gill slits in front of and extending below pectoral origins. Precaudal vertebrae 50-53. A single genus, *Cetorhinus* Blainville, 1816, with 1 widespread species.

15.1 *Cetorhinus maximus*

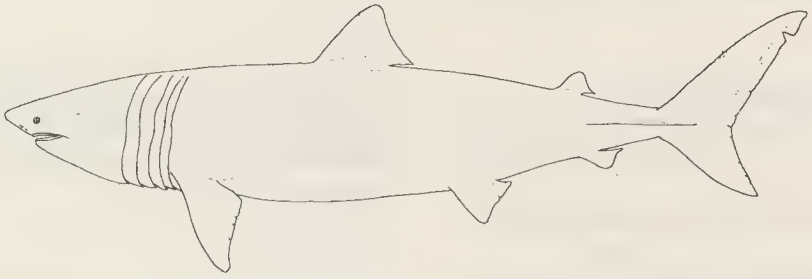
(Gunnerus, 1765)

PLATE 2

Basking shark Koesterhaai

Squalus maximus Gunnerus, 1765: 33, Pl. 2 (Norway). *Halsydrus maximus:* Smith, **SFSA No. 23***. *Cetorhinus maximus:* Bass et al., 1975: 31*; Compagno, 1981*.

Dark grey above, paler below, sometimes with paler bands or patches. Mature at 4-5 m; attains 9 m, perhaps over 10 m. Probably ovoviviparous. Plankton feeder. Normally docile but may attack boats if provoked. A few records from the southwestern Cape; occurs in temperate waters of all oceans.



15.1 *Cetorhinus maximus:* 808 cm mature female (NW Atlantic; after Bigelow & Schroeder, 1948).

Family No. 16: ALOPIIDAE

by A.J. Bass

Thresher sharks **Sambokhaaie**

Caudal fin long, about half total length. Minute second dorsal and anal fins. Nostrils separate from mouth. Distinct upper precaudal pit. Relatively large, attaining 3-5 m. Grey dorsally, white below. Feed on small fish and squid, possibly herding prey into a small area by means of the long tail. Mainly oceanic but regularly caught inshore; often foul hooked in tail fin. Ovoviviparous; the embryos are oviphagous. A single genus, *Alopias* Rafinesque, 1810, with 3 species, all found in our area.

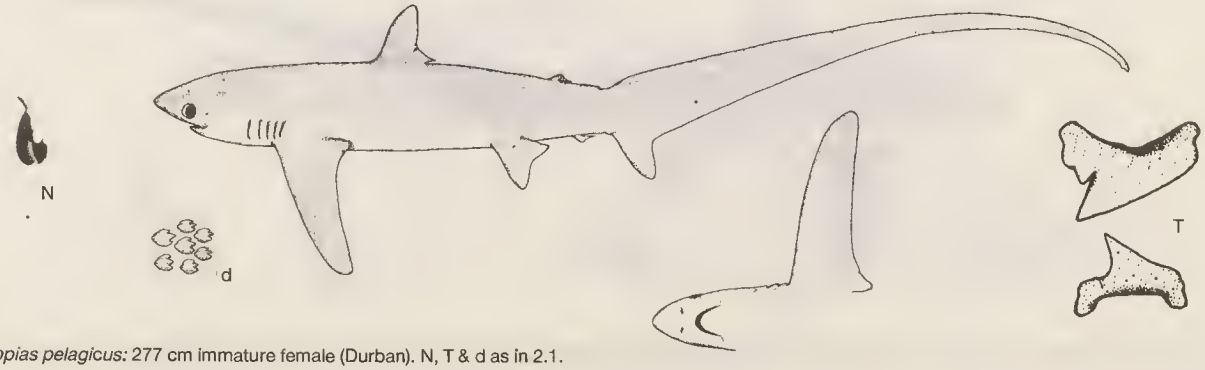
KEY TO SPECIES

1a Eyes large, extending onto dorsal surface of head; less than 15 teeth on each side of jaws; hind tip of 1st D over or slightly in front of V origin ..... *A. superciliosus*

1b Eyes small, not visible on top of head; more than 15 teeth on each side of jaws; hind tip of 1st D well in front of V origin 2

2a Teeth markedly oblique with one or more basal denticles on outer side ..... *A. pelagicus*

2b Teeth erect or slightly oblique without any basal denticles on outer side ..... *A. vulpinus*



16.1 *Alopias pelagicus:* 277 cm immature female (Durban). N, T & d as in 2.1.

16.2 *Alopias superciliosus:* 161 cm immature female (Algoa Bay). N,T & d as in 2.1.

16.1 *Alopias pelagicus*
Nakamura, 1935

Smalltooth thresher — Kleintand-sambokhaai

Alopias pelagicus Nakamura, 1935: 2, Figs. 1, 5, 6 (Formosa); Bass et al., 1975: 34*.

Teeth $\frac{21\text{-}22}{20\text{-}2\text{-}20}$; small, markedly oblique with distinct denticles on the side. Precaudal vertebrae 126.

Ovoviviparous; 2 pups per litter; attains 3.3 m. One specimen from Durban; also northwest Indian Ocean and Formosa.

16.2 *Alopias superciliosus*
(Lowe, 1840)

Bigeye thresher — Grootoog-sambokhaai

Alopecias superciliosus Lowe, 1840: 39 (Madeira). *Alopias superciliosus:* Bass et al., 1975: 38*; Gruber & Compagno, 1981: 617*.

Deep grooves from above eyes to over gill slits. Teeth about $\frac{12\text{-}12}{11\text{-}11}$. Precaudal vertebrae 98-106.

Ovoviviparous; 2 pups per litter, born at 100-130 cm; attains 4.5 m. Two specimens from eastern Cape (probably quite common there), 1 from Natal; occurs widely in warm oceanic waters.

16.3 *Alopias vulpinus*
(Bonnaterre, 1788)

Thintail thresher — Fynstert-sambokhaai

Squalus vulpinus Bonnaterre, 1788: 9, Fig. 349, Pl. 85 (Mediterranean). *Alopias vulpinus:* Smith, **SFSA No. 22***; Bass et al., 1975: 35*; Compagno, 1981: 2*.

Teeth about $\frac{21\text{-}2\text{-}20}{24\text{-}2\text{-}22}$; upright, without denticles. Precaudal vertebrae 112.

Two pups per litter, born at 115 cm. Attains 5.5 m; one caught off Cape Point was 5 m long and weighed 345 kg. Throughout our region, more common in the southern parts although many records could have been *A. superciliosus;* ranges widely in warm-temperate seas.

16.3 *Alopias vulpinus:* 348 cm female (off Port Alfred). T = teeth from 376 cm female (Natal).

Family No. 17: MITSUKURINIDAE

by A.J.Bass and L.J.V. Compagno

Goblin sharks **Kabouterhaaie**

Snout produced into a long, flat, blade-like rostrum. Jaws highly protusible; teeth slender, awl-like, similar in both jaws. Body soft and limp. Fins thin and flexible; dorsal fins subequal, without spines. Five gill slits; gill filaments exposed. Precaudal vertebrae 56. Spiracles present. No nictitans. A single living species found in deep water. The genus *Scapanorhynchus* Woodward is represented only by fossil species.

17.1 *Mitsukurina owstoni*

Jordan, 1898

Goblin shark Kabouterhaai

Mitsukurina owstoni Jordan, 1898: 200, Pls. 11, 12 (Misaki, Japan). *Scapanorhynchus owstoni:* Bass et al., 1975: 18*; Piotrovskiy & Prut'ko, 1980: 124.

Pale brownish grey, without distinct markings. Attains 335 cm. In our area known from a 116 cm female trawled in 550 m west of Cape Town and two further specimens, a 250 cm female and a 322 cm male from the open ocean off the Transkei coast. Also recorded from Japan, Australia, Portugal, France and Guinea.

17.1 *Mitsukurina owstoni:* 116 cm immature female (off Cape Town).

Family No. 18: PSEUDOCARCHARIIDAE

by A.J. Bass

Crocodile sharks **Krokodilhaaie**

Pelagic sharks, similar in general appearance to those in the Family Odontaspididae but the eye large, with vertical diameter of orbit at least half as long as first gill slit, and most of the lanceolate teeth lacking basal denticles. Precaudal vertebrae 84-87. Spiracles small, sometimes absent. Slight lateral keels on sides of caudal peduncle. One genus, *Pseudocarcharias* Cadenat, 1963, with a single wide-ranging species.

18.1 *Pseudocarcharias kamoharai*

(Matsubara, 1936)

Crocodile shark Krokodilhaai

Carcharias kamoharai Matsubara, 1936: 380 (Japan); D'Aubrey, 1964: 9*. *Odontaspis kamoharai:* Bass et al., 1975: 8*.

Dark brown above, paler below; sometimes a white blotch between mouth and gill slits. Embryo oviphagous? Few pups per litter, born at 36+ cm; attains about 110 cm. A pelagic shark, often taken on surface longlines in tropical open oceans. Common in Mozambique Channel, once found near Cape Town.

18.1 *Pseudocarcharias kamoharai:* 81 cm mature female (SW of Cape Town: 39°29'S, 16°42'E). N & T as in 2.1.

Family No. 19: ODONTASPIDIDAE

by A.J.Bass and L.J.V. Compagno

Ragged-tooth sharks **Skeurtandhaaie**

Two dorsal fins, without spines. First dorsal axil in front of pelvic origin. Pectoral origin behind last gill slit. Anal fin present. No nictitans. Upper precaudal pit present. Teeth long, lanceolate; 1 or more basal denticles on each side of main cusp. Eye small, vertical diameter of orbit less than half as long as first gill slit. Two genera with 3 or 4 species; 2 species in our area.

KEY TO GENERA

1a Second D subequal to 1st D; most teeth with 1 basal denticle on each side ..... *Eugomphodus*

1b Second D markedly smaller than 1st D; most teeth with 2 or more basal denticles on each side ..... *Odontaspis*

Genus ***Eugomphodus*** Gill, 1861

One species.

19.1 *Eugomphodus taurus*

(Rafinesque, 1810)

PLATE 2

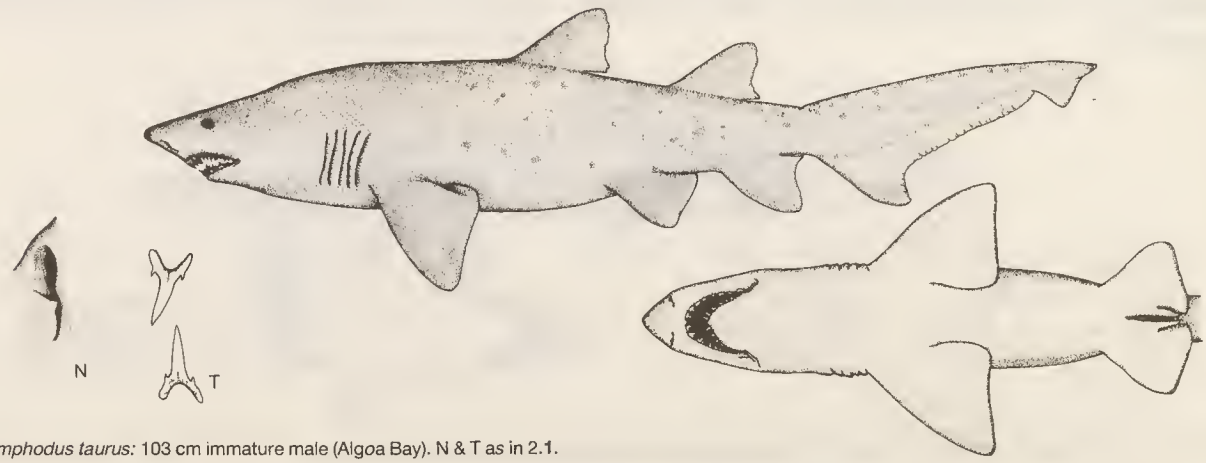
Spotted ragged-tooth Spikkel-skeurtandhaai

Carcharias taurus Rafinesque, 1810: 10, Pl. 44, Fig. 1 (Sicily); Smith, **SFSA No. 25*;** Smith & Smith, 1966: 23*. *(?)Carcharias tricuspidatus:* Smith, **SFSA No. 24*.** *Odontaspis taurus:* Bass et al., 1975: 12*; van der Elst, 1981: 52*; Compagno, 1981: 2*.

No bump on upper edge of C. Spiracles minute. Precaudal vertebrae 91-97.

Pale brown or grey, paler below; fins plain, body with dark spots which fade in adults. Embryos oviphagous; 2 pups per litter, born at 100 cm; mature at 220 cm (males) and 240 cm (females); attains almost 3.0 m. Teeth grasping not cutting so must swallow prey whole; feeds on fish; not usually dangerous but occasionally bites bathers; aggressive towards skindivers with speared fish. Tropical Atlantic and Indo-West Pacific oceans; absent from Madagascar. Common in shallow water; mating occurs off Natal, but the young are born in eastern Cape waters. Gilmore et al. (1983) have published an excellent paper on the reproduction of this species. The ovary and oviducal gland produce 6 different types of egg capsules during the 9-12 month gestation period. After their own yolk supply is used up, the embryos begin feeding on other eggs in the uterus. At about 10 cm, the embryos begin to feed on their smaller unborn siblings as well as the eggs. During the last 2 or 3 months of the gestation period, the single remaining embryo in each uterus feeds on enlarged yolk capsules containing 7-23 unfertilised ova.

19.1 *Eugomphodus taurus:* jaws of large specimen.



19.1 *Eugomphodus taurus:* 103 cm immature male (Algoa Bay). N & T as in 2.1.

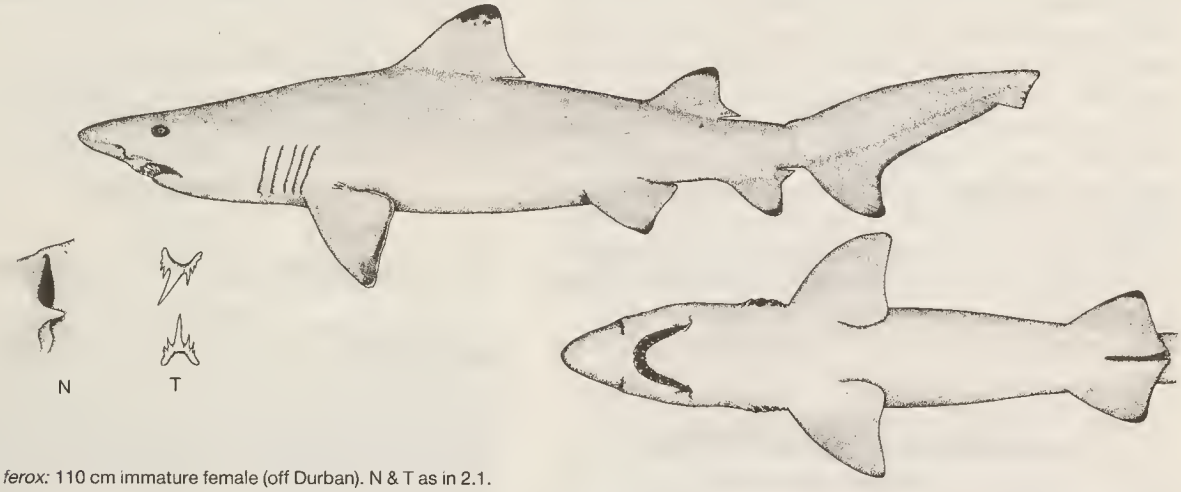
Genus *Odontaspis* Agassiz, 1835

One or 2 species.

19.2 *Odontaspis ferox*
(Risso, 1810)

Bumpytail ragged-tooth Knopstert-skeurtandhaai

Squalus ferox Risso, 1810: 38, Pl. 6, Fig. 1 (off Nice, France). *Odontaspis herbsti:* Bass et al., 1975: 10*.



19.2 *Odontaspis ferox:* 110 cm immature female (off Durban). N & T as in 2.1.

Distinct bump on upper edge of C, just behind precaudal pit. Small spiracles usually present. Precaudal vertebrae 95-98.

Grey above, paler below. Attains at least 3.6 m. Continental slopes of all oceans; in our area a few specimens trawled in 400 - 420 m off Natal and a 352 cm female caught northeast of Madagascar.

Order PRISTIOPHORIFORMES

Sawsharks — Saaghaaie

The only sharks with a flattened blade-like snout edged with various-sized slender saw-teeth and a pair of rostral barbels on underside of snout in front of nostrils. Five or 6 pairs of gill slits on sides of head; no anal fin; and 2 spineless dorsal fins. Sawfishes, Family No. 22, are batoids, and differ from sawsharks in having larger pectoral fins expanded forwards onto the sides of the head, gill slits on the underside of the head, larger, stronger and more uniformly sized teeth on the sides of the snout, and no barbels. Ovoviviparous. Adults reach 137 cm. A single family of mostly deep-water benthic sharks currently found in the Indo-West Pacific and western North Atlantic.

Family No. 20: PRISTIOPHORIDAE

by A.J. Bass & P.C. Heemstra

Sawsharks — **Saaghaaie**

Snout produced into a long flat rostrum ("saw") armed with needle-like "teeth" along each edge; 2 long barbels on underside of "saw"; 5 or 6 small gill slits on each side of head in front of pectoral fins. No nictitans; spiracles large. Two dorsal fins without spines; no anal fin.

Two genera with 5 or 6 species; *Pristiophorus* Müller & Henle, 1837, from the West Pacific has 5 gill slits.

Genus ***Pliotrema*** Regan, 1906

Six gill slits, 1 species, endemic in our area.

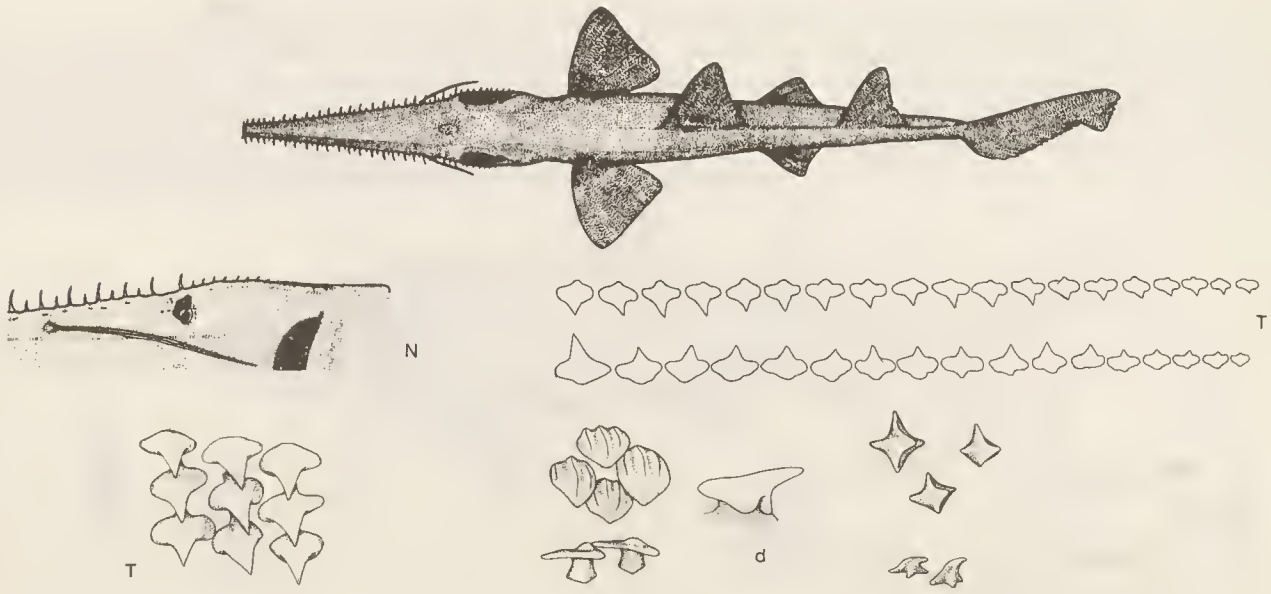
20.1 *Pliotrema warreni*
Regan, 1906
PLATE 4

Sixgill sawshark — Seskief-saaghaai

Pliotrema warreni Regan, 1906: 1, Pl. 1 (Natal, South Africa); Smith, **SFSA No. 57*;** Bass et al., 1975: 20, Fig. 11, Pl. 8. *Pristiophorus cirratus (non* Latham): Smith, **SFSA No. 56.** (The single record of this species in South African waters is based on a specimen from False Bay that was misidentified by Boulenger and, some years later, was used by Regan as one of the 2 type-specimens for his new species, *Pliotrema warreni.)*

Teeth in mouth small, unicuspid, in several functional series.

Pale brown above, white below. Ovoviviparous; the "teeth" on the rostrum of unborn pups are folded back beneath the skin; 7-17 pups per litter are born at about 35 cm; males mature at 80 cm and females at 110 cm; attains 136 cm. Recorded from False Bay to southern Mozambique. Commonly taken in bottom trawls at depths of 60 - 430 m.



20.1 *Pliotrema warreni:* dorsal view of 36 cm immature male (Natal). N, T & d as in 2.1.

Order SQUATINIFORMES

Angelsharks **Engelhaaie**

Curious, greatly flattened, batoid-like sharks with large pectoral fins expanded along sides of head as free triangular lobes; lower lobe of caudal fin longer than upper; 5 pairs of gill slits on sides of head; mouth at front of head; no anal fin; 2 spineless dorsal fins rearwards on tail. Ovoviviparous. Adults 1.8 to 2.4 m in length. A single family of inshore to deep-water benthic sharks found in all temperate and subtropical seas.

Family No. 21: SQUATINIDAE

by A.J. Bass

Angelsharks **Engelhaaie**

Head and body greatly flattened. Pectoral fins expanded forward to form triangular lobes extending over the ventrolateral gill slits, but not fused to sides of head as in skates and rays. No anal fin; 2 dorsal fins without spines; lower lobe of caudal fin larger than upper lobe. Mouth terminal. Spiracles present. No nictitans.

A single genus, *Squatina* Dumeril, 1806, with several species; 1 endemic species in our area.

21.1 *Squatina africana*

Regan, 1908

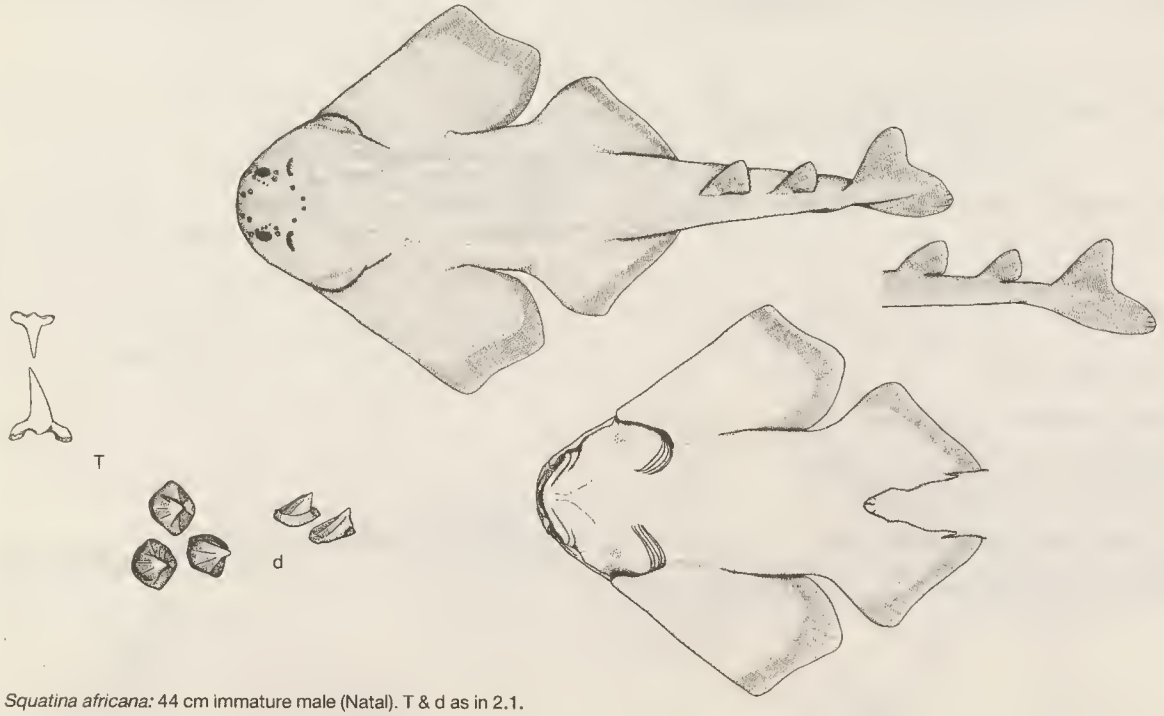
PLATE 5

African angelshark Afrikaanse engelhaai

Squatina africana Regan, 1908: 248, Pl. 38 (Durban Bay, Natal); Smith, **SFSA No. 55*;** Bass et al., 1975: 21*.

Teeth small, with a single narrow cusp, alike in both jaws. Dorsal surface of body with irregular rough denticles. Precaudal vertebrae 104-108.

Brownish dorsally, marbled with white spots and pale brown reticulations. Ovoviviparous; 7-10 pups per litter, born at 30 cm; males mature at 75-78 cm, females at 90 cm; attains 108 cm. Common in Natal waters, but apparently rare in eastern Cape Province. Usually in depths of 60 - 400 m, but sometimes caught by surf anglers.



21.1 *Squatina africana:* 44 cm immature male (Natal). T & d as in 2.1.

Superorder BATOIDEA

Rays or Batoids — Rôe of Batoids

Cartilaginous fishes with 5 or 6 gill openings below the pectoral fins, upper edge of orbit fused to eye, dorsal fin(s) present or absent (without spines in living species), anal fin absent.

There are between 450 and 500 species of batoids, from dwarf electric rays (*Narke*) 10 cm long to sawfishes (*Pristis*) at least 7.3 m (possibly 9.8 m) long and mantas 6 or 7 m wide. Rays inhabit almost all parts of the sea, from the shore down to over 2 000 m, and from the Arctic to the Antarctic. A few species of sawfishes (*Pristis*) and several marine stingrays (Dasyatidae) readily enter tropical and warm/temperate rivers. Almost 30 species of stingrays are confined to freshwater in the tropics, mostly in South America but with several species in west Africa, southeast Asia, China and the Australian region.

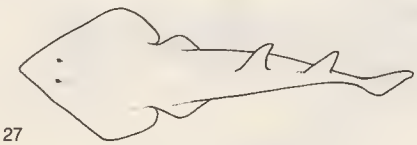
KEY TO FAMILIES OF BATOID FISHES

1a P not greatly enlarged, body elongated and shark-like 2
1b P greatly enlarged to form a disc, body not shark-like 3

2a Snout elongated into a narrow, flat blade with large teeth on each side ..... PRISTIDAE (No. 22)

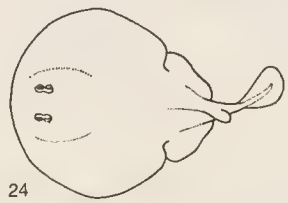
22

2b Snout not formed into a toothed blade . RHINOBATIDAE (No. 27)

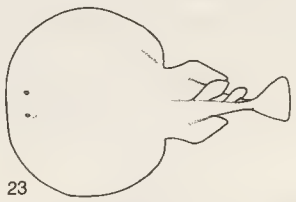

27

3a Large electric organ present on each side of head; tail stout, C large 4
3b No electric organ on each side of head; tail slender to thin and whiplike, with or without a small C 5

4a Mouth very small and transverse; anterior nasal flaps united or nasal curtain narrow and long; spiracles immediately behind eyes ..... NARKIDAE (No. 24)


24

4b Mouth large and broadly arched; nasal curtain broad and short; spiracles a short distance behind eyes ..... TORPEDINIDAE (No. 23)

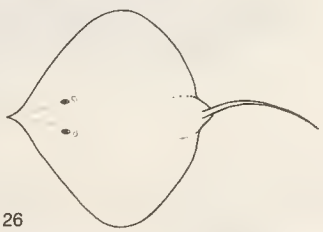

23

5a Rear margin of V deeply notched, divided into anterior and posterior lobes; anterior nasal flaps not medially fused to form a nasal curtain; no sting on tail 6
5b Rear margin of V not notched or divided; anterior nasal flaps medially fused to form a nasal curtain; usually a sting on tail 7

6a Two D on tail; a medial row or rows of enlarged denticles or thorns on tail, and usually thorns and smaller denticles on disc; tail moderately slender . RAJIDAE (No. 25)

25

6b No D on tail; no thorns on tail, and no thorns or denticles on disc except for alar spines of adult males; tail thin and whip-like ..... ANACANTHOBATIDAE (No. 26)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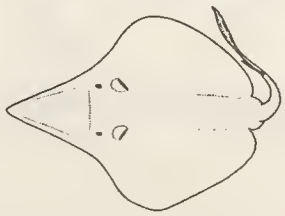
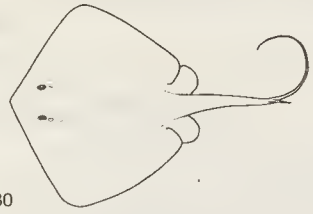
7a Six pairs of gill openings on underside of disc; snout greatly elongated, its length about half disc width ..... HEXATRYGONIDAE (No. 31)


31

7b Five pairs of gill openings on underside of disc; snout length less than half disc width 8

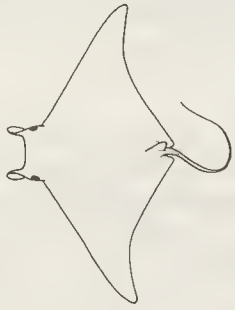
8a Head in front of spiracles not elevated and marked off from pectoral disc; no D ..... DASYATIDAE (No. 30)



30

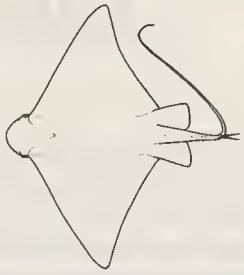
8b Head in front of spiracles elevated and strongly marked off from disc; a single D present 9

9a Head with a pair of elongated, horn or paddle-like cephalic fins; teeth minute, numerous and sharp, not formed into broad crushing plates ..... MOBULIDAE (No. 29)



29

9b Head without cephalic fins; teeth large, few, and formed into broad crushing plates ..... MYLIOBATIDAE (No. 28)



28

Order PRISTIFORMES

Sawfishes — Saagvisse

Shark-like batoids with saw-like elongated snouts with a row of strong large lateral teeth on each side. Sawsharks, Family No. 20, differ from sawfish in having their pectoral fins not expanded forwards onto sides of head, gill slits on sides of head, smaller teeth on sides of snout, and barbels on underside of snout in front of nostrils. Two dorsal fins: first originating over or in front of pelvic fin bases; pectoral fins small; tail thick and long; caudal fin large and functional in swimming. Ovoviviparous. Adults large, 3 to 7+ m. A single family of small circumtropical batoids, some entering freshwater.

Family No. 22: PRISTIDAE

by L.J.V. Compagno

Sawfishes — **Saagvisse**

Body elongate and shark-like, flattened anteriorly; tail stout. Snout elongated into a flat, rostral saw, with 16 to 35 large teeth embedded in sockets on either side, but without ventral barbels. Gill openings on underside of pectoral fins. Numerous small, blunt teeth in jaws. Two large dorsal fins, first with origin over or in front of pelvic fins.

Large, bottom dwelling fishes, present in all warm continental seas and often entering estuaries and ascending rivers. Adults of some species attain over 6 m. Sawfishes use the rostral saw to kill small fishes with sideways slashes, and can be dangerous to people when cornered or restrained. Live-bearing (ovoviviparous), with young born at 40-70 cm, the "saw" covered to prevent damage to the mother. Excellent eating but little utilised in southern Africa. Two genera, *Anoxypristis* and *Pristis,* and 6 or 7 species; 3 species of the genus *Pristis* Linck, 1790 occur in our area.

KEY TO SPECIES

1a Saw short and broad, with 17-22 pairs of teeth; first D origin far anterior to V origins, about over rear tips of P; short ventral lobe on C ..... *P. microdon*

1b Saw long and narrow, with 23 to 34 pairs of teeth; first D origin over or behind V origins; no ventral lobe on C 2

2a First D origin about opposite V origins; interspace between posteriormost 2 teeth on saw about 3 times space between anteriormost 2 teeth ..... *P. pectinata*

2b First D origin over rear half of V bases; interspace between posteriormost 2 teeth on saw 4 or more times space between anteriormost 2 teeth ..... *P. zijsron*

22.1 *Pristis microdon*

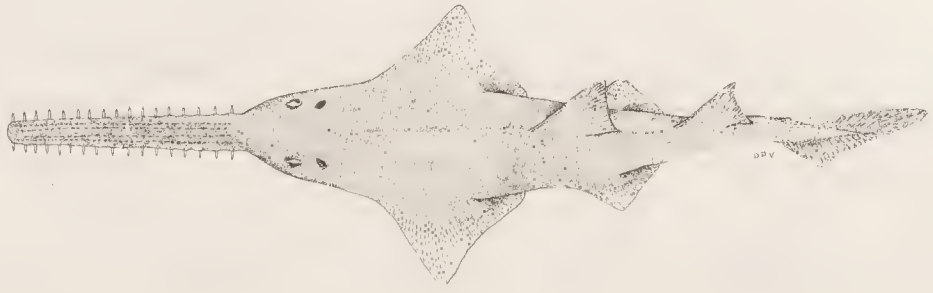
Latham, 1794

Smalltooth sawfish — Kleintand-saagvis

Pristis microdon Latham, 1794: 280, Pl. 26, Fig. 4 (no type-locality); Smith, **SFSA No. 58;** Wallace, 1967: 6*; 1969: 25.

Saw teeth 17-22 on each side; oral teeth $\frac{115\text{-}127}{122\text{-}140}$ in adult; precaudal vertebral count 171-172; total vertebral count 230-232; saw shorter, broader and more tapered than in *P. pectinata* or *P. zijsron.*

Uniform olive green above, cream below. Attains at least 4.6 m. Tropical Indo-West Pacific, south to Natal; once taken at Port Alfred. Favours shallow water and is often found in estuaries and fresh water, including the Zambezi River. Name provisional.



22.1 *Pristis microdon*: (redrawn after Day, 1878).

22.2 *Pristis pectinata:* 109 cm immature male (Natal).

22.2 *Pristis pectinata*
Latham, 1794
PLATE 4

Largetooth sawfish — Groottand-saagvis

Pristis pectinatus Latham, 1794: 278, Pl. 26, fig. 2 (no type-locality); Smith, **SFSA No. 59***; Wallace, 1967: 9*; 1969: 25; van der Elst, 1981: 54*.

Saw teeth 24-34 on each side, oral teeth $\frac{133}{136}$ in adult; precaudal vertebral count 173-181; total vertebral count 228-232; saw long and narrow, slightly tapered.

Dark grey to blackish brown above, white to yellowish below; said to reach 7.6 m or more, but commonly to 5.5 m. S.A. angling record = 275.8 kg. All tropical continental seas, south to Port Alfred. Common off Natal and often taken by anglers there; good eating. Frequents shallow bays, estuaries and lagoons, and readily enters fresh water. Van der Elst (1981) reports that during summer large pregnant females enter Lake St. Lucia and Richards Bay to drop their 15-20 young, each about 60 cm long.

22.3 *Pristis zijsron*
Bleeker, 1851

Longcomb sawfish — Langkam-saagvis

Pristis zijsron Bleeker, 1851: 442 (Bandjermassing, Borneo, in fresh water); Smith, **SFSA No. 59a.**

Saw teeth 23-32 on each side, usually more than 25; saw longer and narrower than that of *P. pectinata.*

Greenish grey above, white below. Said to reach 7.3 m or more. A little-known Indo-West Pacific tropical species, ranging south to Maputo.

22.3 *Pristis zijsron:* (redrawn after Day, 1878).

Order TORPEDINIFORMES

Electric rays — Drilvisse

Batoids with pectoral fins greatly expanded and fused with head and trunk, forming a large, oval disc. A pair of unique, kidney-shaped electric organs in front of disc, usually visible through skin as pattern of hexagonal markings. The electric organs can produce a powerful and dangerous electric shock when these rays are disturbed. Dorsal fin(s) present or absent; tail thick but short; caudal fin functional in swimming. Adults about 10-183 cm. Ovoviviparous. Circumtropical and temperate inshore to deep-water benthic batoids. Two or 4 families, depending on the classification used; 11 genera and 42 species.

Family No. 23: TORPEDINIDAE

by L.J.V. Compagno

Electric rays — **Drilvisse**

Head, body and pectoral fins form a rounded, soft and flabby disc, usually slightly wider than long. Electric rays (Torpedinidae, Narkidae and 2 extralimital families) are unique in having 2 large, kidney-shaped electric organs in the disc on either side of the head. These organs are capable of generating strong electric shocks which are administered at will. Nasal flaps form broad, short nasal curtain; mouth broadly arched. Five pairs of gill openings on underside of disc. Jaws with small cuspidate teeth. Two moderate-sized dorsal fins and a large caudal fin present; tail short and strong.

Small to moderately large batoid fishes, largest possibly over 2 m long. Large pectoral fins are not used for swimming; fish is slowly propelled by caudal peduncle and caudal fin. Electric rays stun both small and large fishes on bottom or in midwater with shocks, and can jolt the unwary angler, trawlerman or swimmer that encounters them. Worldwide in all tropical and temperate seas, inshore and in deep water near the bottom. One genus, *Torpedo* Houttuyn, 1764 with several species, 3 in our area.

KEY TO SPECIES

1a Margins of spiracles smooth; C height about equal to distance from upper C origin to first D origin ..... *T. nobiliana*

1b Margin of spiracles with short tentacles or papillae; C height much less than distance from upper C origin to first D origin 2

2a Dorsal surface grey, uniform or with numerous white flecks or pale to dark brown spots ..... *T. fuscomaculata*

2b Dorsal surface bright red or brown, with pale reticulated pattern ..... *T. sinuspersici*

23.1 *Torpedo fuscomaculata*

Peters, 1855

PLATE 5

Blackspotted electric ray — Swartspikkel-drilvis

Torpedo fuscomaculata Peters, 1855: 278 (Mozambique); Smith & Smith, 1966: 34*; Wallace, 1967: 49*. *Torpedo smithii* Günther, 1870: 451 (South Africa). *Torpedo marmorata: (non* Risso, 1810): Smith, **SFSA No. 91*** (Fig. only); Smith & Smith, 1966: 34*.

Greyish, dull-coloured in comparison to *T. sinuspersici.* Attains 64 cm TL. Knysna to southern Mozambique in 64 - 439 m; also Seychelles, Mauritius, Madagascar and Zanzibar. Not very common.

23.2 *Torpedo nobiliana*

Bonaparte, 1835

Atlantic electric ray — Atlantiese drilvis

Torpedo nobiliana Bonaparte, 1835: Fig. (pp. not numbered; Italy); Barnard, 1925: 89; Smith, **SFSA No. 92.**

Uniformly dark chocolate or purplish brown to black above, white below. Attains at least 122 cm TL in our area, to at least 180 cm elsewhere. Western North Atlantic, Mediterranean Sea and eastern Atlantic; western Cape coast to Algoa Bay, in 110 - 457 m. Trawl-caught rays are usually exhausted and incapable of powerful shocks, but can deliver up to 220 volts when rested.

23.2 *Torpedo nobiliana:* 30.5 cm wide female (off Orange River), dorsal view.

23.2 *Torpedo nobiliana*: 30.5 cm wide female (off Orange River), ventral view.

23.3 *Torpedo sinuspersici*
Olfers, 1831
PLATE 5

Marbled electric ray — Marmer-drilvis

Torpedo sinus-persici Olfers, 1831: 15 (presumably Persian Gulf); Wallace, 1967: 53*. *Torpedo sinuspersici:* van der Elst, 1981: 63*. *Torpedo marmorata (non* Risso, 1810): Smith, **SFSA No. 91** (in part; not Fig.).

Brightly patterned, unlike other species of *Torpedo*. Indian Ocean, on the east coast of southern Africa from East Cape to Mozambique, also Madagascar, Red Sea, Persian Gulf and India. Maximum length about 130 cm, most smaller. Common in shallow water in sandy areas, but occurring down to 200 m. Occasionally hooked by anglers, more often seen by divers; can deliver a strong shock. Name provisional.

Family No. 24: NARKIDAE

by L.J.V. Compagno

Numbfish — **Drilvisse**

Head, body and pectoral fins form a rounded disc with 2 large, kidney-shaped electric organs on either side of head. Nasal flaps form a narrow, long nasal curtain; mouth narrow and transverse. Five pairs of gill openings on underside of disc. Jaws with minute cuspidate teeth. Two, one, or no dorsal fins; a large caudal fin and a short, strong tail.

Small to moderate-sized batoid fishes, largest less than 1 m long. Pectoral disc not used for swimming, propulsion by tail and caudal fin. Mostly deep-water rays encountered in trawl catches, some capable of delivering powerful shocks. Indian Ocean and western Pacific in temperate and tropical seas. At least 3 genera, 2 in our area.

KEY TO GENERA

1a Two dorsal fins ..... *Heteronarce*
1b One dorsal fin ..... *Narke*

Genus ***Heteronarce*** Regan, 1921

Three species, 1 in our area.

24.1 *Heteronarce garmani*
Regan, 1921

Natal electric ray — Natalse drilvis

Heteronarce garmani Regan, 1921: 414 (Natal); Smith, **SFSA No. 90*;** 1964: 291*; Wallace, 1967: 55*; Hulley, 1972: 2*. *Heteronarce regani* von Bonde & Swart, 1923: 14, Fig. 2, Pl. 22 (Natal). *Narcine natalensis* Fowler, 1925: 198, Fig. 2 (Natal).

Pectoral disc slightly longer than wide, length about half total length; disc smooth. Margin of spiracles without tentacles.

Colour brown above, with obscure dark markings, white on underside. Attains 25 cm TL. Known only from Algoa Bay to Natal in 73 - 329 m. Rare, more specimens wanted.

24.1 *Heteronarce garmani*: 10 cm wide (off Natal; after von Bonde & Swart, 1923).

Genus ***Narke*** Kaup, 1826

Several species, 1 in our area.

24.2 *Narke capensis*
(Gmelin, 1789)

Onefin electric ray — Eenvin-drilvis

Raja capensis Gmelin, 1789: 1512 (Cape of Good Hope). *Astrape capensis:* Müller & Henle, 1841: 130. *Narke capensis:* Smith, **SFSA No. 89*;** Wheeler, 1958: 205; Smith, 1964: 292; Wallace, 1967: 59*.

Pectoral disc wider than long, width three fifths or more of total length; disc smooth. Margin of spiracles with 3 small tentacles.

Colour brown above, white below with brown margins. Attains about 38 cm TL. Known only from Cape of Good Hope to Madagascar, in shallow water down to 183 m. Gives a very powerful shock despite its small size.

24.2 *Narke capensis:* 15.5 cm wide male (Natal).

Order RAJIFORMES

Guitarfishes & Skates — Sandkruipers & Rôe

Thick-bodied or greatly flattened batoids with pectoral fins variably expanded and fused with head and trunk. Snout usually angular, sometimes broadly rounded. Nasal flaps not fused to each other across the snout in our species. No electric organs, or a slender pair in tail. Usually 2 dorsal fins, one or none in a few genera; tail thick or relatively slender, without a sting; caudal fin large or variably reduced. Oviparous or ovoviviparous. The largest group of batoids, with 3 to 7 families according to the classification used.

Suborder RAJOIDEI

Skates — Rôe

Flattened batoids with pectoral fins greatly expanded and fused with head and trunk to form a disc. Nostrils close to mouth, with nasal flaps expanded posteriorly to overlap mouth. A pair of small slender electric organs usually present in tail. Pelvic fins with anterior ends expanded as distinct lobes, these sometimes entirely separate from posterior lobes. Usually 2 small dorsal fins (sometimes absent) close to tail tip; tail slender but not whip-like, with a reduced caudal fin that does not function in swimming. Eggs deposited in quadrangular cases with a horn at each corner. Adults 18 cm to 2.4 m long. The largest group of batoids, found in all seas including the Arctic and Antarctic, benthic in habitat and ranging from inshore to very deep water. Two to 4 or more families depending on the classification used; at least 15 or 16 genera, with 200-210 species.

Family No. 25: RAJIDAE

by P.A. Hulley

Skates — Rôe

Disc quadrangular to rhomboidal; snout long and acutely angled to short and obtusely rounded; tail with lateral folds, 2 dorsal fins and caudal fin. Mouth transverse to arched, with numerous teeth, set in bands along jaws in quincunx to parallel pattern; teeth exhibiting sexual dimorphism in many species. Five pairs of ventral gill slits. Anterior margin of neurocranium produced medially as a rostral bar, ranging from a stout conical rod to a delicate slender bar, or rostrum absent; pectorals with radials of ordinary form, without lateral processes; propterygia falling well short of, or in contact with, tip of rostrum. Pelvic girdle transverse, with weakly to strongly developed lateral prepelvic and iliac processes. Clasper with 3-9 terminal cartilages.

Benthic in all oceans, from Arctic to Antarctic waters and from shallow coastal shelf to abyssal regions; rare in tropical shallow waters, especially in vicinity of coral reefs; some species found in brackish waters. Feed on other benthic organisms. Oviparous. Skate wings are good eating. Hulley (1970, 1972a, 1972b, 1977) has revised the southern African species. Nine genera with more than 200 species; 4 genera in our area. Snout length is measured from tip of snout to a line joining front of orbits.

KEY TO GENERA

1a V with an anterior limb-like structure completely separate externally from posterior part of fin; lateral margin of V confluent with rear edge of disc . . . . . *Cruriraja*

1b Anterior lobe of V joined to rest of fin; lateral edge of V not joined to edge of disc 2

2a Propterygia of P falling distinctly short of tip of snout, separated from rostrum by a semi-cartilaginous space; rostral cartilage extending to tip of snout, rigid and stout, although somewhat tapering anteriorly; rostral appendices dorsoventrally flattened, short or long, but always fused to rostral bar throughout their length . . . . . *Raja*

2b Propterygia extending almost to tip of snout; rostral cartilage extending to tip of snout, or over two thirds of this distance, as delicate, flexible rod; rostral appendices elongate, separated from rostral bar over most of their length 3

3a Rostral base broad, with rostral bar gently tapering, reaching tip of snout; anterior fontanelle broad and pear-shaped; preorbital processes well developed; (less than 30 rows of teeth in upper jaw; distance from middle of vent to 1st D origin 1.3-1.6 in distance from tip of snout to middle of vent) . . . . . *Bathyraja*

3b Rostral base narrow, with rostral bar markedly tapering, failing to reach rostral node; anterior fontanelle narrow and shaped like isosceles triangle; preorbital processes poorly developed; (more than 30 rows of teeth in upper jaw; distance from middle of vent to 1st D origin 1.3-1.7 times distance from tip of snout to middle of vent) . . . . . *Neoraja*

Genus ***Bathyraja*** Ishiyama, 1968

Pectorals with propterygia extending to tip of rostral cartilage; rostrum slender and unsegmented, rostral appendices short, with free posterior margins. Pelvic girdle transverse; prepelvic processes varying in length; iliac processes recurved; 2 or more obturatorial foramina.

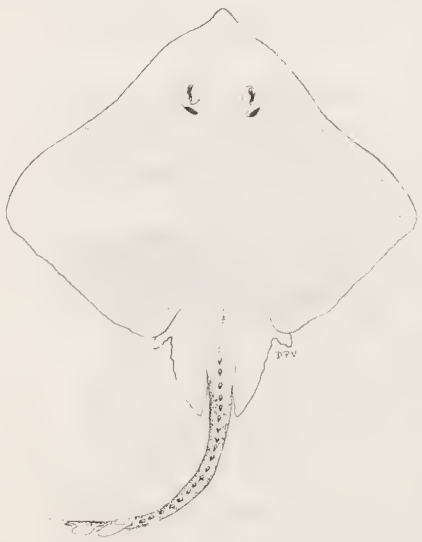
About 38 species; 1 in our area. Ishiyama (1958) recognises 3 subgenera, *Bathyraja, Arctoraja, Notoraja,* for Japanese species.

25.1 *Bathyraja smithii*
(Müller & Henle, 1841)

Raja smithii Müller & Henle, 1841: 150, Pl. 49, Fig. 1. (South Africa). *Raia smithi:* Smith, **SFSA No. 68** (part). *Breviraja smithii* Hulley, 1970: 213*; 1972: 2*.

Disc 1.2-1.3 times as broad as long; maximum angle in front of spiracles about 90°-100°; D (fins) separate. Snout obtuse, its length 2.0-2.6 times interorbital distance. 24-28 rows of teeth in upper jaw. 68-71 predorsal caudal vertebrae. Juveniles with 1 preorbital, 1-2 postorbital and 3-4 scapular thorns; 2 median nuchal thorns; about 30 mid-dorsal thorns from nuchal region to 1st D origin; 1 interdorsal thorn; entire upper surface of disc and tail with widely spaced spinules; ventral surface smooth. Adults with ocular, nuchal and scapular thorns absent; 14-19 mid-dorsal thorns from above vent to 1st D origin; 0-1 interdorsal thorns; dorsal surface of disc and tail spinulose, but no enlarged lateral rows of thorns on tail; ventral surface smooth.

Dorsally more or less uniform greyish, sometimes with white spots; ventrally white, with black blotches between gill slits and around vent; front margins of disc narrowly and rear margins of disc and V broadly black; ventral surface of tail smoky black. Attains 114 cm TL, 85 cm DW. Agulhas Bank and west of Cape Town, in 650 - 1 020 m. *Bathyraja eatoni* Günther, 1879, known from Kerguelen Id., may be synonymous.



25.1 *Bathyraja smithi:* 62 cm wide (E. of Cape Point).

Genus ***Cruriraja*** Bigelow & Schroeder, 1948

Propterygia falling short of tip of rostrum; snout without terminal filament; rostrum unsegmented. Lateral tail fold present; C with epicaudal lobe only. Lower surfaces of disc and tail without spines. One pair of obturatorial foramina.

Known as "limbed skates" (voet roë); 8 species, 3 in our area.

KEY TO SPECIES

1a No thorns on tip of snout, along rostral ridges or in interspace between D (fins) ..... *C. durbanensis*
1b Several thorns on tip of snout and along rostral ridges; thorns in dorsal interspace present 2

2a No thorns on midline of back above front half of abdominal region; single, enlarged thorn on anterior, dorsal border of clasper glans; ventral border of glans with dermal denticles ..... *C. triangularis*
2b Thorns on midline of back above front half of abdominal region present; single, enlarged thorn on anterior dorsal border of clasper glans; eperon on anterior ventral border of glans ..... *C. parcomaculata*

25.2 *Cruriraja durbanensis*
(Von Bonde & Swart, 1923)

Raia durbanensis Von Bonde & Swart, 1923: 11, Pl. 22, Fig. 1 (30°10′S, 14°33′E). *Cruriraja durbanensis:* Smith, 1964: 287; Wallace, 1967: 7; Hulley, 1970: 156*; 1972: 78.

"Width equal to distance from snout almost to middle of tail. In male snout pointed but not produced, about 90°, anterior margin almost straight. In female snout rounded, without point, anterior margins undulate. Outer pectoral angle broadly rounded, hind margin moderately convex. Eye a little less than interorbital width, 4 in preocular length of snout. Whole upper surface of disc and upper and lateral surfaces of tail covered with spinelets; in male 1 large spine in front of, 2 behind orbit; in female 5 and 3 respectively; 2 (male) or 1 (female) supra-scapular spines; a median row from occiput to 1st dorsal in male; in female only extending about half-way along tail; lower surface quite smooth. Colour reddish brown, lighter beneath" (Barnard, 1925: 69).

Known only from the holotype, a juvenile male, 23 cm TL, 13 cm DW (taken in 859 m in the Atlantic Ocean off western Cape Province and not off Durban as the specific name erroneously suggests) and paratype, a female, 31 cm TL (locality and depth unknown); both specimens missing.

25.2 *Cruriraja durbanensis:* 13 cm wide holotype (off Port Nolloth; after Von Bonde & Swart, 1923).

25.3 *Cruriraja parcomaculata*
Von Bonde & Swart, 1923
PLATE 6

Raja parcomaculata Von Bonde & Swart, 1923: 9, Pl. 21, Fig. 2 (off Durban). *Raia smithi:* Smith, **SFSA No. 68*** (part). *Cruriraja parcomaculata:* Smith, 1964: 188*; Wallace, 1967: 11*; Hulley, 1970: 157*; 1972: 78*.

Disc 1.2-1.4 times broader than long; maximum angle in front of spiracles 112° (adult males) to 120° (juveniles and females); distance from middle of vent to 1st D origin 1.1-1.2 times distance from tip of snout to middle of vent; D (fins) separate. Snout length 2.6-3.5 times interorbital distance. Upper jaw teeth in 39-44 rows (adults), 30-31 rows (juveniles). 66-69 predorsal caudal vertebrae.

Juveniles with 5 thorns around inner margin of orbit, 1 interspiracular and 2 scapular thorns on each side; 1 median nuchal spine; 23-27 mid-dorsal thorns from scapular region to 1st D origin, flanked laterally by irregular series of smaller spines; 2-3 thorns in dorsal interspace; entire upper surface of disc with fine spinules, except on outer rear edges; larger spines on tip of snout and along front margins of disc.

Adults with 11-13 thorns around inner margin of orbit, 2 interspiracular and 3 scapular thorns on each side; 2-4 median nuchal spines, arranged in double series; 4-5 irregular rows stellate-based thorns mid-dorsally from scapular region to 1st D origin, diminishing to double series of slender, recurved spines about halfway along tail, flanked laterally by a row of smaller spines on each side, from rear edge of V to dorsal interspace; lateral row of thorns along each side of tail; 4-8 thorns in dorsal interspace; group of thorns as stated in Key above and on front margins of disc; otherwise upper surface smooth.

Dorsally uniform brown, sometimes with scattered darker patches on disc and tail (juveniles) or with irregular lighter and darker areas (adults); ventrally white. Attains 55 cm TL, 35 cm DW. Known only from Lüderitz to Durban in about 260 - 620 m.

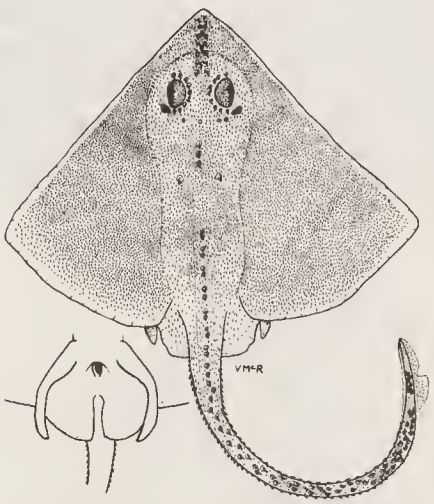
25.3 *Cruriraja parcomaculata:* 33 cm wide (Algoa Bay).

25.4 *Cruriraja triangularis*
Smith, 1964

Cruriraja triangularis Smith, 1964: 290, Pl. 28 (off Durban); Wallace, 1967: 8*; Hulley, 1970: 156; 1972: 78.

Disc about 1.3 times broader than long; maximum angle in front of spiracles about 90°; distance from middle of vent to 1st D origin about 1.3 times distance from tip of snout to middle of vent; D (fins) separate. Snout pointed but not produced; its length 3.9 times interorbital distance. Upper jaw teeth in 42-46 rows. 65-70 predorsal caudal vertebrae. 7-12 thorns around inner margins of orbit and 1-2 interspiracular thorns; 1-5 median nuchal spines; suprascapular spines absent; a mid-dorsal row of thorns from abdominal region to 1st D origin, diminishing in size posteriorly and flanked laterally by a dorsolateral row on each side, from rear end of V to 1st D origin; lateral row of thorns along each side of tail; 3-4 interdorsal thorns; 2 rows of thorns along front half of rostrum; otherwise smooth.

Dorsally uniform grey-brown, with dusky patches along each side of midline; ventrally pale, rear margins of disc and V darker. Attains 41 cm TL, 24 cm DW. Known only from 23°S (Mozambique) to Durban, in about 220 - 420 m.



25.4 *Cruriraja triangularis:* 15.5 cm wide female holotype; ventral view of pelvic fins of paratype, 12 cm wide (both off Durban).

Genus ***Neoraja*** McEachran & Compagno, 1982

Snout angular to obtusely rounded, tip with short broad process, front margin of disc nearly straight to strongly concave. Pelvic fins deeply incised, anterior lobes long, narrow and bluntly to acutely pointed. Tail generally greater than 60% of TL, with epicaudal and hypocaudal lobes. Moderate to small thorns along inner margin of orbits, over scapular and nuchal region (but not forming distinct triangular patch), along midline of disc in 1 or 3 distinct rows and along tail in 1 or 3 rows; upper surface of disc more or less evenly covered with denticles.

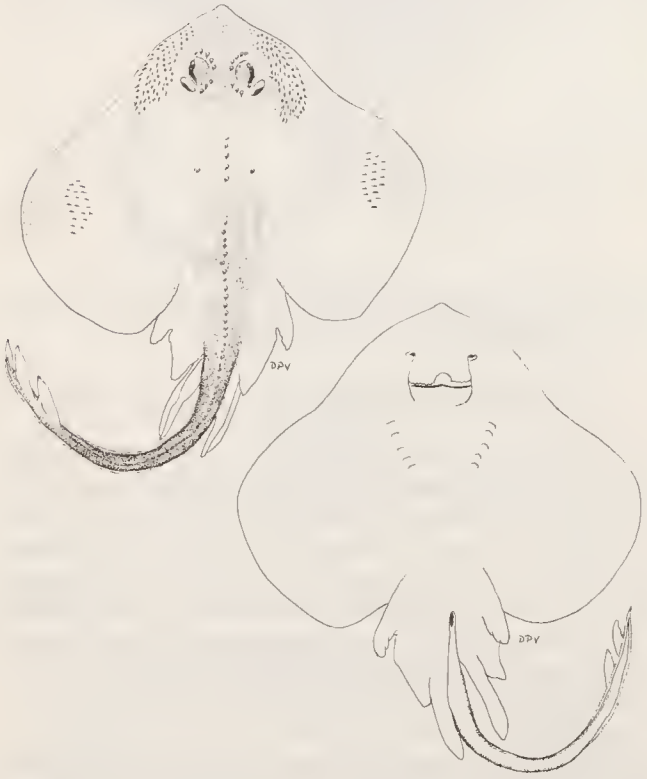
McEachran & Compagno (1982) recognise 2 subgenera (*Neoraja, Fenestraja*) with about 10 species; 1 species in our area.

25.5 *Neoraja (Neoraja) stehmanni*
(Hulley, 1972)

Raja plutonia (*non* Garman): Barnard, 1925: 68. *Raja spinacidermis* (*non* Barnard): Norman, 1935: 46 (part). ?*Raja spinacidermis:* Hulley, 1970: 173* (in part, juvenile male only). *Breviraja stehmanni* Hulley, 1972: 254, Figs. 1-5 (off Cape Town). *Neoraja stehmanni:* McEachran & Compagno, 1982: 423.

Disc 1.2-1.4 times as broad as long; maximum angle in front of spiracles 115°-130°. D (fins) continuous. Snout rounded and barely produced; its length 2.9-3.8 times interorbital distance. 38-44 rows of teeth in upper jaw. 65-74 predorsal caudal vertebrae. Entire upper surface of disc and tail with small asperities, except tip of snout, narrow front margin of P and anterior lobe of V; adult males with naked area at P base; ventral surface smooth. 1-6 preorbital, 1-4 postorbital/supraspiracular, 1 interspiracular (some juveniles) and 1 scapular thorns on each side; 1-4 median nuchal thorns; 11-38 mid-dorsal thorns, usually interrupted between P and V girdles, extending posteriorly for ½ to ⅓ length of tail, showing alternate development with age; tail posterior to V axil, with additional rows of thorns or large prickles.

Dorsally greyish, tail with 6-7 irregular, dark crossbars, either continuous or interrupted; ventrally pale, tip of snout with black spot and darker areas along front and rear margins of disc and rear margins of V; dusky irregular areas between nostrils, around mouth, between gill slits and on belly; tail with dark crossbars encroaching from sides of tail, but mature specimens with darker mottling. Attains 35 cm TL, 20 cm DW. Only south of Agulhas Bank to west of Cape Town, in 292 - 1 025 m.



25.5 *Neoraja stehmanni:* 19.7 cm wide (S. Cape coast); dorsal and ventral views.

Genus ***Raja*** Linnaeus, 1758

Prepelvic processes present; iliac processes recurved; 2 or more pairs of obturatorial foramina. More than 135 species; 18 species in 7 subgenera in our area.

KEY TO SPECIES

1a Mucous pores on ventral surface of disc pigmented, appearing as small black spots and streaks 2
1b Mucous pores on ventral surface of disc not pigmented 6

2a Tail long and slender, the width at 1st D origin less than ½ width at base of tail; snout markedly produced and pointed ..... *R.(Dipturus) lanceorostrata*
2b Tail not long and slender, its width at 1st D origin more than ½ width at tail base; snout not very produced and less acutely pointed 3

3a Ventral surface of disc mostly covered by small, close-set asperities ..... *R. (Dipturus) springeri*
3b Ventral surface of disc not covered by small asperities, although spines and spinules may be present on tip of snout, front margins of disc and internasal regions 4

4a Distance from middle of vent to tip of snout greater than distance from middle of vent to tip of tail, by an amount about equal to or greater than preoral length ..... *R. (Dipturus) doutrei*
4b Distance from middle of vent to tip of snout equal to, or greater than, distance from middle of vent to tip of tail, by an amount less than ½ preoral length 5

5a Snout produced; interorbital distance about 5.5 in snout length; internasal distance about 3 times in preoral length ..... *R. (Dipturus) stenorhynchus*
5b Snout not produced; interorbital distance 3-4 in snout length; internasal distance about 2 in preoral length ..... *R. (Dipturus) pullopunctata*

6a Upper surface of disc and tail completely covered with fine, close-set spinules; no enlarged thorns on disc or on tail (except for alar and malar thorns of adult males) ..... *R. (Malacoraja) spinacidermis*
6b Upper surface of disc and tail never completely covered with spinules; larger thorns always present on disc and/or tail 7

7a Distance from middle of vent to 1st D origin greater than distance from middle of vent to tip of snout; tail with 5-7 rows of well-developed thorns ..... *R. (Rajella) caudaspinosa*
7b Distance from middle of vent to 1st D origin less than distance from middle of vent to tip of snout; tail with 1-5 rows of thorns, which may or may not be well developed 8

8a Snout produced and sharply pointed ..... *R. (Rostroraja) alba*
8b Snout not produced and not sharply pointed 9

9a Ocellus present on dorsal surface of each P 10
9b No ocellus on dorsal surface of each P 12

10a Ocellus black and yellow marbled 19
10b Ocellus ring-shaped and not marbled 11

11a Ocellus circular or slightly ovate, consisting of 3 definite rings of colour ..... *R. (Raja) miraletus*

11b Ocellus strongly horizontally ovate, consisting of single dark ring, enclosing 1 or 2 dark spots ..... *R. (Raja) clavata*

12a Distance from middle of vent to tip of snout about 1.5 times greater than distance from middle of vent to tip of tail 13
12b Distance from middle of vent to tip of snout less than distance from middle of vent to tip of tail 14

13a Upper surface of disc with stellate-based thorns on front margins, rostral cartilage and rear angles; ventral surface of disc white, with some scattered darker blotches ..... *R. (Amblyraja) radiata*
13b Upper surface of disc without stellate-based thorns on front margins, rostral cartilage and rear angles; ventral surface of disc dark grey, with white triangular patches between nostrils, around mouth and at pectoral girdle ..... *R. (Amblyraja) robertsi*

14a Less than 50 rows of teeth in upper jaw 15
14b More than 50 rows of teeth in upper jaw 19

15a Median row of thorns along back and tail absent; no thorns along rostral cartilage ..... *R. (Rajella) ravidula*
15b Median row of thorns on back and tail always present; thorns present on rostral cartilage 16

16a A single row of thorns along mid-dorsal region of back and tail; auxiliary rows of thorns (when present) always lateral; 46-54 predorsal caudal vertebrae 17
16b 3 or more rows of thorns along mid-dorsal region of back and tail; auxiliary rows of thorns semi-lateral in position; 55-69 predorsal caudal vertebrae 18

17a Shield in clasper glans well developed and exposed; dorsal surface of disc with numerous, dark, regular spots ..... *R. (Raja) straeleni*
17b Shield in clasper glans poorly developed; dorsal surface of disc with or without numerous, irregular, darker blotches ..... *R. (Raja) clavata*

18a Reduction in size to eventual loss of mid-dorsal row of thorns from disc to tail; lower surface of tail uniform grey with white distal tip; 65-69 predorsal caudal vertebrae; clasper with slit and cleft ..... *R. (Rajella) dissimilis*
18b Mid-dorsal row of thorns large and continuous to 1st D origin; lower surface of tail white or with scattered darker blotches; 55-63 predorsal caudal vertebrae; clasper with 2 slits ..... *R. (Rajella) confundens*

19a Distance from middle of vent to 1st D origin longer than from tip of snout to greatest disc width, by an amount greater than preoral length; 70 predorsal caudal vertebrae; spike in clasper glans bilobed ..... *R. (Leucoraja) wallacei*
19b Distance from middle of vent to 1st D origin longer than from tip of snout to greatest disc width, by an amount less than preoral length; 55-58 predorsal caudal vertebrae; spike in clasper glans bulbous but not bilobed ..... *R. (Rajella) leopardus*

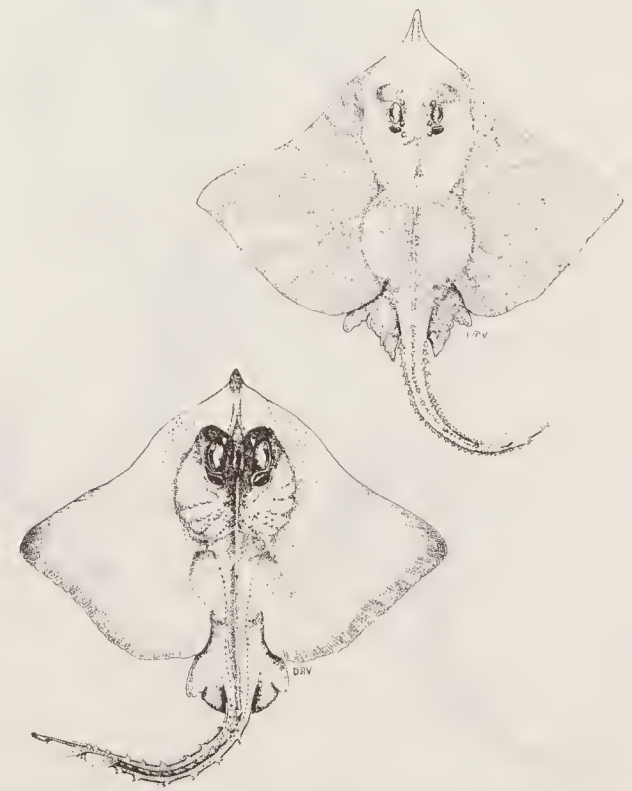
25.6 *Raja alba*
Lacepède, 1803

Spearnose skate — Spiesneus-rog

Raja alba Lacepède, 1803: 663, Pl. 20, Fig. 1 (no type material); Hulley, 1966: 497*; 1970: 176*; Wallace, 1967: 27*. *Raia alba:* Smith, **SFSA No. 67*.** *Raja (Rostroraja) alba:* Hulley, 1972: 77*.

Disc 1.4-1.5 times as broad as long; maximum angle in front of spiracles ca. 105°. Distance from middle of vent to 1st D origin 1.4-1.6 in length from tip of snout to middle of vent; D (fins) usually separate. Snout length 2.5-3.2 times interorbital distance. 40-45 rows of teeth in upper jaw. 62-67 predorsal caudal vertebrae. Juveniles with 1 preorbital, 0-1 postorbital thorns on each side; 10-16 mid-dorsal thorns from rear edge of V to 1st D origin; 0-2 interdorsal thorns; 7-17 lateral caudal thorns in a row on each side; ventral surface with spinules on tip of snout, front margins of disc and internasal region. Adults with about 6 thorns around inner orbital margin on each side; 16-30 mid-dorsal thorns from rear edge of V to 1st D origin; 0-2 interdorsal thorns; 17-29 lateral caudal thorns on each side, irregularly arranged; spinules on snout, rostral cartilage, front margins of disc, mid-line of back and on tail; ventral surface with spinules on snout, front margin of disc, internasal region, gill slits, abdomen and tail.

Juveniles dorsally uniform brown, darker at extremities of P, V and C; adults dorsally grey to brown, with or without scattered white spots; ventrally white, margins of disc and V brown to black. Attains 2.3 m TL, 1.6 m DW. Namibia to Barra Falsa in 50 - 360 m; also from England to Madeira, Mediterranean, west Africa south to our region and to NE Madagascar.



25.6 *Raja alba:* top: 66 cm wide (South Africa); bottom: juvenile 22.5 cm wide (off Cape Padrone).

25.7 *Raja caudaspinosa*
Von Bonde & Swart, 1923

Raja caudaspinosa Von Bonde & Swart, 1923: 8, Pl. 21, Fig. 1 (?Natal). *Raia albalinea* Von Bonde & Swart, 1923: 6, Pl. 20, Fig. 1 (32°3.00'S, 16°2.00'E). *Raja caudaspinosa:* Hulley, 1970: 170*. *Raja (Rajella) caudaspinosa:* Hulley, 1972: 77*.

Disc 1.2-1.4 times as broad as long; maximum angle in front of spiracles about 125°-130°; distance from middle of vent to 1st D origin 1.1-1.3 times distance from tip of snout to middle of vent; D (fins) continuous. Snout length 2.0-2.6 times interorbital distance. 32-36 rows of teeth in upper jaw. 66-73 predorsal caudal vertebrae. 5-9 thorns around inner orbital margin, 0-1 interorbital, 1-2 interspiracular and 3-4 scapular thorns on each side; 4-5 median nuchal thorns, with 3-5 thorns in a group posteriorly; 22-23 mid-dorsal thorns from nuchal region to 1st D origin, decreasing in size posteriorly and flanked on each side by 1 row of thorns on back and 2 rows of thorns on tail; large, stellate-based thorns in 4-6 irregular rows along front margins on each side; spines and spinules along front margins of disc and on tail; ventral surfaces of disc and tail smooth.

Dorsally dusky grey to brown, with or without scattered darker spots, and juveniles with white-barred pattern on disc; ventrally pale. Attains about 58 cm TL, 32 cm DW. Only off west coast between Lüderitz and Cape Point in 310 - 520 m.

25.7 *Raja caudaspinosa:* top: 29 cm wide male; bottom: 26 cm wide female (W. Cape coast).

25.8 *Raja clavata*
Linnaeus, 1758
PLATE 6

Thornback skate — Doringrug-rog

Raja clavata Linnaeus, 1758: 232 ("Oceano Europaeo"); Hulley, 1966: 497; 1970: 183*; Wallace, 1967: 35*. *Raja capensis* Müller & Henle, 1841: 151 ("Vom Cap"). *Raia rhizacanthus* Regan, 1906: 3, Pl. 3 (Natal); 1908: 242; Smith, **SFSA No. 71*.** *Raia barnardi:* Smith, **SFSA No. 70*.** *Raja rhizacanthus:* Smith & Smith, 1966: 29*. *Raja (Raja) clavata:* Hulley, 1972: 77*.

Disc 1.3-1.4 times as broad as long; maximum angle in front of spiracles 80°-100°; distance from middle of vent to 1st D origin 1.2-1.6 in length from tip of snout to middle of vent; D (fins) separate. Snout length 2.6-3.4 times interorbital distance. 36-45 rows teeth in upper jaw. 45-53 predorsal caudal vertebrae. Spinules on snout, interorbital and mid-dorsal region of back and tail. Juveniles with 3 preorbital, 1 postorbital, 1 supraspiracular, 1 interspiracular and 2 scapular thorns on each side; 2-4 median nuchal thorns; 24-30 mid-dorsal thorns from scapular region to 1st D origin; 1-2 interdorsal thorns; spinules on snout, front margins of disc; ventral surface smooth. Anterior thorns lost with growth; 19-41 mid-dorsal thorns from above vent to 1st D origin; 1-2 interdorsal thorns; a row of lateral caudal thorns on each side; ventral surface of disc with spinules along front margins and around vent; buckler-like thorns on dorsal and ventral surfaces, especially in females.

Highly variable colours: dorsally brown to grey-brown, with or without numerous irregular darker and lighter spots or with larger darker blotches; juveniles generally with dark, horizontally ovate ocellus at each P base, consisting of a single dark ring enclosing 2 (sometimes 1) dark spots; ventrally pale, with margins of disc greyish, occasionally with some darker irregular patches. Attains 85 cm TL, 60 cm DW. Walvis Bay to Durban in 50 - 1 020 m; also in Black Sea, Mediterranean, eastern North Atlantic and off southern Madagascar and Mauritius.

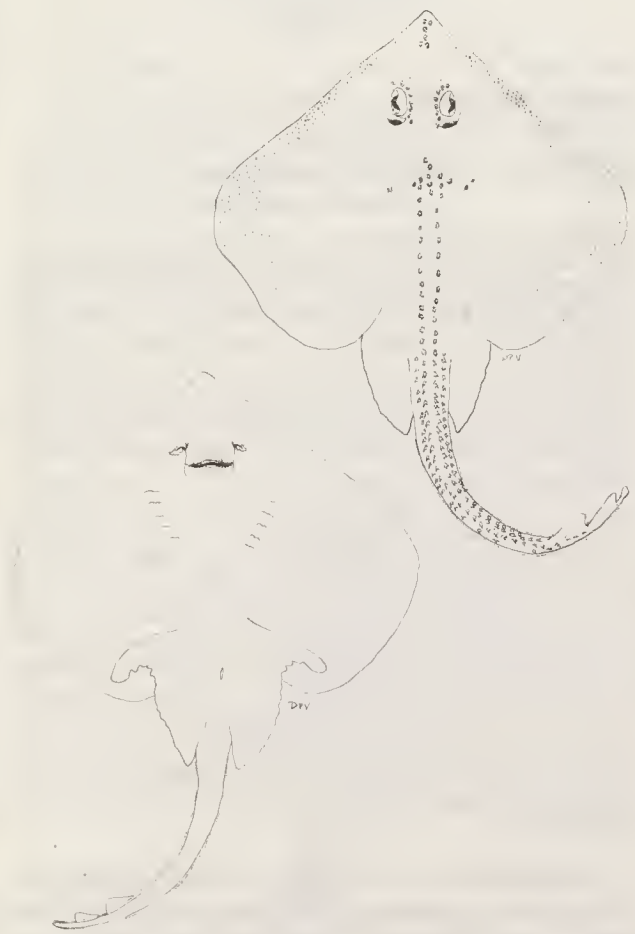
25.8 *Raja clavata:* 35.5 cm wide male (Algoa Bay).

25.9 *Raja confundens*
Hulley, 1970

? *Raja barnardi:* Krefft, 1968: 61*. *Raja confundens* Hulley, 1970: 203, Pl. 11, Fig. 17 (off Cape Columbine). *Raja (Rajella) confundens:* Hulley, 1972: 77*.

Disc 1.2-1.3 times as broad as long; maximum angle in front of spiracles about 99°-120°; distance from middle of vent to 1st D origin 1.1-1.4 in length from tip of snout to middle of vent; D (fins) continuous. Snout length 2.5-3.3 times interorbital distance. 39-45 rows of teeth in upper jaw. 55-63 predorsal caudal vertebrae. 5-10 thorns around inner orbital margin, 1-2 supraspiracular, 1-2 interspiracular, 2-8 lateral nuchal and 2-3 scapular thorns on each side; 2-9 median nuchal thorns; 17-24 mid-dorsal thorns from nuchal region to 1st D origin, flanked by a row of thorns on back and 2 rows of semi-lateral and lateral thorns on each side of tail; stellate-based thorns on rostral cartilage and front margins of disc; some specimens with patch of spines on rear angle of disc; ventral surfaces of disc and tail smooth.

Dorsally uniform grey; ventrally grey, with darker irregular patches along rear margins of disc and V, about vent and along tail. Attains about 68 cm TL, 44 cm DW. Known only off west coast from about 19°S to east of Cape Point, in 170 - 660 m.



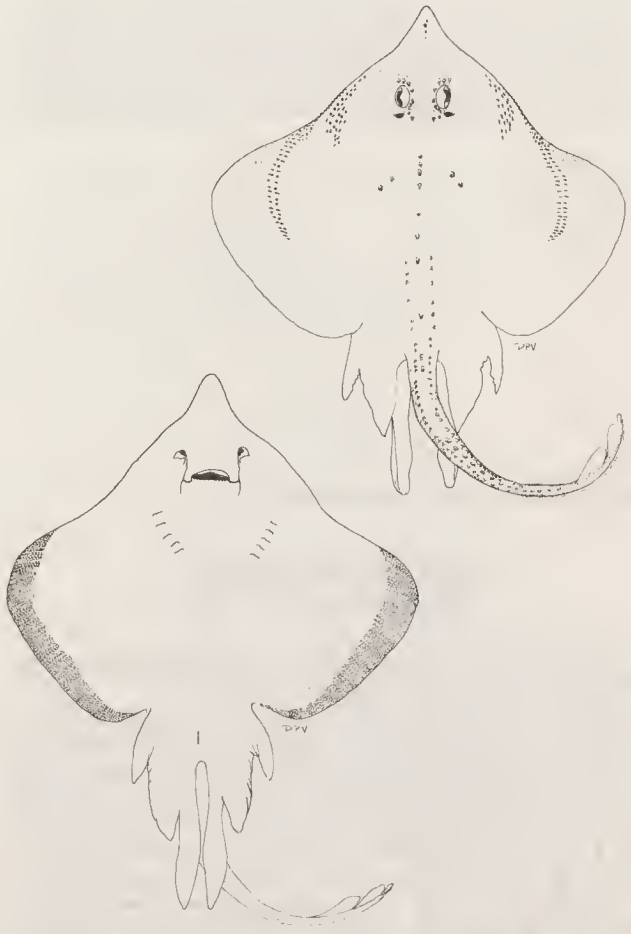
25.9 *Raja confundens:* 44 cm wide female (SW coast). Dorsal and ventral views.

25.10 *Raja dissimilis*
Hulley, 1970

Raja dissimilis Hulley, 1970: 199, Pl. 10, Fig. 15 (33°47′S, 17°14′E). *Raja (Rajella) dissimilis:* Hulley, 1972: 77*.

Disc 1.1-1.2 times as broad as long; maximum angle in front of spiracles about 88°-93°; distance from middle of vent to 1st D origin 1.2-1.3 in length from tip of snout to middle of vent; D (fins) continuous. Snout length 4.1-4.6 interorbital distance. 37-41 rows of teeth in upper jaw. 1-8 preorbital, 2-5 postorbital, 1 suprascapular, 1 interspiracular and 0-3 scapular thorns on each side; 1-3 median nuchal thorns; 20-32 mid-dorsal thorns from nuchal region to 1st D region, flanked on each side by 16-38 thorns, the thorns becoming smaller and more widely spaced posteriorly; rostral thorns present in adults; ventral surfaces of disc and tail smooth.

Dorsally uniform dark grey, tail mottled with white posteriorly; ventrally white, but dark grey at rear margins of disc, on V and on tail. Attains 64 cm TL, 39 cm DW. Known only from 3 specimens from west of Cape Town, in 1 000 m.



25.10 *Raja dissimilis:* 37 cm wide male (off Cape Town). Dorsal and ventral views.

25.11 *Raja doutrei*
Cadenat, 1960

Raja doutrei Cadenat, 1960: 294, Figs. 1-11, 13, 15 (Senegal); Hulley, 1970: 164*. *Raja (Dipturus) doutrei:* Hulley, 1972: 77*; Lloris, 1982: 10.

Disc 1.2 times as broad as long; maximum angle in front of spiracles about 72°; distance from middle of vent to 1st D origin 2.0-2.2 in length from tip of snout to middle of vent; D (fins) separate. Snout length 3.8-4.0 times interorbital distance. 32 rows of teeth in upper jaw. 43-49 predorsal caudal vertebrae. 6-7 thorns around inner margin of each orbit and above each spiracle; 13-26 mid-dorsal thorns from above vent to 1st D origin; 1-2 interdorsal thorns; single, lateral series of thorns on each side in females, absent in adult males; spine on tip of snout and front margins of disc; ventral surface of disc with spines on snout and front margins of disc; otherwise smooth.

Dorsally uniform brown, with scattered, irregular darker blotches; ventrally brown, mucous pores black. Attains about 100 cm TL, 70 cm DW. Tropical west African species known from Senegal to Lüderitz, Namibia in 450 - 600 m.

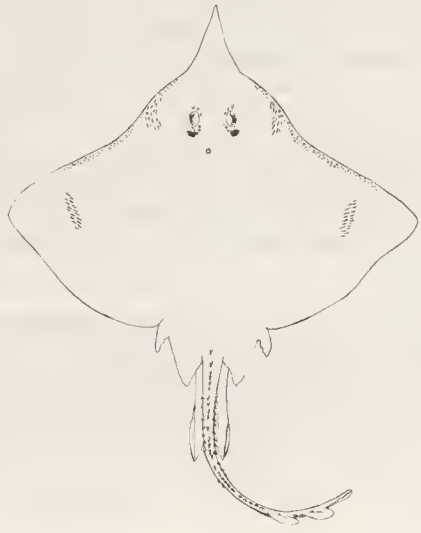
25.11 *Raja doutrei:* 62 cm wide male (Namibia).

25.12 *Raja lanceorostrata*
Wallace, 1967

Raja lanceorostrata Wallace, 1967: 15, Fig. 8 (off Limpopo River mouth). *Raja (Dipturus) lanceorostrata:* Hulley, 1972: 77*.

Disc 1.2-1.3 times as broad as long; maximum angle in front of spiracles about 66°; distance from anterior margin of vent to 1st D origin 1.4-1.6 in length from tip of snout to anterior margin of vent; D (fins) separate. Snout length 5.2-7.4 times interorbital distance. 31 rows of teeth in upper jaw. 56-57 predorsal caudal vertebrae. 3 preorbital, 3 postorbital and 3 supraspiracular thorns on each side; 1 median nuchal thorn; 26 thorns mid-dorsally, from base of tail to 1st D origin; 1 interdorsal thorn; 7-13 lateral caudal thorns; scapular and rostral thorns absent; spinules along front margins of disc; malar and alar thorns in adult males; otherwise dorsal surface of disc smooth; ventral surfaces of disc and tail smooth, except for narrow band of spinules along front margin of disc and on rostral cartilage.

Dorsally grey, with numerous lighter spots, translucent area on each side of rostral cartilage; ventrally grey, becoming lighter at gill slits and along front of disc; mucous pores black. Attains 82 cm TL, 55 cm DW. Known only from 3 specimens collected off Limpopo River mouth, in about 435 m.



15.12 *Raja lanceorostrata:* 55 cm wide mature male holotype.

25.13 *Raja leopardus*
Von Bonde & Swart, 1923

Raia leopardus Von Bonde & Swart, 1923: 7, Pl. 20, Fig. 2 (? Natal); Smith, **SFSA No. 73***. *Raja barnardi* Norman, 1935: 43, Fig. 14 (34°00'S, 17°58'E). *Raja leopardus:* Hulley, 1970: 206*. *Raia caudaspinosa* (*non* Von Bonde & Swart): Smith, **SFSA No. 72***. *Raja (Rajella) leopardus:* Hulley, 1972: 77*.

Disc 1.1-1.3 times as broad as long; maximum angle in front of spiracles about 100-110°; distance from middle of vent to 1st D origin 1.1-1.5 in length from tip of snout to middle of vent; D (fins) usually continuous. Snout length 2.8-4.4 times interorbital distance. 52-70 rows of teeth in upper jaw. Dorsal surface with spinules (juveniles) or spines (adults) on snout, front margins of disc and each side of tail. Juveniles with 4-5 thorns around inner margins of orbits, 0-1 supraspiracular, 1 interspiracular and 1-2 scapular thorns on each side; 3-5 median nuchal thorns; 25-30 mid-dorsal thorns from nuchal region to 1st D origin; 3-6 small thorns semi-laterally on each side of tail at level of pelvics; spinules as above, wider-spaced asperities over remainder of disc. Adults with 5-13 thorns around inner orbital margins and above spiracles, 1-2 interspiracular and 2-3 scapular thorns on each side; 4-9 median nuchal thorns, with 1-2 lateral rows, forming triangular patch; 19-29 mid-dorsal thorns along back and tail to 1st D origin, flanked by 1 row of thorns along back and 2-3 rows along tail on each side; ventral surface with spines on tip of snout and front margins of disc.

Dorsally uniform brown to grey, sometimes with numerous dark spots, especially in juveniles; ventrally uniform pale, or with irregularly arranged darker blotches and patches on disc and V. Attains about 95 cm TL, 63 cm DW. Known only off west coast from 18° to 35°S, in 300 - 690 m.

25.13 *Raja leopardus:* 38 cm wide (W. Cape coast; redrawn after Hulley, 1970).

25.14 *Raja miraletus*

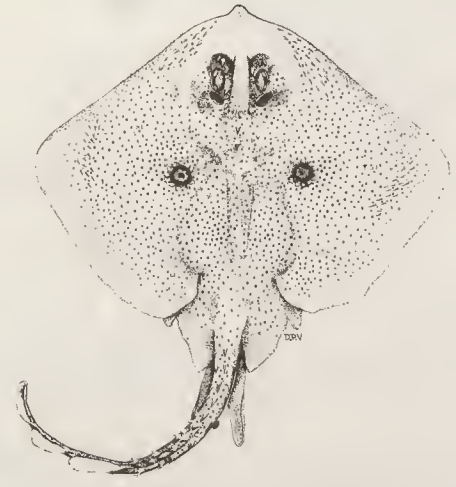
Linnaeus, 1758

PLATE 6

Twineye skate Tweeoog-rog

Raja miraletus Linnaeus, 1758: 231 (Mediterranean); Wallace, 1967: 31*; Hulley, 1969: 137*. *Raia ocellifera* Regan, 1906: 2, Pl. 2 (Algoa Bay); 1908: 242; Smith, **SFSA No. 69*;** 1964: 285. *Raja (Raja) miraletus:* Hulley, 1972: 77*; Lloris, 1982: 10.

Disc 1.3-1.4 times as broad as long; maximum angle in front of spiracles about 110°-116°; distance from middle of vent to 1st D origin 1.1-1.4 in length from tip of snout to middle of vent; D (fins) separate. Snout length 2.3-3.1 times interorbital distance. 42-50 rows of teeth in upper jaw. 44-52 predorsal caudal vertebrae. Juveniles with 2 preorbital, 1 postorbital, 0-2 supraspiracular and 1 scapular thorns on each side; 3 median nuchal thorns; 18-23 mid-dorsal thorns from scapular region to 1st D origin; 0-2 interdorsal thorns; sometimes a few scattered spines semi-laterally on tail, otherwise dorsal and ventral surfaces smooth. Adults with 4-8 thorns on inner orbital margin, 0-2 median nuchal thorns, 10-27 mid-dorsal thorns from above axils of V to 1st D origin; 1-2 interdorsal thorns; 8-16 thorns in semi-lateral and 0-13 thorns in lateral row on each side of tail; spinules on snout, front margins of disc, midline of back and sometimes on posterior P angle; ventral surface with spinules on snout, front margins of disc and internasal region.



25.14 *Raja miraletus:* 27.5 cm wide male (Algoa Bay).

Dorsally brownish, with or without small darker spots; a large blue-black ocellus at each P base, consisting of 3 definite rings of colour; ventrally pale, with or without a small dark spot on tip of snout. Attains 50 cm TL, 35 cm DW. Common. False Bay to Durban, in 20 - 440 m; also from Mediterranean, southwards to Angola.

25.15 *Raja pullopunctata*

Smith, 1964

PLATE 6

Raia batis (*non* Linnaeus): Smith, **SFSA No. 65*.** *Raia pullopunctata* Smith, 1964: 285, Pl. 25 (Algoa Bay). *Raja pullopunctata:* Hulley, 1966: 505*; Hulley, 1970: 166*; Wallace, 1967: 13*. *Raja campbelli* Wallace, 1967: 24, Fig. 12 (east of Durban). *Raja (Dipturus) pullopunctata:* Hulley, 1972: 77*.

Disc 1.2-1.4 times as broad as long; maximum angle in front of spiracles 92°-108°; distance from middle of vent to 1st D origin 1.6-1.9 in length from tip of snout to middle of vent; D (fins) separate. Snout length 3.4-4.1 times interorbital distance. 53-58 rows of teeth in upper jaw. 50-58 predorsal caudal vertebrae. Juveniles with 2 preorbital, 1 postorbital thorn on

25.15 *Raja pullopunctata:* top: 52 cm wide mature male; bottom: 14 cm wide juvenile holotype (both Algoa Bay).

each side; 1 median nuchal thorn; 8-12 mid-dorsal thorns, from above vent to 1st D origin; 1 interdorsal thorn; otherwise smooth. Adults with 5-8 thorns around inner margin of orbit; 1 (sometimes 2) median nuchal thorn; 10-12 mid-dorsal thorns from above vent to 1st D origin; 1-2 interdorsal thorns; otherwise upper surface smooth, but lower surface with spinules on tip of snout, front margins of disc and internasal area.

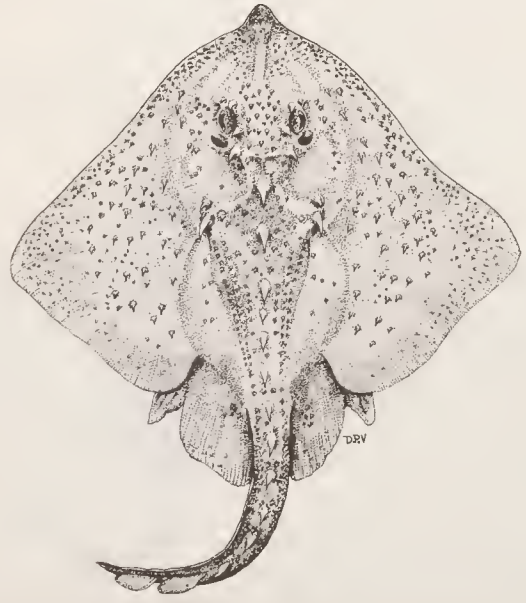
Dorsally light brown to biscuit, sometimes darker, with numerous small darker spots and blotches; ventrally greyish, mucous pores black. Attains more than 125 cm TL, 94+ cm DW. Known only from Lüderitz to 23°S (Mozambique) in 50 - 450 m.

25.16 *Raja radiata*
Donovan, 1808

Raja radiata Donovan, 1808: 1, Pl. 114 (north coast of Britain); Hulley, 1970: 193*. *Raja (Amblyraja) radiata:* Hulley, 1972: 77*.

Disc 1.2-1.3 times as broad as long; maximum angle in front of spiracles about 100°; distance from middle of vent to 1st D origin 1.8-1.9 in length from tip of snout to middle of vent; D (fins) separate. Snout obtuse, its length 2.1-2.4 times interorbital distance. 37-39 rows of teeth in upper jaw. 58-62 predorsal caudal vertebrae. 1 preorbital, 1 postorbital, 1 supraspiracular and 2-3 scapular thorns on each side; 2 median nuchal thorns; 11-19 mid-dorsal thorns on radiate bases from nuchal region to 1st D origin, flanked on each side by 2-3 irregular rows of thorns on stellate bases; small interdorsal spines; thorns present on rostrum, interorbital and interspiracular regions and on sides of tail, and scattered thorns and spines on P; ventral surfaces of disc and tail smooth.

Dorsally brownish grey, with scattered irregular black blotches; ventrally white, with darker spots and blotches on tail and V, and black spot on tail tip. Attains 100 cm TL, 77 cm DW. Off west coast, in about 550 - 650 m. Common in 20 - 1 000 m in eastern and western North Atlantic, southwards to latitude of English Channel and Nova Scotia respectively.



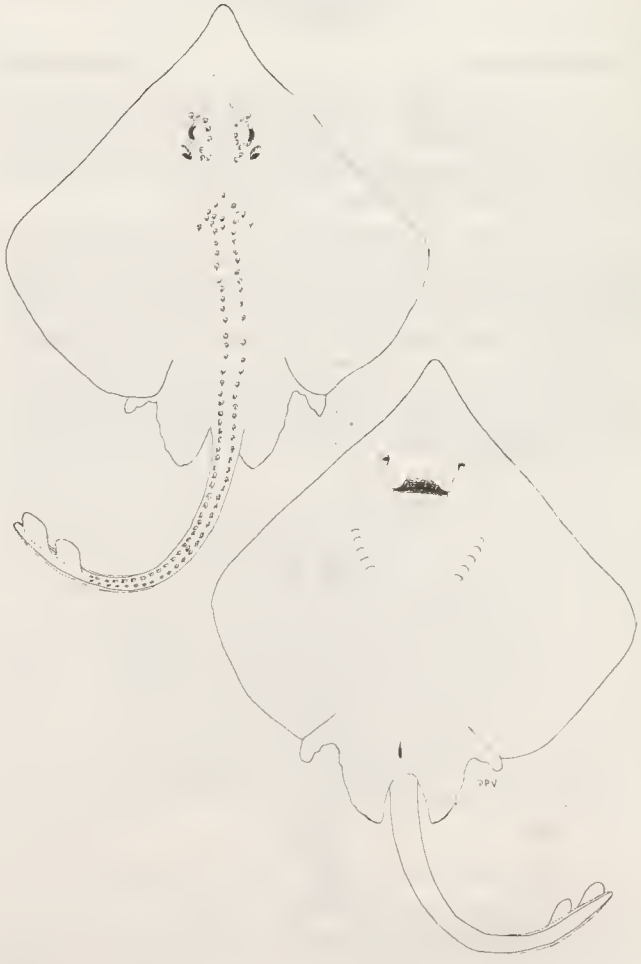
25.16 *Raja radiata:* 12 cm wide (Canada).

25.17 *Raja ravidula*
Hulley, 1970

Raja ravidula Hulley, 1970: 196, Pl. 9, Fig. 14 (33°49'S, 17°13'E). *Raja (Rajella) ravidula:* Hulley, 1972: 77*.

Disc 1.1-1.2 times as broad as long; maximum angle in front of spiracles about 92°; distance from middle of vent to 1st D origin 1.2-1.3 in length from tip of snout to middle of vent; D (fins) usually continuous. Snout length 4.3-4.8 times interorbital distance. 39-44 rows of teeth in upper jaw. 69-70 predorsal caudal vertebrae. 3-4 preorbital, 3 postorbital, 1 suprascapular, 0-1 interspiracular, 0-3 scapular and 4-5 lateral nuchal thorns on each side; 6 median nuchal thorns; single series of thorns on each side of midline, from nuchal region to 1st D origin; entire dorsal surface of disc with blunt, widely spaced asperities, larger and more pointed on tail; ventral surfaces of disc and tail smooth.

Dorsally pale grey, becoming darker along rear margins of disc and V and at distal end of tail; ventrally white, but darker at margins of disc, at V axils, on distal end of anterior V lobe and at front of vent, tail greyish brown, mottled posteriorly. Attains more than 63 cm TL, 36 cm DW. Known only from 3 specimens taken off Cape Town in 1 000 m; Stehmann (1981) suggests its occurrence in the eastern tropical Atlantic.



25.17 *Raja ravidula:* 36 cm wide holotype (off Cape Town). Dorsal and ventral views.

25.18 *Raja robertsi*
Hulley, 1970

Raja robertsi Hulley, 1970: 190, Pl. 8, Fig. 12 (off Cape Town). *Raja (Amblyraja) robertsi:* Hulley, 1972: 77*.

Disc 1.3 times as broad as long; maximum angle in front of spiracles about 96°; distance from middle of vent to 1st D origin 1.9 in length from tip of snout to middle of vent; D (fins) continuous. Snout length 2.4 times interorbital distance. 42 rows of teeth in upper jaw. 55 predorsal caudal vertebrae. 1 preorbital, 1 postorbital, 1 supraspiracular and 2 scapular thorns on each side; 2 median nuchal thorns; 25 mid-dorsal thorns from nuchal region almost to 1st D origin; lateral rows of thorns on disc and tail absent; stellate-based spines on rostrum present; entire upper surface of disc and tail with close-set spinules; ventral surface of disc and tail smooth.

Dorsally greyish, with a few scattered darker patches; V somewhat darker; ventrally uniform grey to black, darker at rear margins of P, tips of anterior V lobes and on tail, white patches medially at level of P girdle, at mouth and about nostrils. Probably attains 100 cm TL, 73 cm DW. Known only from the type, taken west of Cape Town, in 1 350 m.

25.18 *Raja robertsi:* 77 cm TL holotype (off Cape Town). Dorsal and ventral views.

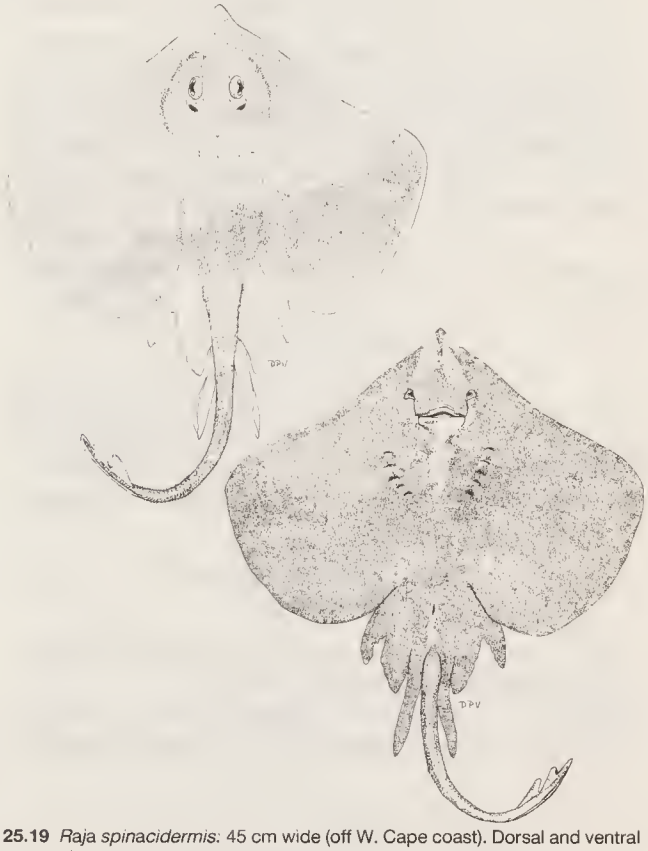
25.19 *Raja spinacidermis*
Barnard, 1923

Roughskin skate Ruwevel-rog

Raia spinacidermis Barnard, 1923: 440 (? off Cape Point); 1925: 73*; Smith, **SFSA No. 66.** *Raja spinacidermis:* Hulley, 1970: 173*. *Raja (Malacoraja) spinacidermis:* Hulley, 1972: 78*; Hulley & Stehmann, 1977: 227*.

Disc 1.2-1.4 times as broad as long; maximum angle in front of orbits 107°; distance from middle of vent to 1st D origin 1.1-1.3 in length from tip of snout to middle of vent; D (fins) continuous. Snout length 3.7-4.2 times interorbital distance. 54-60 rows of teeth in upper jaw. 63-65 predorsal caudal vertebrae. Ventral surface naked, except for spinules on tip of snout; front margins of disc and distal half of tail.

Dorsally pale slate grey, becoming darker on rear margins of disc and on V; ventrally uniform dark brown, except for small white areas at corners of mouth, between gill slits, at V axils and at base of tail. Juveniles with ventral surface of disc predominantly white. Attains 64 cm TL, 45 cm DW. Uncommon. Off west coast below about 900 m; also in deep water on both sides of North Atlantic.



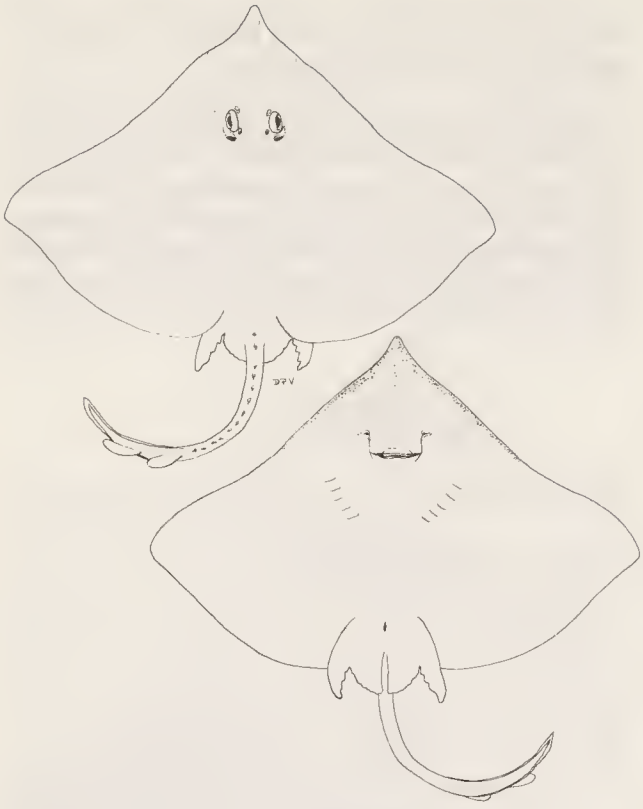
25.19 *Raja spinacidermis:* 45 cm wide (off W. Cape coast). Dorsal and ventral views.

25.20 *Raja springeri*
Wallace, 1967

Raja springeri Wallace, 1967: 18, Figs. 9-10 (ESE Durban). *Raja (Dipturus) springeri:* Hulley, 1972: 77*.

Disc 1.4 times as broad as long; maximum angle in front of spiracles about 85°; distance from front end of vent to 1st D origin 1.8-2.3 in length from tip of snout to front vent; D (fins) separate. Snout length 4.8-5.1 times interorbital distance. 35-40 rows of teeth in upper jaw. 53-56 predorsal caudal vertebrae. 2-7 thorns above each orbit; 15 thorns mid-dorsally, from above V to 1st D origin; 2 interdorsal thorns; upper surfaces of disc and tail with scattered small asperities.

Dorsally and ventrally dark grey, ventral mucous pores black. Attains 83 cm TL, 65 cm DW. Known only from 9 specimens taken between 23°S (Mozambique) and ESE of Durban, in 400 - 740 m.



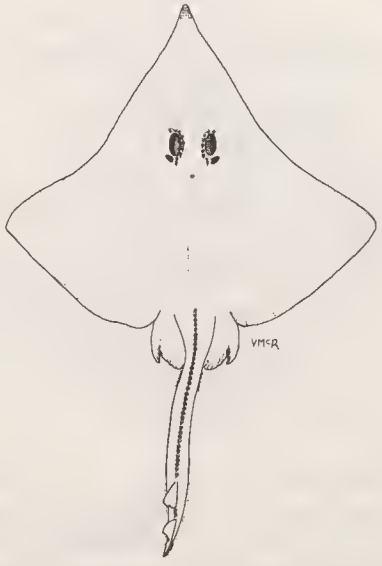
25.20 *Raja springeri:* 27 cm wide female (off Kenya). Dorsal and ventral views.

25.21 *Raja stenorhynchus*
Wallace, 1967

Raja stenorhynchus Wallace, 1967: 23, Fig. 11 (22°25′S, 35°54′E). *Raja (Dipturus) stenorhynchus:* Hulley, 1972: 77*.

Disc 1.1 times as broad as long; maximum angle in front of spiracles about 64°; distance from front end of vent to 1st D origin 2.1 in length from tip of snout to front of vent; D (fins) separate. 38 rows of teeth in upper jaw. 49 predorsal caudal vertebrae. 9-11 thorns above each orbit; (?) 1 median nuchal thorn; 35 thorns mid-dorsally from above V to 1st D origin; 4-5 lateral caudal thorns; small group of spinules on tip of snout; ventral surfaces of disc and tail with spinules on anterior third of rostral cartilage and along front margins of disc.

Dorsally and ventrally uniform dark grey, mucous pores black. Attains at least 90 cm TL, 60 cm DW. Known from 1 specimen taken east of Ponta da Barra Falsa, Mozambique, in 740 m.



25.21 *Raja stenorhynchus:* 60 cm wide female holotype (S. Mozambique).

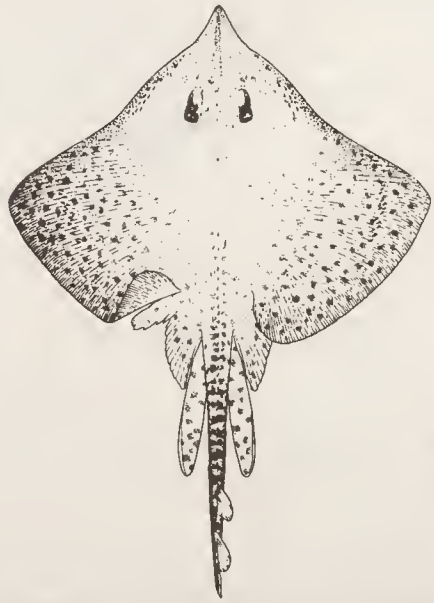
25.22 *Raja straeleni*
Poll, 1951

False thornback skate — Vals doringrug-rog

Raja straeleni Poll, 1951: 118, Fig. 54 (13°05′S, 12°46′E); Hulley, 1970: 187*. *Raja (Raja) straeleni:* Hulley, 1972: 77*; Lloris, 1982: 10.

Disc 1.2-1.5 times as broad as long; maximum angle in front of spiracles about 95°-100°; distance from middle of vent to 1st D origin 1.2-1.5 in length from tip of snout to middle of vent; D (fins) separate. Snout length 2.8-3.2 times interorbital distance. 35-45 rows of teeth in upper jaw. 48-52 predorsal caudal vertebrae. 1-2 preorbital, 1-3 postorbital, 0-1 supraspiracular and 0-2 scapular thorns on each side, 4-5 median nuchal thorns; 20-52 mid-dorsal thorns from about axis of greatest disc width to 1st D origin; 0-6 interdorsal thorns; a few lateral caudal thorns anteriorly on tail, becoming regularly arranged and hook-like posteriorly; dorsal surface in males entirely covered with small spinules, but in females spinules only on tip of snout, front margins and mid-dorsal region of disc and tail; ventral surface with spines on tip of snout and front margins of disc.

Dorsally brown to grey, with scattered dark spots, except on snout, V and tail; ventrally pale or mottled grey, sometimes with darker margin on rear edges of disc and V; juveniles lack darker spots dorsally. Attains about 67 cm TL, 49 cm DW. Off Namibia; eastern Atlantic between about 20°N and 22°S, in 80 - 690 m.



25.22 *Raja straeleni:* 43.5 cm wide male (W. Africa; after Poll, 1951).

25.23 *Raja wallacei*
Hulley, 1970

Blancmange skate — Witpoeding-rog

Raja barnardi (*non* Norman): Wallace, 1967: 39*. *Raja wallacei* Hulley, 1970: 210, Pl. 12B, Fig. 19 (34°10′S, 17°45′E). *Raja (Leucoraja) wallacei:* Hulley, 1972: 77*.

Disc 1.2-1.3 times as broad as long; maximum angle in front of spiracles about 110°; distance from middle of vent to 1st D origin 1.1-1.2 in length from tip of snout to middle of vent; D (fins) separate. Snout length in front of orbits 2.3-3.1 times interorbital distance. 59-67 rows of teeth in upper jaw. 7-10 circumorbital, 2-3 supraspiracular, 0-1 interspiracular, 1-4 lateral nuchal and 1-2 scapular thorns on each side; 1-7 median nuchal thorns; mid-dorsal thorn row absent or with about 34 thorns from nuchal region to 1st D origin, flanked on each side by a row from nuchal region to V axils, increasing to 2 rows to level of dorsal interspace; no interdorsal thorns; spines on tip of snout, along front margins of disc and on tail; ventral surface with spinules on tip of snout and front margins of disc; otherwise smooth.

Dorsally uniform brown, with scattered, irregular lighter spots; mottled ocellus at each P base; ventrally pale, with a dark blotch on tip of anterior V lobe. Attains 92 cm TL, 53 cm DW. Cape to Limpopo River mouth, in 70 - 450 m.

25.23 *Raja wallacei:* 52 cm wide male (Natal).

Family No. 26: ANACANTHOBATIDAE

by P.A. Hulley

Smooth skates — **Gladdevel-rôe**

Pectorals with radials of ordinary form, without lateral processes; tail slender, subequal to length of disc. A terminal filament of varying length arising from a small, bluntly rounded protuberance at tip of snout; front margins of disc concave behind level of protuberance and again at level of spiracles. Dorsal fins absent, but membranous caudal present, with epicaudal lobe larger than hypocaudal lobe. Pelvic fins more or less fused along inner edge with root of tail; radials absent on basipterygium between lobes. Five pairs of small, ventral gill slits. Dorsal and ventral surfaces of disc without dermal denticles; dermal papillae on dorsal surface present or absent.

Small skates of slope regions in tropical/subtropical waters. Hulley (1973) has reviewed the family; 1 genus *(Anacanthobatis),* with 4 subgenera: *Anacanthobatis, Springeria, Sinobatis, Schroederobatis.*

Genus ***Anacanthobatis*** Von Bonde & Swart, 1923

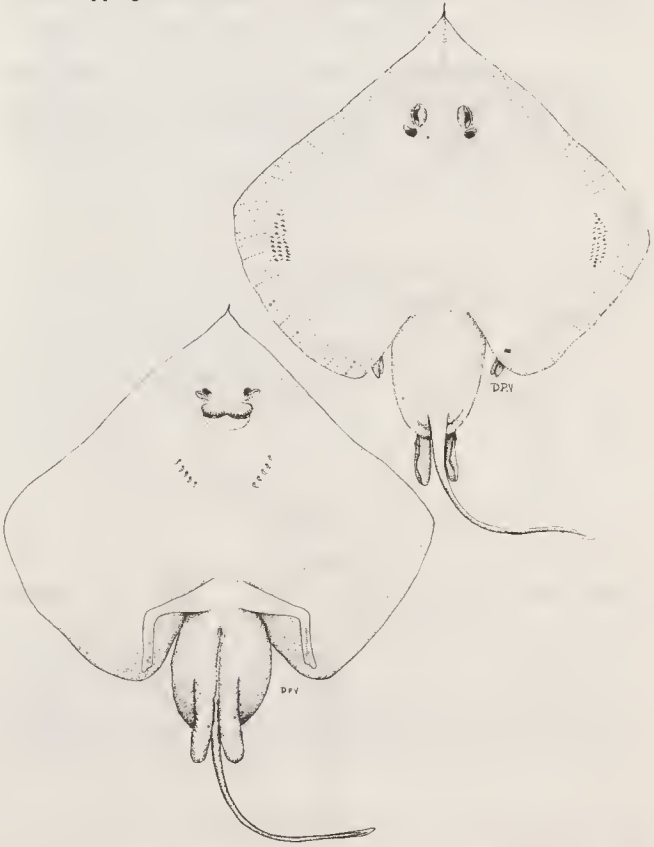
Leiobatis, the name originally proposed, is preoccupied; Von Bonde & Swart (1923: Errata Slip) redefined the genus under the name *Anacanthobatis.* Recognition of the subgenera is based on structural affinities of the clasper. The inclusion of *Anacanthobatis ori* within the subgenus *Anacanthobatis* is open to question, as mature males of this species have yet to be examined.

Seven species; 2 in our area, both placed in subgenus *Anacanthobatis.*

KEY TO SPECIES

1a 20-24 rows of teeth in upper jaw; nasal curtain not overlapping corners of mouth ..... *A. ori*

1b 29-35 rows of teeth in upper jaw; nasal curtain overlapping corners of mouth ..... *A. marmoratus*



26.1 *Anacanthobatis marmoratus:* 17 cm wide male (off Limpopo River). Dorsal and ventral views.

26.1 *Anacanthobatis marmoratus*
Von Bonde & Swart, 1923

Anacanthobatis marmoratus Von Bonde & Swart, 1923: 18, Pl. 23 (30°09′45″S, 30°8′02″E); Smith, **SFSA No. 84*;** Wallace, 1967: 43*; Hulley, 1973: 133*. *Anacanthobatis dubius* Von Bonde & Swart, 1923: 19 (26°00′45″S, 33°9′50″E).

Disc 1.2 times as broad as long, with maximum angle from base of filament to level of spiracles about 102°; tail slender, about twice in TL, with narrow lateral folds; V completely fused along entire length with root of tail. Mouth slightly arched; nasal curtain fringed; 29-35 rows of teeth in upper jaw. Skin naked, without dermal denticles, but alar spines at outer angles of disc in mature males; dorsal surface with dermal papillae.

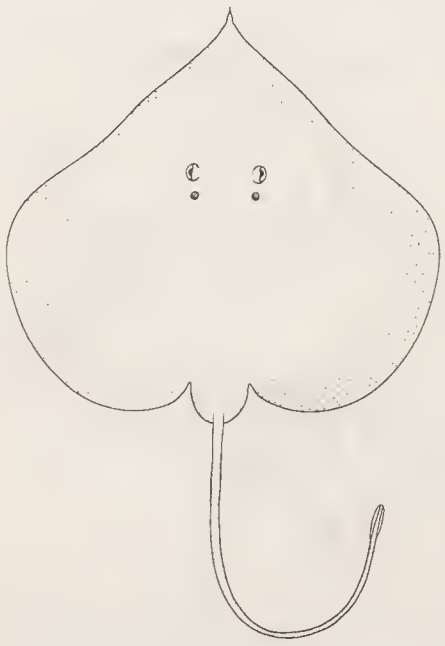
Dorsally mottled light brown and white, with scattered ocelli; papillae and rostral filament dark brown; ventrally uniform pale. Attains 25 cm TL. Known only from Durban to southern Mozambique in 230 - 320 m.

26.2 *Anacanthobatis ori*
(Wallace, 1967)

Springeria ori Wallace, 1967: 46, Fig. 24 (21°18′S, 36°18′E). *Anacanthobatis ori:* Hulley, 1973: 153.

Disc 1.1 times as broad as long, with maximum angle from base of filament to level of spiracles about 93°; tail slender, about 1.6 in TL; V completely fused with root of tail. Mouth slightly arched; 20-24 rows of teeth in upper jaw. Skin naked, without dermal denticles; dorsal surface with dermal papillae.

Dorsally and ventrally uniform grey-black. Attains 206 mm TL. Known from a single locality east of Bazaruto Id. in about 1 500 - 1 600 m.



26.2 *Anacanthobatis ori:* 20.5 cm TL female holotype (off Bazaruto Id.).

Suborder RHINOBATOIDEI

Guitarfishes **Sandkruipers**

Thick-bodied to flattened batoids with pectoral fins variably expanded and fused with head and trunk. Nostrils well in front of mouth in our species; nasal flaps not expanded. Electric organs absent from tail. Pelvic fins with anterior ends not forming separate lobes. Two large dorsal fins; first dorsal origin closer to tail base than to caudal fin; tail thick; caudal fin functional in swimming. Ovoviviparous. Adults 40 cm to 3 m long. A large circumtropical and warm/temperate group of mostly inshore and sometimes deep-water benthic batoids. One to 3 families depending on the classification used.

Family No. 27: RHINOBATIDAE
by L.J.V. Compagno

Guitarfishes **Sandkruipers**

Body elongate and shark-like, much depressed in front, tail stout; snout wedge-shaped or broadly rounded. Numerous small, blunt teeth in jaws. Two large dorsal fins; caudal fin well developed. Small to large batoid fishes, found in all warm to cool continental seas. Ovoviviparous. Adults of some species attain 3.1 m; but most species in our area are smaller.

These harmless batoids feed on bottom organisms, including molluscs and crustaceans, but will also take small fishes. Some species are found in sandy areas close to shore and readily hooked by anglers; flesh excellent but little utilised in southern Africa. Eight or 9 genera, with about 52 species; 3 genera and 7 species in our area.

KEY TO GENERA

1a First D origin behind V base; C without a lower lobe .... *Rhinobatos*
1b First D origin over or in front of V bases; C with a distinct lower lobe 2

2a Head and snout broadly rounded, sharply delimited from P .. *Rhina*
2b Head and snout angular, wedge-shaped, with outline merging into those of P ..... *Rhynchobatus*

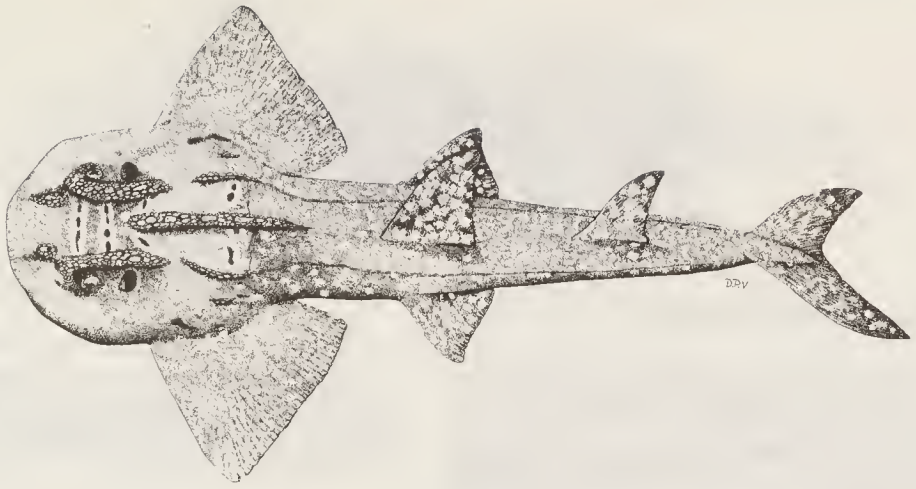
Genus ***Rhina*** Bloch & Schneider, 1801

A single species.

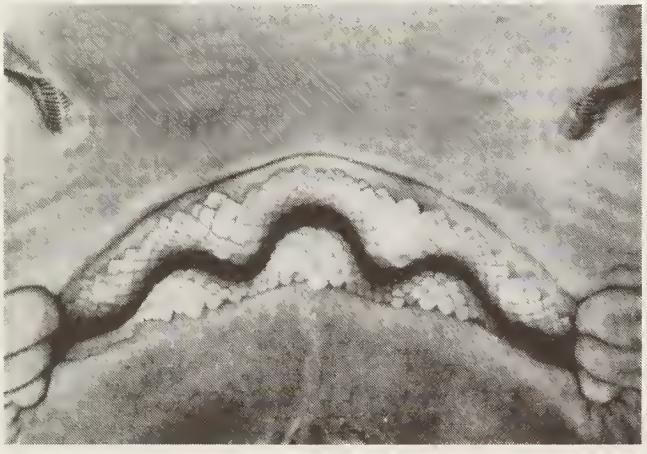
27.1 *Rhina ancylostoma*
Bloch & Schneider, 1801

Bowmouth guitarfish Boogbek-sandkruiper

Rhina ancylostomus Bloch & Schneider, 1801: 352, Pl. 72 (Coromandel, Indian Seas). *Rhina ancylostoma:* Smith, 1961: 503, **No. 59a***; Wallace, 1967: 14*.



27.1 *Rhina ancylostoma:* 130 cm female (Durban).



27.1 *Rhina ancylostoma:* teeth from Inhaca specimen.

Teeth $\frac{47}{50}$ in 152 cm female; dental bands with 3 projections on lower band fitting into 3 indentations in upper band; rear margin of spiracles without dermal folds; heavy ridges with greatly enlarged denticles on back, over eyes and spiracles, and on scapular region.

Grey above, white below; numerous white spots dorsally on fins, body and tail; black spots on head and shoulders but no eyespots or ocelli. Attains at least 244 cm. Tropical Indo-West Pacific south to Natal. Occurs close inshore; uncommon.

Genus ***Rhinobatos*** Linck, 1790

About 34 species, 5 in our area.

KEY TO SPECIES

1a Anterior nasal flaps extending medially only to level of inner edge of nostrils; a conspicuous black spot on ventral surface of snout ..... *R. holcorhynchus*

1b Anterior nasal flaps extending medially well past inner edge of nostrils, nearly meeting at midline of snout; no black spot on snout 2

2a Single dermal fold on rear margin of spiracles; snout short, bluntly pointed, length from snout tip to eyes 1.7-1.8 times distance between spiracles ..... *R. blochii*

2b Two dermal folds on rear margin of spiracles; snout longer and more acutely angular, length from snout tip to eyes 2 to 3 times distance between spiracles 3

3a Snout narrower and bottle-shaped, length from snout tip to mouth about 3.5 times mouth width; nostril width about 1.5 times internarial width; horizontal distance between outer edge of nostril and edge of snout about 3.3 times distance between D bases ..... *R. ocellatus*

3b Snout broader and more wedge-shaped, length from snout tip to mouth 2.5-3 times mouth width; nostril width about equal to internarial width; horizontal distance between outer edge of nostril and edge of snout about 1.5-2.5 times distance between D bases 4

4a Snout, P and V with pale blue-grey spots, those on snout forming a symmetrical pattern; a few symmetrical, large, dark spots on back ..... *R. leucospilus*

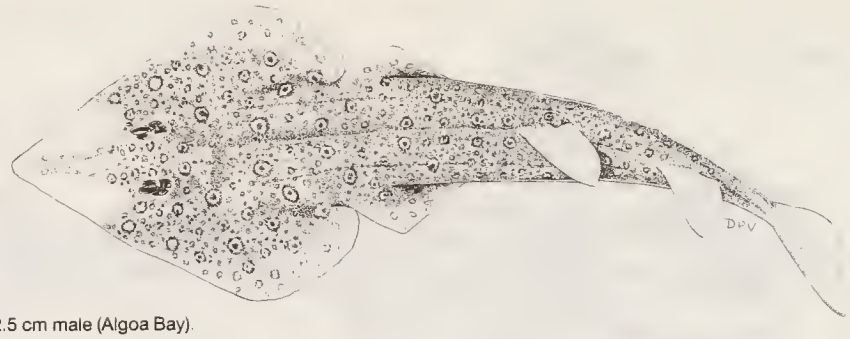
4b Snout with a broad light area on either side of rostrum, but no symmetrical pattern of spots; P and V, body and tail with brown spots or brown and white annular rings ..... *R. annulatus*

27.2 *Rhinobatos annulatus*
Smith, 1841
PLATE 4

Lesser guitarfish — Kleiner sandkruiper

Rhinobatus (Syrrhina) annulatus Smith, *in* Müller & Henle, 1841: 116 (Cape of Good Hope). *Rhinobatos (Syrrhina) columnae (non* Bonaparte): Lampe, 1914: 215. *Rhinobatus annulatus:* Norman, 1926: 964*; Smith & Smith, 1966: 28*; Wallace, 1967: 27*; van der Elst, 1981: 55*. *Rhinobatos annulatus:* Smith, **SFSA No. 63*** (in part); Hulley, 1972: 2*.

Teeth $\frac{42\text{-}25}{46\text{-}67}$; precaudal vertebral counts 155-162, total counts 190-200. Snout margin slightly convex behind angular snout tip; eyes slightly larger than spiracles.



27.2 *Rhinobatos annulatus:* 52.5 cm male (Algoa Bay).

Buff to dark brown above; individuals from Natal have simple dark brown spots on disc and tail, but those from Cape Region have ocelli consisting of a dark spot surrounded by light spots and dark rings. Attains possibly 140 cm, maturing at 59-70 cm. Known only from Cape to Natal; Madagascar record uncertain; enters estuaries when upwelling occurs on the south coast. Restricted to surf zone in Natal, but occurring down to 73 m south of Natal. The commonest guitarfish in southern Africa, often taken by surf anglers; angling record 27.7 kg. Flesh highly esteemed.

27.3 *Rhinobatos blochii*
Müller & Henle, 1841
PLATE 4

Bluntnose guitarfish — Stompneus-sandkruiper

Rhinobatus (Syrrhina) blochii Müller & Henle, 1841: 115, Pl. 37, Fig. 1 (Cape of Good Hope). *Rhinobatus blochii:* Norman, 1926: 969*; Poll, 1951: 99*. *Rhinobatos blochii:* Smith, **SFSA No. 61** (in part, not Fig. 61 = *R. leucospilus*).

Snout margin strongly convex behind angular snout tip; eyes slightly larger than spiracles.

Young have a few small white spots on dorsal surface of disc and tail. Attains 96 cm. Known only from the Cape to Walvis Bay; rare, more specimens wanted.

27.4 *Rhinobatos holcorhynchus*
Norman, 1922

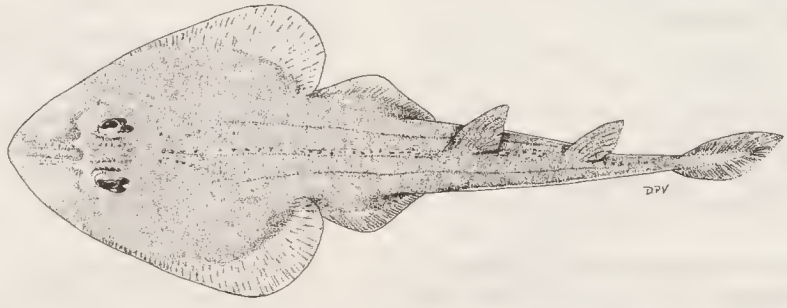
Slender guitarfish — Slank sandkruiper

Rhinobatus holcorhynchus Norman, 1922: 318 (Zululand); Norman, 1926: 957*; Wallace, 1967: 18*. *Rhinobatus natalensis* Fowler, 1925: 195, Fig. 1 (off Durban). *Rhinobatos schlegeli (non* Müller & Henle): Smith, **SFSA No. 64*.**

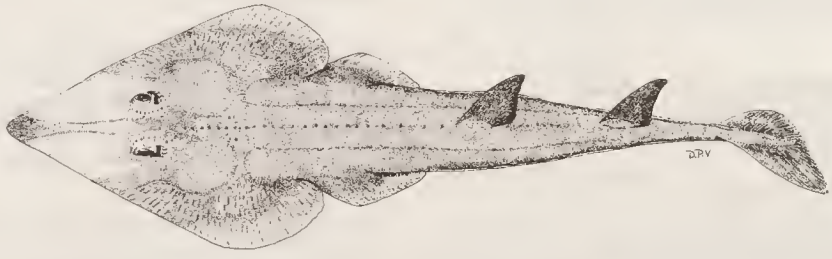
Teeth $\frac{46\text{-}47}{40\text{-}41}$; precaudal vertebral counts 163-164, total counts 199-203.

Snout margin straight or slightly concave behind snout tip; eyes about twice spiracle size.

Dark olive green above, with light area on either side of rostral cartilage on snout, no spots on dorsum. Said to reach 127 cm. Known only from Zululand south to Port Shepstone, in 75 - 183 m; rare, more specimens wanted.



27.3 *Rhinobatos blochii:* (redrawn after Müller & Henle, 1841 and Norman, 1926).



27.4 *Rhinobatos holcorhynchus:* 44.5 cm male (Natal).

27.5 *Rhinobatos leucospilos*: 68 cm female (Natal).

27.5 *Rhinobatos leucospilus*
Norman, 1926

Greyspot guitarfish — Gryskol-sandkruiper

Rhinobatus leucospilus Norman, 1926: 966, Fig. 18 (Durban); Wallace, 1967: 24*; van der Elst, 1981: 56*. *Rhinobatos blochi (non* Müller & Henle, 1841): Smith, **SFSA** Fig. 61 only.

Teeth $\frac{42\text{-}51}{45\text{-}58}$; precaudal vertebral counts 161-169, total counts 200-208. Snout margin slightly convex behind snout tip; eyes slightly larger than spiracles; mid-dorsal, scapular and supraorbital thorns very small.

Buff dorsally, with symmetrical bluish grey spots on snout; fins with faint grey and brown spots; lower surface white. Attains 92 cm. Known only from Durban to Amatikulu Bluff. A moderately common guitarfish taken from the surf down to 71 m. Flesh excellent.

27.6 *Rhinobatos ocellatus*
Norman, 1926

Speckled guitarfish — Spikkel-sandkruiper

Rhinobatus ocellatus Norman, 1926: 967, Fig. 20 (Bird Id., Algoa Bay); Wallace, 1967: 22*. *Rhinobatos annulatus (non* A. Smith): Smith, **SFSA No. 63** (in part); Hulley, 1972: 2*.

Teeth $\frac{69}{72}$; snout margin straight or slightly concave behind snout tip; mid-dorsal, scapular and supraorbital thorns reduced or absent.

Dorsal surface brown, with numerous blue-grey ocelli ringed with dark brown on the disc, head, fins and tail. Adult males reach at least 81 cm. Known only from 55 m off Bird Id., Algoa Bay. Rare, more specimens wanted.

Genus ***Rhynchobatus*** Müller & Henle, 1841

Possibly 6 species, 5 in the Indo-West Pacific; 1 reaching southern Africa.

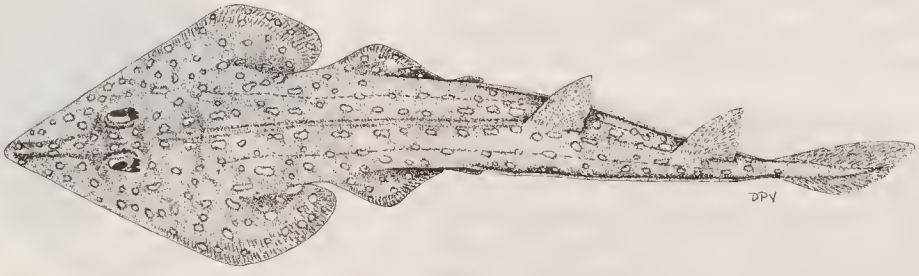
27.7 *Rhynchobatus djiddensis*
(Forsskål, 1775)
PLATE 4

Giant guitarfish — Reuse sandkruiper

Raja djiddensis Forsskål, 1775: 18 (Red Sea). *Rhynchobatus djeddensis*: Smith, **SFSA No. 60***; Wallace, 1967: 11*. *Rhyncobatus djeddensis* van der Elst, 1981: 57*.

Teeth $\frac{31\text{-}41}{37\text{-}48}$; precaudal vertebral count 161-169, total count 204-211; dental bands weakly undulated, with a single low projection on lower band fitting into a median depression on upper band; rear margin of spiracles with 2 dermal folds; rows of small thorns or denticles over eyes and spiracles on back and scapular region.

Olive green above, with rows of white spots; dark spots on interorbital and a pair of prominent black eyespots or ocelli, ringed with white spots, on P. Ovoviviparous, about 4 young, 60 cm in length, born during summer. Attains at least 305 cm and 227 kg. Red Sea and tropical western Indian Ocean south to Transkei, 1 stray reached Knysna, but common only from Natal northwards; apparently replaced by closely related species in the northern and eastern Indian Ocean and western Pacific. An inshore summer visitor to Pondoland, Natal and southern Mozambique, where it provides excellent sport for anglers; considered an important gamefish, taking crayfish and pilchard bait. Flesh excellent.



27.6 *Rhinobatos ocellatus*: 80.5 cm male (Algoa Bay).

Order MYLIOBATIFORMES

Stingrays — Pylsterte

Flattened batoids with pectoral fins expanded and fused with head and trunk to form a disc; 5 or 6 gill slits; snout angular, broadly rounded or bilobed; nasal flaps fused to each other across the snout to form a squared-off or bilobate nasal curtain; no electric organs; one dorsal fin or none; tail fairly thick or more or less elongate and whiplike, usually with a stinging spine near base of tail; caudal fin small or absent, apparently of little or no use in swiming. Ovoviviparous. Adults 15 cm to 6.7 m across the disc. A large circumtropical and warm/temperate group of inshore, deep-water benthic, and oceanic batoids. Four to 7 families depending on the classification used; 21 genera and 170 or more species.

Suborder MYLIOBATOIDEI

Stingrays, Eaglerays, Mantas — Pylsterte, Arendroë, Mantas

Five pairs of gill slits. Brain not greatly reduced in size. Three to 6 families depending on the classification used; 18-20 genera, and at least 170 species.

Family No. 28: MYLIOBATIDAE

by L.J.V. Compagno

Eaglerays — Arendroë

Head, body and pectoral fins form a strongly angular disc, nearly twice as wide as long. Head and snout strongly marked off from rest of disc; snout forms a single lobe or a pair of broadly rounded lobes separated by a median notch with a bilobate shelf overhanging snout. Five pairs of gill openings on underside of disc. Large plate-like crushing teeth normally in 1 or 7 or 9 rows in each jaw. A moderate-sized dorsal fin on tail base, and a sting behind it. No caudal fin or finfolds; tail slender, whiplike, as long as disc or longer.

Moderate-sized to very large batoid fishes, reaching at least 2.3 m width and possibly even 3-4 m. Strong-swimming, flying like birds through the water with their strong pectoral "wings", and hence very difficult for anglers to subdue. Position of sting at base of tail makes eaglerays less dangerous than true stingrays, but they should be handled with care; can crush fingers or toes with their powerful jaws.

Worldwide in tropical and subtropical waters, inshore and well offshore. Five genera, 4 in our area, each with a single species.

KEY TO GENERA

1a Snout forming a pair of broadly rounded lobes separated by a median notch; front part of head concave, overhanging snout ..... *Rhinoptera*

1b Snout projecting as a single lobe; forehead not overhanging snout 2

2a Snout broad and short, connected to pectoral disc by a broad ridge under each eye; P tips blunt, hardly falcate ..... *Myliobatis*

2b Snout elongate, narrow, with narrow ridge or no ridge under eyes to disc; P tips acutely pointed and falcate 3

3a One row of tooth plates in each jaw; nasal curtain deeply notched; white spots on dorsal surface of disc (southern African species only) ..... *Aetobatus*

3b Jaws with 7 rows of tooth plates; nasal curtain shallowly notched; no white spots on disc ..... *Pteromylaeus*

Genus ***Aetobatus*** Blainville, 1820

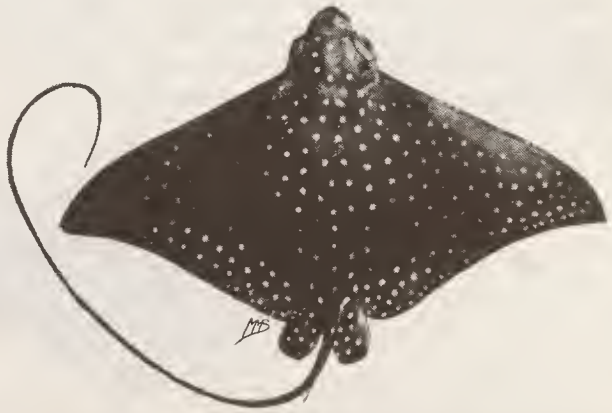
Three or more species, 1 in our area.

28.1 *Aetobatus narinari*
(Euphrasen, 1790)

Spotted eagleray — Spikkel-arendrog

Raja narinari Euphrasen, 1790: 217, Pl. 10 (West Indies). *Aetobatis narinari:* Gilchrist & Thompson, 1911: 56. *Stoasodon narinari:* Smith, **SFSA No. 74*.** *Aetobatus narinari:* Wallace, 1967: 15*; van der Elst, 1981: 49*.

Tooth plates chevron-shaped in lower jaw. V narrow.



28.1 *Aetobatus narinari:* 54 cm wide (N. Mozambique).

Disc blue or black above with numerous white spots or rings, white below. Maximum width at least 2.3 m and reputedly to 4 m, maximum weight over 200 kg, S.A. angling record = 98 kg. Circumtropical in coastal waters south to Algoa Bay. Extremely agile and powerful, often leaping high into the air. Eats mainly bivalves, also shrimp, crabs, octopi and worms. A strong fighter when hooked, often breaking or stripping line; edible but not often eaten.

Genus ***Myliobatis*** Cuvier, 1816

Several species, 1 in the area.

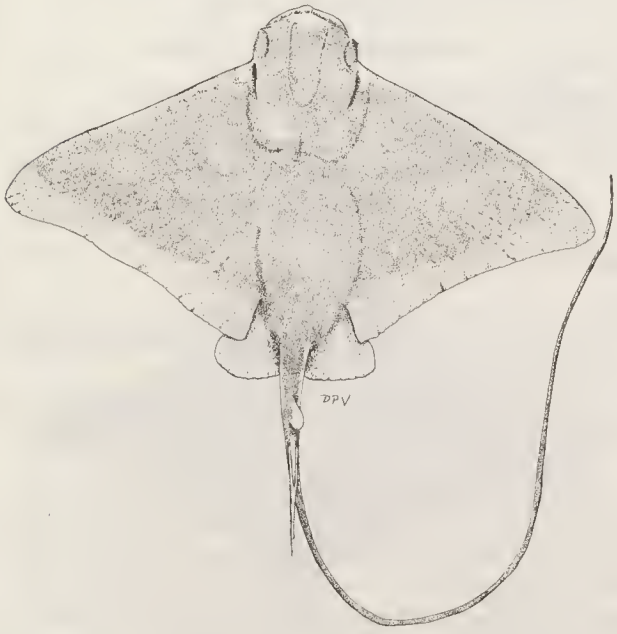
28.2 *Myliobatis aquila*
(Linnaeus, 1758)
PLATE 5

Eagleray — Arendrog

Raja aquila Linnaeus, 1758: 232 (Mediterranean). *Myliobatis aquila:* Smith, **SFSA No. 76;** Wallace, 1967: 17*; van der Elst, 1981: 50*. *Myliobatis cervus* Smith, 1934: 169, Fig. 1 (Knysna); **SFSA No. 75*;** Smith & Smith, 1966: 30*; Hulley: 1972: 2*; 1973: 129.

Median tooth plates transverse in lower jaw. Nasal curtain not notched. V broad.

Disc chocolate-brown to black above, white below, no prominent markings. Maximum width about 150 cm. Mediterranean and East Atlantic around the Cape to Natal. Coastal, readily entering shallow lagoons and estuaries, strong-swimming and occasionally leaping out of the water. Eats bivalves, crabs, molecrabs and small fish. Good sport for anglers, excellent eating.



28.2 *Myliobatis aquila*: 36 cm wide (Algoa Bay).

Genus ***Pteromylaeus*** Garman, 1913

Three species, 1 in our area.

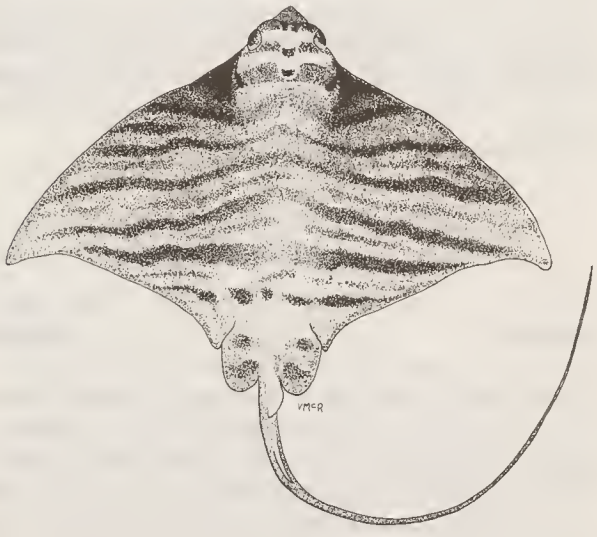
28.3 *Pteromylaeus bovinus*
(Saint-Hilaire, 1817)

Bullray — Bulrog

Myliobatis bovina Saint-Hilaire, 1817: Fig. 1, Pl. 26; 1827: 323 (Egypt, Mediterranean). *Pteromylaeus bovinus:* Smith, **SFSA No. 77*;** Wallace, 1967: 20*; van der Elst, 1981: 51*. *?Aetomylus huletti* Smith, 1961: 513, **No. 77a** (Zululand).

Tooth plates usually 7 in each jaw, median series much larger than others; 5 papillae on floor of mouth. V narrow.

Disc brown above, with pale blue-grey crossbars visible when fish is excited or injured. Maximum width about 175 cm, weight at least 83 kg. Tropical and warm-temperate eastern Atlantic and Mediterranean; southwestern Cape to Zanzibar. Apparently absent from cold water off the western Cape coast and Namibia. Eats fish, crabs, bivalves and squid; occasionally leaps from the water. Often hooked by shore anglers, fights gamely; excellent eating.



28.3 *Pteromylaeus bovinus*: 21 cm wide (Natal).

Genus ***Rhinoptera*** Cuvier, 1829

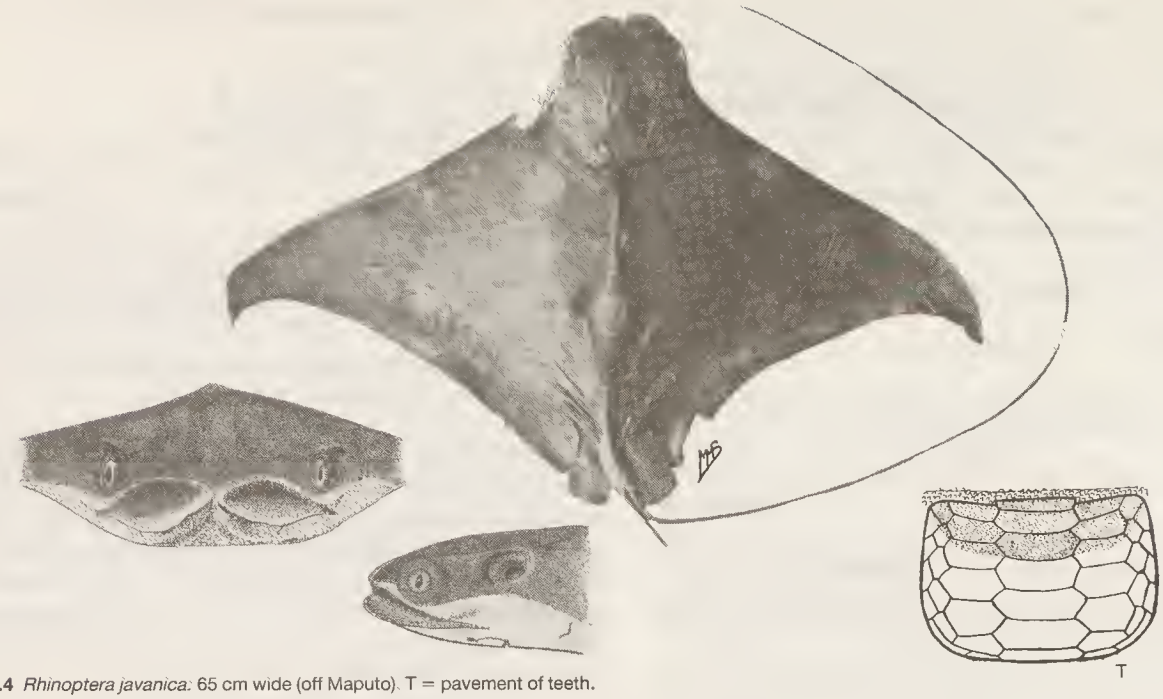
Several species, 1 in our area.

28.4 *Rhinoptera javanica*
Müller & Henle, 1841

Flapnose ray — Flapneus-rog

Rhinoptera javanica Müller & Henle, 1841: 182, Pl. 58 (Java); Smith, 1952: 1020; 1961: 504, **No. 77a***; Wallace, 1967: 23*; Hulley, 1972: 2*.

Normally 7 rows of teeth in each jaw, but varying up to 11/10. Apices of disc strongly falcate; tail about length of disc.



28.4 *Rhinoptera javanica*: 65 cm wide (off Maputo). T = pavement of teeth.

Disc plain brown above, white below, no conspicuous markings. Attains 150 cm disc width and 45 kg. Indo-West Pacific, uncommon off Durban and ranging north probably to India, Thailand, Indonesia and southern China. Eats bivalves; sometimes congregates in huge shoals.

Family No. 29: MOBULIDAE

by L.J.V. Compagno

Mantas **Mantas**

Head, body and pectoral fins form a strongly angular disc, nearly twice as wide as long. Head in front of spiracles strongly marked off from rest of disc, with a pair of elongated, paddle-like cephalic fins, separated by the concave or straight anterior edge of head. Five pairs of gill openings on underside of disc; internal gill openings guarded by unique filter plates that allow these rays to filter small organisms from the water. Jaws with small cuspidate teeth, normally over 100 rows in each jaw or in 1 jaw only. A moderate-sized dorsal fin on tail base; a small, vestigial sting present or absent. Tail slender, whiplike; no caudal fin or finfolds.

Moderate-sized to gigantic batoid fishes, maximum width at least 6.7 m. Powerful swimmers, flapping bird-like through the water and often leaping high into the air. The horn-like cephalic fins are used to guide small planktonic and fish prey into the mouth. Harmless except when harpooned from a small boat, as a 1 000 kg specimen leaping onto a small boat can do considerable damage. Worldwide in tropical and subtropical waters, close inshore and well out to sea. Two to 4 genera, of which 2 reach the area.

KEY TO GENERA

1a Mouth terminal; teeth in lower jaw only; head broad, width at spiracles greater than length from middle of upper jaw to 5th gill openings ..... *Manta*

1b Mouth on underside of head; teeth normally in both jaws; head width at spiracles less than length from middle of snout to 5th gill openings ..... *Mobula*

Genus *Manta* Bancroft, 1829

Possibly a single species, but this is uncertain.

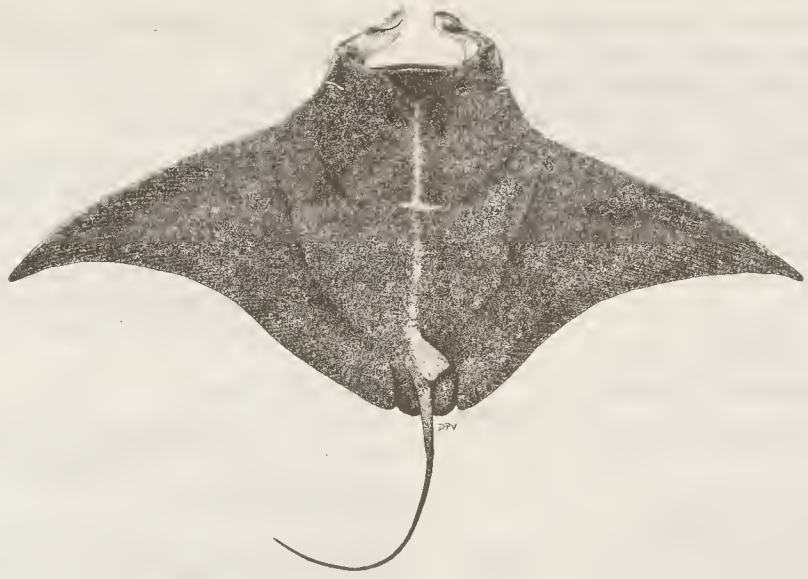
29.1 *Manta birostris*
(Donndorff, 1798)
PLATE 5

Manta Manta

Raja birostris Donndorff, 1798: 876 (no locality). *Manta ehrenbergi*: Barnard, 1925: 87. *Manta birostris*: Smith, **SFSA No. 88***; Smith & Smith, 1966: 33*; Wallace, 1967: 13*.

Lower jaw with 130-200 tooth rows. Disc above and below largely covered with small denticles.

Colour reddish or greenish brown to black above, often with white patches on shoulders; underside white, edged with grey. One of the largest of fishes, attains at least 6.7 m disc width and over 2 tons in weight. Possibly circumtropical, from the Cape eastwards. Harmless plankton feeders, "flying" slowly through the water but capable of high speed. Often cartwheeling at the surface or leaping en-



29.1 *Manta birostris:* 235 cm wide male (Algoa Bay).

tirely out of the water and landing with a slap audible for kilometres. Inshore and sometimes far out to sea. Occasionally harpooned for "sport", but not easily landed, towing boats for miles and sometimes leaping onto them. Sometimes foul anchor lines with their prehensile cephalic fins.

Genus ***Mobula*** Rafinesque, 1810

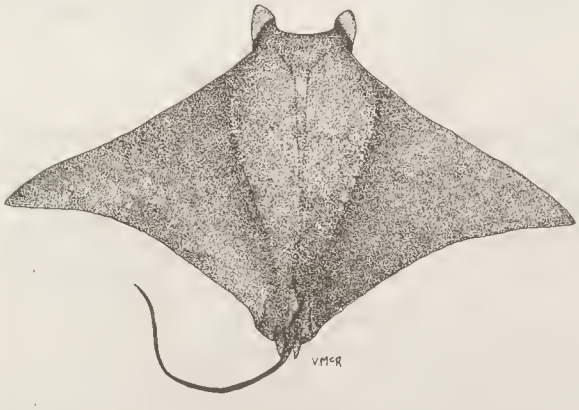
Several species, 1 in our area.

29.2 *Mobula diabolus*
(Shaw, 1804)

Devilray — Duiwelrog

Raja diabolus Shaw, 1804: 291 (India). *Mobula kuhlii:* Barnard, 1925: 86*. *Mobula diabolus:* Smith, **SFSA No. 87*;** Wallace, 1967: 11*; Hulley, 1972: 2*.

Teeth minute, $\frac{69\text{-}102}{80\text{-}106}$ rows. Skin smooth.



29.2 *Mobula diabolus:* 111 cm wide male (Natal).

Colour grey-brown to blue-black above, white below. Maximum width about 178 cm, weight to 52 kg. Wide ranging in Indian Ocean and western Pacific; south to Port Alfred, but common only from Durban northwards. Generally in schools, leaping high out of the water; often fouled in shark nets. Name provisional.

Family No. 30: DASYATIDAE

by L.J.V. Compagno

Stingrays — **Pylsterte**

Head, body and pectoral fins forming a rounded or angular pectoral disc, about 1-2 times as wide as long. Snout broadly to narrowly angular or rounded, length less than half disc width. Head in front of spiracles not marked off from rest of disc. Five pairs of gill openings on underside of disc. Moderately numerous small blunt or cuspidate teeth in each jaw. Tail moderately slender to very slender, whip-like, varying from somewhat shorter than disc to several times disc length, usually with a large, venomous sting on its dorsal surface well behind its base. Dorsal and ventral finfolds present or absent.

Small to large batoid fishes, found in all tropical and subtropical oceans. Maximum size of largest species about 4.3 m long or 4 m wide. Most species are commonly found close inshore, in estuaries, off beaches and off river mouths; some species occur in freshwater. Many species dangerous, because of their large size, and large, serrated, venomous stings; many cases of stingray injuries known, some fatal, in which the stingray was stepped on or disturbed and drove its sting into the limbs or body of its human assailant. Stings

should be promptly removed from wounds and the wound should be immediately bathed or immersed in hot (55 °C) water. These fishes should be handled with great care; some, such as *Hypolophus sephen,* can drive their sting into a limb touching virtually any part of its disc. Live-bearing (ovoviviparous). The family Dasyatidae is here used in a broad sense to include the subfamilies Gymnurinae and Urolophinae. Nine or 10 genera and about 89 species; 7 genera and 16 species in our area.

KEY TO GENERA

1a Disc about twice as wide as long; tail half disc length or less ..... *Gymnura*
1b Disc width 0.9-1.3 times disc length; tail 0.9-3 times disc length* 2

2a C consists of broad dorsal and ventral cutaneous folds meeting at tail tip; distance from snout tip to orbits about twice distance between spiracles ..... *Urotrygon*
2b No C, though ventral cutaneous fold may reach tail tip; distance from snout tip to orbits much less than distance between spiracles 3

3a No finfolds on tail; tail base narrow and not depressed 4
3b A ventral finfold on tail, and sometimes a dorsal fold; tail base broad and somewhat depressed 5

4a No sting; snout rounded; disc circular or oval and covered with large flattened denticles interspersed with scattered large, sharp, thorn-like denticles (thorns in young) ..... *Urogymnus*
4b Sting present; snout angular*; disc rhomboidal, more or less covered by small flattened denticles, but without scattered large thorns (midline of disc with enlarged denticles in some species) ..... *Himantura*

5a Ventral finfold reaching tail tip; disc circular or oval ..... *Taeniura*
5b Ventral finfold falling well short of tail tip; disc rhomboidal 6

6a Ventral finfold high and prominent, its height 2-3 times tail height over fold; teeth with high hexagonal crowns ..... *Hypolophus*
6b Ventral finfold height less than tail height above it; teeth with low suboval or rhomboidal crowns ..... *Dasyatis*

*Characters applying only to southern African species.

Genus ***Dasyatis*** Rafinesque, 1810

A large, circumtropical genus with at least 31 species; 5 of which occur in southern African waters.

KEY TO SPECIES

1a Disc (of adults) scattered with prominent, sharp stellate denticles; tail covered with sharp, thorn-like denticles; no D fold on tail ..... *D. thetidis*
1b Disc and tail relatively smooth, without enlarged stellate denticles 2

2a Anterior contour of disc broadly arched; disc uniformly violet-purple above and below ..... *D. violacea*
2b Anterior contour of disc angular; colour mainly brown above, light below 3

3a Disc drab brown above, without blue markings; sting ending close to tail tip; tail subequal to disc length ..... *D. brevicaudata*
3b Disc golden brown with bright blue markings; sting ending well short of tail tip 4

4a Snout acutely pointed and moderately long, preorbital snout length greater than interspiracular width; blue markings on disc forming a reticulated network; tail not banded ..... *D. pastinaca*
4b Snout blunt and short, preorbital snout length less than interspiracular width; disc with scattered blue spots; tail behind sting with black and white bands ..... *D. kuhlii*

30.1 *Dasyatis brevicaudata*
(Hutton, 1875)

Short-tail stingray — Kortstert-pylstert

Trygon brevicaudatus Hutton, 1875: 317 (New Zealand). *Dasyatis schreineri* Gilchrist, 1912: 33, Fig. (False Bay). *Dasyatis brevicaudatus:* Smith, **SFSA No. 81***; Wallace, 1967: 37*; 1969; 25.

Tooth rows 33-50 in each jaw. Disc slightly wider than long, naked without medial row of enlarged denticles or thorns; tail with scattered small stellate denticles, not strongly thorny; tail length slightly less than disc; a short dorsal finfold above ventral fold.

Colour grey-brown above, white below, no markings on disc or tail. Maximum width possibly 2.1 m, total length at least 4.3 m, weight possibly over 300 kg, possibly the largest stingray. False Bay to Maputo, also southern Australia and New Zealand. Probably most abundant in 182 - 476 m but occasionally close inshore; sometimes taken by rock anglers.

30.1 *Dasyatis brevicaudata:* 77 cm wide (Natal).

30.2 *Dasyatis kuhlii*
(Müller & Henle, 1841)
PLATE 6

Bluespotted stingray — Bloukol-pylstert

Trygon kuhlii Müller & Henle, 1841: 164, Pl. 50 (Vanikoro Id., New Guinea, India). *Dasyatis kuhlii:* Compagno & Heemstra, 1984: 13*.

Tooth rows 25-30 in each jaw; total pectoral radials 108; total vertebral centra 138, diplospondylous centra 80; intestinal valve turns 15; oral papillae 2. Disc slightly wider than long, largely naked, with few mid-dorsal denticles; tail naked, length equal to or slightly greater than disc; a small dorsal finfold above the ventral fold.

Colour reddish brown above with bright ocelli with blue centres and scattered black spots; disc margins dusky, underside white; intact tail with a few black and white bands behind sting. Maximum disc width less than 50 cm; total length to about 70 cm. Known in our area only from near Durban; a widespread inshore species of the Indian Ocean and western Pacific from Zanzibar east to India, Ceylon, Japan, the Philippines and Australia.

30.3 *Dasyatis pastinaca*
(Linnaeus, 1758)
PLATE 6

Blue stingray — Blou pylstert

Raja pastinaca Linnaeus, 1758: 232 (Europe). *Dasyatis pastinacus:* Fowler, 1941: 420; Smith, **SFSA No. 80***; Smith & Smith, 1966: 31*; Wallace, 1967: 34*; van der Elst, 1981: 45*.

Tooth rows $\frac{28\text{-}38}{28\text{-}43}$; intestinal valve turns 22; oral papillae 5. Disc slightly wider than long, mostly wider than long, mostly naked, except for few denticles near front margin; tail smooth, its length slightly greater than disc; a short dorsal finfold above ventral fold.

Colour rich golden brown with bright light blue reticular markings; tail darker, without light and dark bands. Maximum width about 75 cm; total length about 1.5 m; weight to 25 kg. Natal to Namibia, ranging north in the eastern Atlantic to the North Sea and the Mediterranean. A common inshore stingray, often taken by shore anglers on sandy beaches, but also trawled in 50 m. Good eating but not often utilised.

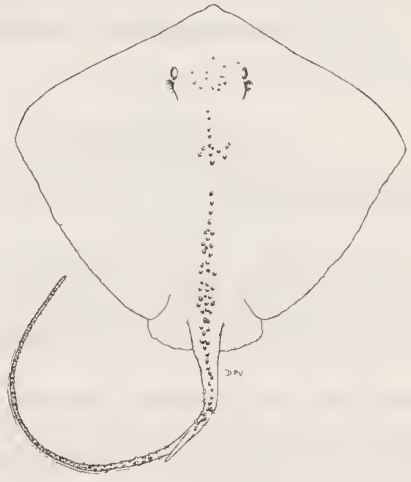
30.4 *Dasyatis thetidis*
Ogilby, 1899

Thorntail stingray — Doringstert-pylstert

Dasyatis thetidis Ogilby, *in* Waite, 1899: 46 (New South Wales, Australia); Wallace, 1967: 40*. *Dasybatus agulhensis* Barnard, 1925: 78 (Agulhas Bank). *Dasyatis lubricus* Smith, 1957: 429, Pl. 15 (Algoa Bay); Smith, 1961: 565, **No. 79a***.

Tooth rows $\frac{25\text{-}43}{29\text{-}48}$; intestinal valve turns 26; oral papillae 5. Disc slightly wider than long, with scattered large to small stellate denticles and a regular mid-dorsal row of large thorns from nape to sting; tail very thorny, its length about twice disc length; ventral finfold height 0.2-0.4 height of tail above it.

Colour dark brown to grey-black above, light below, without markings. Maximum width at least 1.8 m, total weight at least 214 kg; length about 4 m; one of the largest stingrays. Algoa Bay to Barra da Falsa, Mozambique; also southern Australia and New Zealand. An uncommon stingray ranging from close inshore to 366 m depth, occasionally hooked by anglers.



30.4 *Dasyatis thetidis:* 133 cm wide male (Natal).

30.5 *Dasyatis violacea*
(Bonaparte, 1832)

Pelagic stingray — Pelagiese pylstert

Trygon violacea Bonaparte, 1832: Pl. not numbered. *Trygon purpurea* Smith, *in* Müller & Henle, 1841: 160, Pl. 52 (probably South Africa). *Dasyatis purpurea:* Barnard, 1934: 229. *Dasyatis purpureus:* Smith, **SFSA No. 82.** *Dasyatis violacea:* Bigelow & Schroeder, 1962: 230*; Wilson & Beckett, 1970: 701*; Compagno & Heemstra, 1984: 5.

Tooth rows $\frac{32\text{-}34}{32\text{-}38}$; intestinal valve turns 22; oral papillae 10-12. Disc somewhat wider than long, with a partial or entire mid-dorsal row of enlarged denticles running onto tail base, otherwise smooth to partially covered with tiny pointed denticles; tail length less than twice disc length; tail with distinct ventral finfold, dorsal finfold low or absent.

30.5 *Dasyatis violacea:* 35 cm wide male (Cook Ids., Pacific).

Disc uniformly violet, purple, or dark blue-green above and below, without prominent markings. Maximum width 80 cm, maximum length 164 cm. An anomaly among stingrays, oceanic in temperate and tropical waters of the Atlantic, Mediterranean Sea and Pacific Ocean; 2 records from South Africa. Usually hooked by pelagic longlines well offshore.

Genus ***Gymnura*** van Hasselt, 1823

About 12 species, 2 in our area.

KEY TO SPECIES

1a No tentacle at rear edge of spiracle ..... *G. japonica*
1b A tentacle at rear edge of spiracle ..... *G. natalensis*

30.6 *Gymnura japonica*
(Temminck & Schlegel, 1850)

Japanese butterflyray — Japanse vlinderrog

Pteroplatea japonica Temmink & Schlegel, 1850: 309, Pl. 141 (Japan). *Gymnura japonica:* Smith, **SFSA No. 85.**

Tooth rows 30-40 in each jaw. No D. Tail half disc length.

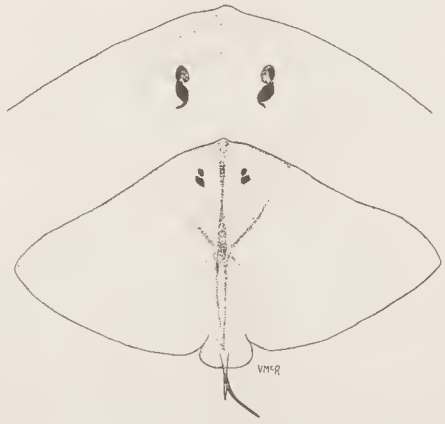
Disc brown with darker mottling above, white below, tail with transverse light and dark bands. Maximum disc width at least 1.8 m. Agulhas Bank, India, China, Japan and Korea. Identification of this species provisional.

30.7 *Gymnura natalensis*
(Gilchrist & Thompson, 1911)
PLATE 5

Backwater butterflyray — Rem-vlinderrog

Pteroplatea natalensis Gilchrist & Thompson, 1911: 56 (Natal); Smith, 1934: 83*. *Gymnura natalensis:* Smith, **SFSA No. 86***; Smith & Smith, 1966: 32*; Wallace, 1967: 26*, van der Elst, 1981: 47*.

Teeth $\frac{68\text{-}93}{70\text{-}93}$. No D. Tail about ⅓ disc length.



30.7 *Gymnura natalensis:* 67 cm wide female (Durban).

Disc grey, green or brown above, often with darker mottling, white below; can rapidly change markings and colour to suit background. Anterior contour of disc with a broader angle in adults than young. Maximum disc width about 250 cm, greatest weight recorded nearly 90 kg. Only known from Mossel Bay to southern Mozambique. A common inshore species, especially off sandy beaches and on offshore banks down to 75 m; sometimes enters estuaries. Commonly caught by shore anglers, often after much effort, but not esteemed as food. Eats flat-fish, sardines, mole crabs, worms and crabs.

Genus ***Himantura*** Müller & Henle, 1841

A large genus with 18 or more species, mostly in the Indo-West Pacific, 4 in our area.

KEY TO SPECIES

1a Dorsal surface of disc with a conspicuous pattern of white or yellow lines on a dark background ..... *H. uarnak*
1b Dorsal surface of disc without conspicuous light markings 2

2a Midline of disc and tail with continuous row of sharp, enlarged, hooked denticles extending from nape to sting; anterior part of tail covered with enlarged, flattened denticles; a band of small dark spots on upper rear margins of disc ..... *H. draco*
2b Midline of back without enlarged denticles, except for one or more midscapular pearl spines; anterior part of tail with small scattered, flattened denticles; no band of spots on disc margins 3

3a Snout tip acutely pointed; middle of disc densely covered with small flattened denticles; tail with light and dark bands in juveniles, fading in adults ..... *H. gerrardi*
3b Snout tip blunt, with a protruding medial lobe; middle of disc with scattered small denticles; tail without bands ..... *H.* sp.

30.8 *Himantura draco*
Compagno & Heemstra, 1984

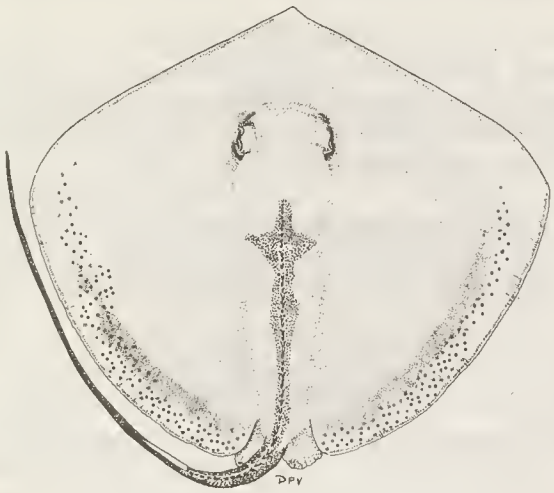
Dragon stingray — Draak-pylstert

Himantura draco Compagno & Heemstra, 1984: 6, Figs. 1–8 (off Durban).

Teeth $\frac{28}{31}$; pectoral radials 148, total vertebral centra 112, total diplospondylous centra 68; intestinal valve turns 25; oral papillae 2. Disc somewhat wider than long, largely naked, with minute denticles on head and abdomen, a narrow medial belt of flattened denticles with lateral extensions on scapular region, and a continuous line of enlarged, mid-dorsal denticles from level of spiracles to sting; anterior part of tail covered with large flattened denticles; small flattened and pointed denticles behind sting; tail length less than twice disc.

Colour brown above, white below, rear margins of disc with light band and dark spots above, tan band below; tail

dusky. Maximum size over 56 cm disc width (immature male). Off Durban, in water less than 50 m deep; only 1 specimen known, more wanted.



30.8 *Himantura draco:* 56 cm immature male holotype (Durban).

30.9 *Himantura gerrardi*
(Gray, 1851)

Sharpnose stingray — Skerpneus-pylstert

Trygon gerrardi Gray, 1851: 116 (India). *Dasyatis jenkinsii (non* Annandale): Wallace, 1967: 47*; van der Elst, 1981: 41*. *Himantura gerrardi:* Compagno & Heemstra, 1984: 3.

Teeth $\frac{22\text{-}34}{28\text{-}40}$; oral papillae 4. Disc slightly wider than long, mostly naked, with a mid-dorsal band of small flattened denticles in adults, extending onto tail base; tail length when intact about twice disc.

30.9 *Himantura gerrardi:* 19 cm wide female (Durban).

Colour light brown above, white below, numerous transverse bands of dark and light brown on tail (may be obscure on large individuals). Maximum disc width about 90 cm, length about 2 m, weight up to 65 kg. Eastern Cape to Natal and Mozambique; widespread in Indian Ocean and western Pacific from Zanzibar, the Red Sea, India, Ceylon east to Indonesia, Japan, Philippines and Australia. A common inshore stingray, often hooked by anglers and fighting gamely; flesh not esteemed but good eating.

30.10 *Himantura uarnak*
(Forsskål, 1775)

Honeycomb stingray — Heuningkoek-pylstert

Raja uarnak Forsskål, 1775 (Red Sea). *Trygon uarnak:* Bleeker, 1860: 58. *Dasyatis uarnak:* Smith, **SFSA No. 79***; Wallace, 1967: 44*. *Dasyatis favus (non* Annandale): Smith, 1961: 565, **No. 79b***. *Himantura uarnak:* van der Elst, 1981: 46*; Compagno & Heemstra, 1984: 2.

Tooth rows $\frac{26\text{-}40}{27\text{-}44}$; intestinal valve turns 16–17; oral papillae 4. Disc slightly wider than long, mostly naked, with a midbelt of small flattened denticles extending onto tailbase; tail length when intact over twice disc length.

Adults brown to blackish above, white below, with white to yellow lines on dorsal surface forming a marbled or reticulated pattern; tail striped with brown or blackish and white or yellow; juveniles pale brown, covered with small dark spots. Maximum disc width about 200 cm, length at least 6 m (mostly tail), weight to almost 120 kg. Eastern

30.10 *Himantura uarnak:* 120 cm wide (Natal).

Cape to Mozambique; Indo-West Pacific from Red Sea and southern Africa (also in eastern Mediterranean as an invader through the Suez Canal) east to Philippines, Australia, Melanesia and Polynesia. Common off sandy beaches and in shallow estuaries and lagoons; frequently taken by shore and boat anglers but not esteemed as food. Feeds on bivalves, crabs, shrimp and worms.

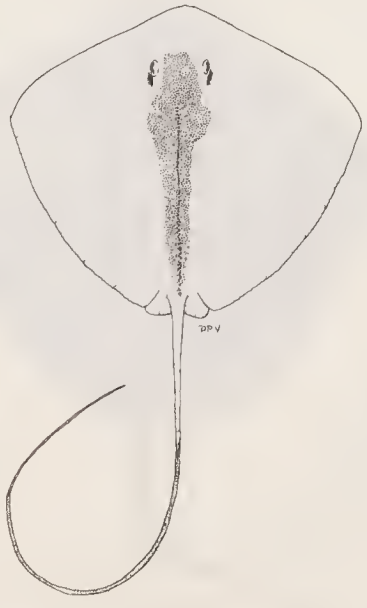
30.10 *Himantura uarnak*: 33.5 cm wide (Natal).

30.11 *Himantura* sp.

Roundnose stingray — Rondneus-pylstert

Dasyatis purpureus (non Smith, 1841): Wallace, 1967: 50*. *Himantura* sp. Compagno & Heemstra, 1984: 6.

Teeth $\frac{25\text{-}34}{25\text{-}31}$; pectoral radials 156-159; total vertebral centra 123-125, total diplospondylous centra 67-69; intestinal valve turns 28; oral papillae 4. Disc slightly wider than long, mostly naked, with a midbelt of very small denticles extending onto tailbase; tail length when intact slightly over twice disc length.



30.11 *Himantura* sp.: 77 cm wide female (Durban).

Disc black to grey-blue above, white below; tail not banded. Maximum disc width at least 109 cm, length to about 2.8 m, weight to about 40 kg. Durban Bay, possibly identical to *H. fai* Jordan & Seale, 1906 from Samoa. Uncommon, more specimens wanted.

Genus ***Hypolophus*** Müller & Henle, 1841

A single species confined to the Indian Ocean and western Pacific.

30.12 *Hypolophus sephen*

(Forsskål, 1775)

Feathertail stingray — Veerstert-pylstert

Raja sephen Forsskål, 1775: 17 (Red Sea). *Dasyatis sephen:* Smith, 1957: 431*; Smith, 1961: 565, **No. 79c***; Wallace, 1967: 42*.

Tooth rows about 20 in each jaw. Disc slightly wider than long, covered with small denticles in adults but partly or entirely naked in young; tail less than twice disc length.

Disc dark brown or black above, white below, tail black, no conspicuous markings. Maximum disc width possibly 183 cm, length over 3 m? A single specimen from Zululand; more wanted. South Africa and the Red Sea to Indonesia, Philippines, Australia, Micronesia and Melanesia; occurs in freshwater far from the sea.

30.12 *Hypolophus sephen:* 45 cm wide female (Natal; also after Day, 1878 and Wallace, 1967).

Genus ***Taeniura*** Müller & Henle, 1841

A genus of 4 species in the eastern Atlantic, Indian Ocean and western Pacific; 2 species in our area.

KEY TO SPECIES

1a Disc oval, longer than wide, with bright blue spots ..... *T. lymma*
1b Disc circular, with black spots and blotches ..... *T. melanospilos*

30.13 *Taeniura lymma*
(Forsskål, 1775)
PLATE 6

Bluespotted ribbontailray — Bloukol-lintstertrog

Raja lymma Forsskål, 1775: 17 (Red Sea). *Taeniura lymma:* Smith, **SFSA No. 78*;** Wallace, 1967: 31*.

Tooth rows 15-24 in each jaw; intestinal valve turns 18; oral papillae 2. Disc naked in young, mid-dorsal area with small denticles in adults; tail length when intact less than twice disc length.

Disc grey-brown or yellow-brown above, white below, disc with light margin and bright blue spots, tail with blue lateral stripes. Maximum disc width possibly 95 cm, length possibly to 243 cm. Indo-West Pacific, Red Sea and south to Natal; common in Zululand.

30.14 *Taeniura melanospilos*
Bleeker, 1853

Round ribbontailray — Ronde lintstertrog

Taeniura melanospilos Bleeker, 1853: 513 (Batavia, Java). *Taeniura melanospila:* Smith, 1952: 1021*; 1955: 5*; 1961: 513, **No. 78a*;** Wallace, 1967: 28*.

Tooth rows $\frac{37\text{-}46}{39\text{-}45}$; intestinal valve turns 24; oral papillae 4. Disc (naked in young) uniformly covered with small stellate denticles above, a mid-dorsal row of small enlarged denticles on disc and tail; tail length when intact slightly longer than disc.

Disc blue-grey above, white below, with scattered irregular dark spots and blotches, tail without lateral stripes. Maximum disc width at least 164 cm, length about 3 m, weight to at least 154 kg. Indo-West Pacific, Red Sea and south to Natal.

30.14 *Taeniura melanospilos:* 144 cm wide female (Durban).

Genus ***Urogymnus*** Müller & Henle, 1841

One or more species in the eastern Atlantic and Indo-West Pacific, apparently 1 species in our area.

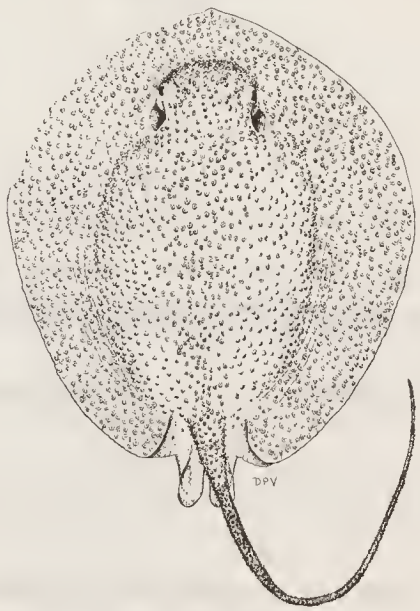
30.15 *Urogymnus asperrimus*
(Bloch & Schneider, 1801)

Porcupineray — Penrog

Raja asperrima Bloch & Schneider, 1801: 367 (Bombay, India). ?*Raja africana* Bloch & Schneider, 1801: 367 (Guinea). *Urogymnus africanus:* Smith, 1952: 225; 1961: 514, **No. 82a.**

Tooth rows about 48 in each jaw; 3-5 oral papillae. Disc thick, with large flat denticles in young; adults and subadults also with small pointed denticles and large, conical thorns, tail about as long as disc.

Disc light grey or whitish above, white below, tail tip blackish. Maximum disc width at least 100 cm. Indo-West Pacific and south to Natal. Possibly more than 1 species involved; rare, more wanted.



30.15 *Urogymnus asperrimus:* 94 cm wide (Kenya).

Genus ***Urotrygon*** Gill, 1864

Several species, 1 in our area.

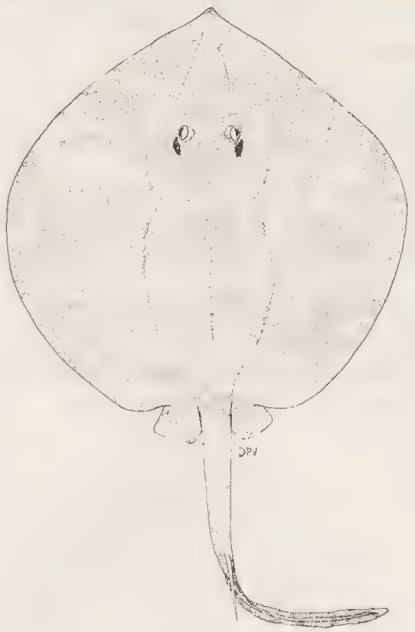
30.16 *Urotrygon daviesi*
Wallace, 1967

Deepwater stingray — Diepwater-pylstert

Urotrygon daviesi Wallace, 1967: Figs. 3 & 4 (off Limpopo River mouth, southern Mozambique; 44 - 440 m); Clarke, 1972: 312.

Teeth $\frac{40}{40}$. Snout pointed, moderately elongated; lateral edges of disc broadly rounded; almost entire dorsal surface and most of ventral surface in adults (but not young) covered with small, close-set, pointed denticles.

Dorsal surface, ventral margins of disc, V and C grey-black, ventral surface otherwise white. Attains 270 cm (151 cm disc width). A rare, deep-water, giant stingray known from off Limpopo River mouth in southern Mozambique, in 44 - 440 m; other records from the Hawaiian Ids., and possibly off southern China.



30.16 *Urotrygon daviesi:* 90 cm wide (off Limpopo River mouth).

Suborder HEXATRYGONOIDEI

Sixgill stingrays **Seskief-pylsterte**

Six pairs of gill slits. Brain greatly reduced and snout elongated. A single family of bizarre, deep-water stingrays.

Family No. 31: HEXATRYGONIDAE

by M.M. Smith & P.C. Heemstra

Sixgill stingrays **Seskief-pylsterte**

Six pairs of gill openings and 6 gill arches with well-developed gill filaments. Snout flabby, long and pointed, filled with a clear gelatinous substance; propterygia extend to tip of snout. Spiracles well back from eyes. Nostrils wide apart, not connected to mouth by a groove; anterior nasal flaps short and fleshy, not joined to form a broad nasal curtain that reaches mouth. Cranium large, without supra-orbital crests; adults with a very small brain, occupying less than one tenth of the cranial cavity. Tail with 1 or 2 well-developed serrate spines (stings).

A few months after the publication of the description of the South African sixgill stingray, another new species of sixgill stringray — *Hexatrematobatis longirostrum* Chu & Meng, 1981 — was described from 2 males (1 juvenile and 1 adult), 63 & 104 cm total length, collected at a depth of 350 - 1 000 m in the South China Sea. The Chinese sixgill stingray is similar in many respects to our South African one; the apparent differences between these two species are difficult to assess, because only the juvenile of *H. longirostrum* was illustrated, and it was said to differ considerably from the adult. Whether *H. longirostrum* represents a distinct species and genus can only be decided after a detailed comparison of the Chinese and South African specimens and/or the examination of additional sixgill stingrays.

It is remarkable that specimens representing a new family of elasmobranchs should be found almost simultaneously off South Africa and in the South China Sea. These recent discoveries indicate that we still have much to learn of the creatures that live in the sea.

Genus ***Hexatrygon*** Heemstra & Smith, 1980

Disc longer than broad; snout length (to front of mouth) greater than half disc width; body and snout flabby. Mouth width 0.18 of disc width; internostril distance 0.86 of mouth width; eye diameter contained 9 times in distance between eyes. Skin smooth, without denticles. Tail with prominent D and V fins supported by cartilaginous radials and extending from tip of spine to tip of tail. A female sixgill stingray that may be of the same species as our South African specimen was trawled from a depth of 1 000 m at the Hawaiian Islands. This specimen is more than 1 m long and contained 5 embryos.

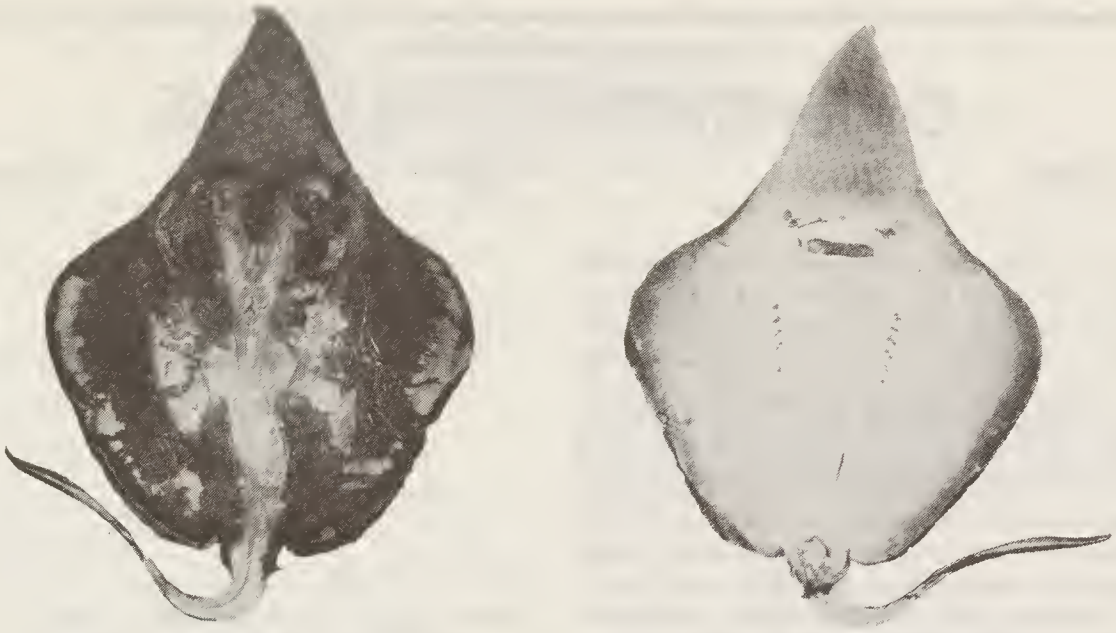
31.1 *Hexatrygon bickelli*
Heemstra & Smith, 1980

Sixgill stingray Seskief-pylstert

Hexatrygon bickelli Heemstra & Smith, 1980: 6, Figs. 1-15 (washed up on Summerstrand Beach, Port Elizabeth).

Teeth small, bluntly rounded, exposed when mouth closed and arranged in a quincunx with 62 series in upper and 66 in lower jaw. Spiral valve with 13 turns; 50 centra between first synarcual and cloaca and 51 from cloaca to base of tail spines. Ampullae of Lorenzini well developed, arranged in longitudinal rows on underside of snout.

Colour dorsally brown-black, but dorsal surface of snout pale brownish; disc white ventrally with margins of disc blackish and blackish streaks between nostrils and mouth, ventral surface of snout translucent and flesh coloured; tail black. The small eyes, the flaccid body, thin black skin on dorsal surface and presence of alkyldiglyceride in the liver oil indicate a deep-sea habitat. The holotype of *H. bickelli* was discovered by Mr Dave Bickell in almost perfect condition, washed up on a Port Elizabeth beach. It is a female of disc length 64 cm, greatest width 50 cm and total length 105 cm.



31.1 *Hexatrygon bickelli:* 50 cm wide female holotype (Algoa Bay). Dorsal and ventral views.

Subclass HOLOCEPHALI

Order CHIMAERIFORMES

by L.J.V. Compagno

Chimaeras **Chimaeras**

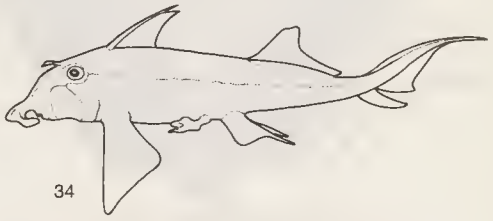
Cartilaginous fishes with a single external gill opening on each side; gills hidden by a soft operculum or gill cover. Teeth fused into three pairs of continuously growing tooth plates, two in upper jaw and one in lower. Upper jaw fused to skull; hyoid arch not involved in suspension of jaws. In addition to paired intromittent organs or claspers on the pelvic fins, adult males have a doorknocker-like frontal tenaculum or head clasper on the forehead and a pair of prepelvic claspers in front of the pelvic fins; the prepelvic and head claspers are used to grasp the female during copulation. Lateral-line canals superficial on skin, readily visible on head and body. First dorsal fin erectile, with a strong, mildly toxic spine. Development oviparous, large eggs enclosed in spindle-shaped egg-cases and deposited on substrate.

Chimaeras are delicate, slow-moving bottom fishes, mostly found in deep water on upper continental or insular slopes down to at least 2 600 m; some species occur in shallow water. Chimaeras use their large, fan-like pectoral fins for propulsion: they feed on small fishes and bottom invertebrates. Found in all oceans except polar seas, but close to land and not pelagic. Callorhinchids are common in trawl catches and occasionally landed by anglers.

Three living families, all three occur in our area.

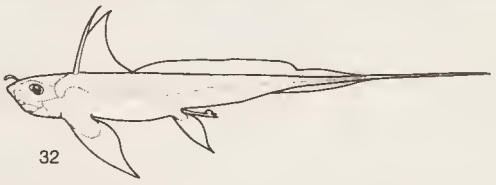
KEY TO FAMILIES

1a Snout with recurved, hoe-shaped projection; second dorsal fin short, high and falcate; caudal fin with a raised axis ..... CALLORHINCHIDAE (No. 34)



1b Snout straight, not hoe-like; second dorsal fin long and low, not falcate; caudal fin with a horizontal axis 2

2a Snout short and bluntly pointed ..... CHIMAERIDAE (No. 32)



2b Snout very long, acutely pointed ..... RHINOCHIMAERIDAE (No. 33)

Family No. 32: CHIMAERIDAE

by L.J.V. Compagno

Chimaeras **Chimaeras**

Snout short and bluntly pointed. First dorsal fin erectile, with a strong, curved or nearly straight, serrate or smooth spine; second dorsal fin long and low, caudal fin with a horizontal axis; a small, low, long-based anal fin present or absent. Egg-cases spindle-shaped, with or without narrow flanges.

Worldwide in temperate to tropical waters, mostly below 200 m, but some species close inshore at high latitudes; tropical species in deep, cold water. Two genera, both in our area.

KEY TO GENERA

1a Anal fin present ..... *Chimaera*
1b Anal fin absent ..... *Hydrolagus*

Genus *Chimaera* Linnaeus, 1758

Six species, 1 in our area.

32.1 *Chimaera monstrosa* Linnaeus, 1758

Chimaera Chimaera

Chimaera monstrosa Linnaeus, 1758: 236 (Atlantic); Dumeril, 1865: 686 (Cape of Good Hope); Smith, **SFSA No. 93.**

LL wavy; C with long filament.

Body silvery with brownish markings. Attains 152 cm. Eastern Atlantic and Mediterranean Sea, off Cape Province in 91 - 1 097 m.

32.1 *Chimaera monstrosa:* (redrawn after von Wright et al., 1895).

Genus ***Hydrolagus*** Gill, 1863

Fifteen or more species, 2 in our area.

KEY TO SPECIES

1a D spine longer than head from snout tip to gill opening; LL nearly straight, not dipping markedly below 1st D; colour dark brown ..... *H. africanus*

1b D spine slightly shorter than head; LL wavy, with a noticeable dip under 1st D; colour greyish ..... *H.* sp.

32.2 *Hydrolagus africanus*
(Gilchrist, 1922)

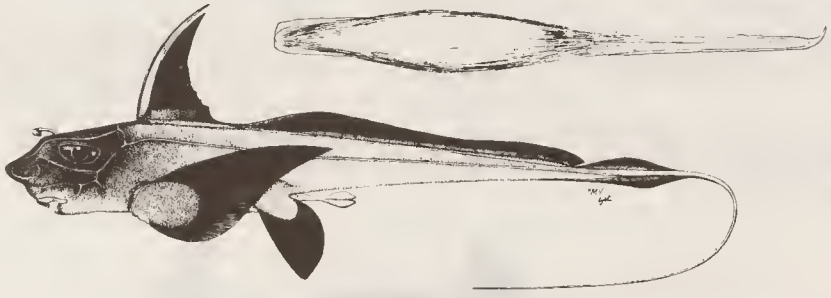
African chimaera Afrikaanse chimaera

Chimaera africana Gilchrist, 1922: 51, Pl. 8 (Natal); Smith, **SFSA No. 94*.** *Hydrolagus africanus:* Smith, 1968: 3*; Karrer, 1973: 201.

Colour blackish brown. Attains at least 67 cm, adults to 40 cm from snout to end of 2nd D. Known only from off Natal and Kenya, 421 - 750 m depth. Rare, more specimens wanted.

32.3 *Hydrolagus* sp.

Colour grey-brown. Length of adolescent female 41 cm to end of C (filament broken off), 35 cm to end of 2nd D. One specimen taken off Durban; close to *H. alberti* Bigelow & Schroeder, 1951 (from Gulf of Mexico) but possibly not conspecific. More specimens wanted.



32.2 *Hydrolagus africanus:* 35 cm to rear of 2nd D, male (Durban); top: egg-case.

32.3 *Hydrolagus sp.:* 42 cm to rear of 2nd D, male (Durban).

Family No. 33: RHINOCHIMAERIDAE

by L.J.V. Compagno

Longnose chimaeras **Langneus-chimaeras**

Snout elongated into a cylindrical or flattened, pointed projection, not hoe-like. First dorsal fin erectile, with a strong, smooth or serrate spine; second dorsal fin long, low and not falcate; caudal fin with horizontal axis; anal fin high and narrow-based or absent. Egg-cases spindle-shaped, with broad filamentous horizontal flanges. Peculiar deep-water chimaeras found at scattered localities worldwide in temperate to tropical seas, in 200 to more than 2 000 m. Three genera, all in our area.

KEY TO GENERA

1a Anal fin present ..... *Neoharriotta*
1b No anal fin 2

2a Dorsal profile of head nearly straight; mouth in front of eye; tooth plates narrow, sharp-edged and smooth ..... *Rhinochimaera*
2b Dorsal profile of head arched; mouth below eyes; tooth plates broad, blunt-edged and ridged ..... *Harriotta*

Genus ***Harriotta*** Goode & Bean, 1895

Two species, 1 in our area; *H. haeckeli* Karrer, 1972 occurs in the North Atlantic.

33.1 *Harriotta raleighana*
Goode & Bean, 1895

Harriotta raleighana Goode & Bean, 1895: 472, Pl. 19 (Atlantic coast of U.S.A.); Bigelow & Schroeder, 1953: 551*; Smith, **SFSA No. 96;** Karrer, 1973: 217; Shcherbachev, 1978: 8.

P short and broad; D spine serrate. Snout slender and tuberculate in adults. No denticles on C of adult males. Frontal clasper small in males.

Colour uniform chocolate brown. Attains 1 m. Off western Cape in 1 100 m; also Brazil, North Atlantic, eastern and western Pacific. Rare, more specimens wanted.

Genus ***Neoharriotta*** Bigelow & Schroeder, 1953

Two species, 1 in our area.

33.2 *Neoharriotta pinnata*
(Schnakenbeck, 1931)

Harriotta pinnata Schnakenbeck, 1931: 309, Figs. 6, 7 & 8 (Walvis Bay); Poll, 1951: 144*. *Neoharriotta pinnata:* Bigelow & Schroeder, 1953: 550*; Smith, 1953: 78, **No. 97*;** 1965: 14*; Karrer, 1973: 217.

P short and broad; D spine serrated. Snout moderately slender in adults, not tuberculate. No denticles on C of adult males. Frontal clasper very large in males.

Colour uniform chocolate brown. Attains about 128 cm. Gulf of Guinea to Walvis Bay in 200 - 470 m.

Genus ***Rhinochimaera*** Garman, 1901

Two species, 1 in our area.

33.3 *Rhinochimaera atlantica*
Holt & Byrne, 1909

Rhinochimaera atlantica Holt & Byrne, 1909: 279 (Ireland); Bigelow & Schroeder, 1954: 72*; Penrith, 1969: 66; Scherbachev, 1978: 8.

33.1 *Harriotta raleighana:* juvenile male (redrawn after Bigelow & Schroeder, 1953).

33.2 *Neoharriotta pinnata:* 75.5 cm to rear of 2nd D, male (Natal).

33.3 *Rhinochimaera atlantica:* 113 cm male (redrawn after Bigelow & Schroeder, 1954).

P long and narrow; D spine smooth. Snout moderately slender in adults, not tuberculated. Dorsal margin of C thickened in adults, with series of enlarged denticles in males. Adult males with small frontal clasper.

Colour uniform chocolate brown. Attains about 131 cm. From Lüderitz to Natal in 549 - 1 100 m; also scattered records in North Atlantic. Rare, more specimens wanted.

Family No. 34: CALLORHINCHIDAE

by L.J.V. Compagno

Elephantfish **Josef**

Snout elongated into a flattened, hoe-like projection. First dorsal fin erectile, with a strong, curved, serrate spine; second dorsal fin higher anteriorly, its base about equal to distance from first dorsal fin; caudal fin with a raised axis; anal fin high, the base narrow and adjoining caudal fin. Egg-cases spindle-shaped, with broad horizontal flanges.

Bizarre, unmistakable fishes confined to cooler waters off southern Australia, New Zealand, southern Africa and South America; caught close inshore to over 200 m. One genus, *Callorhinchus* Lacepède, 1798 with few species, one in our area.

34.1 *Callorhinchus capensis*

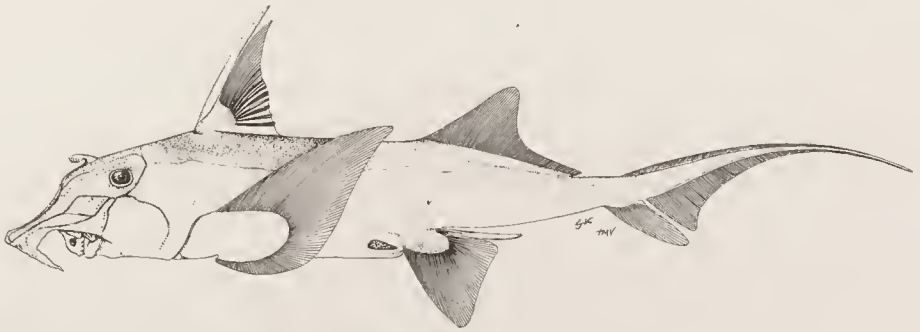
Dumeril, 1865

PLATE 5

Elephantfish Josef

Callorynchus capensis Duméril, 1865: 695, Pl. 13, Fig. 5 (Cape of Good Hope). *Callorhynchus antarcticus (non* Lay & Bennett): Schnackenbeck, 1931: 44. *Callorhynchus capensis:* Smith, **SFSA No. 95***; Poll, 1951: 151*; Smith & Smith, 1966: 35*; van der Elst, 1981: 33*.

Silvery with dusky brown markings, fins brown. Attains 122 cm. Confined to southern Africa, from Namibia to Natal; rare in warmer water. Common, inshore to 200 m. Often caught by trawls and beach seines, sometimes by hook, and sold commercially as "silver trumpeter". Flesh excellent especially when marinated, with no bones or scales to worry fastidious eaters and children. A closely related species is considered a great delicacy in Australia and New Zealand.



34.1 *Callorhinchus capensis:* 49 cm to rear of 2nd D, male (Algoa Bay).

Class
OSTEICHTHYES

Bony fishes

Beenvisse

The technical name "osteichthyes" means "bony fishes", and denotes the preponderance of bone in the skeleton of most species of this class. Most bony fishes are oviparous, with fertilisation external; exceptions to this rule in southern African waters are the Clinidae, Bythitidae and a few other deep-sea fishes, which are viviparous, with internal fertilisation. Except for a few species of the deep-sea eel Family Synaphobranchidae (which have a single median gill opening on the throat), bony fishes have a single gill opening on each side of the head.

The class comprises two subclasses: the Sarcopterygii (lobefin fishes) and the Actinopterygii (rayfin fishes).

Subclass SARCOPTERYGII

The Sarcopterygii includes the Crossopterygii (coelacanths plus four other groups of primitive fishes known only from fossils) and the lungfishes (Dipnoi). The lungfishes (3 families occurring in freshwaters of South America, tropical Africa and Australia, plus several fossil forms) are thought to be the nearest relatives of the amphibians (Rosen et al., 1981), or the sister-group of the crossopterygian ancestor of the amphibians (Wiley, 1979), or even a branch from the chondrichthyan stem (Jarvik, 1980).

Superorder CROSSOPTERYGII

Bony fishes with two dorsal fins, lobelike paired fins, 2 external nostrils and skull with an intracranial joint between the anterior and posterior parts of the cranium, allowing the front part to be elevated during feeding. Numerous genera and species are represented in the fossil record from the Lower Devonian (400 million years ago) to the end of the Cretaceous (70-80 million years) ago, when they were thought to have become extinct along with the dinosaurs and many other fossil groups. One group, the coelacanths (Actinistia) has evidently survived the Cretaceous Period to leave a living relic of this ancient group.

Order COELACANTHIFORMES

Coelacanths **Seelakante**

Notochord unconstricted (no vertebral centra are developed); snout with a pair of external nostrils on each side and a median rostral organ of unknown function; maxilla and median gular bone absent; caudal fin diphycercal, with notochord extending into the exserted midlateral lobe of the symmetrical tail.

The name "coelacanth" means "hollow spine", and refers to the "backbone" or spine – a tube of tough thick cartilage (called a notochord) filled with liquid. In the embryonic development of most fishes and other vertebrate animals, the notochord is replaced by bony centra which form the base for the vertebrae of the spinal column.

Four families, of which 3 have become extinct.

Family No. 35: LATIMERIIDAE

by Margaret M. Smith

Coelacanths **Seelakante**

Second dorsal, anal and paired fins fringed lobes; axial skeleton mainly cartilaginous; no ribs or branchiostegal rays. A single species.

35.1 *Latimeria chalumnae*
Smith, 1939
PLATE 9

Coelacanth Seelakant

Latimeria chalumnae Smith, 1939: 455, Fig. (southwest of East London in about 70 m); 1939: 47*; 1940: 1-106*; **SFSA No. 98*;** 1953: 279; Millot, 1953: 18*; Millot & Anthony, 1958: 2553-2597*; Smith et al., 1975: 1105* (embryo); McCosker & Lagios (ed.), 1979: 1-175*; Locket, 1980. *Malania anjouanae* Smith, 1953: 99, Fig. (Anjouan Id., Comores); **SFSA No. 98a*;** 1953: 279.

D VIII+30; A 27-31; P 29-32; V 29-33; C 25+38+21; GR represented by numerous different sized teeth; LL 76-82 + 15-23 on supplementary caudal; 2nd D, A, P and V all fringed lobes; gill opening edge tough skin, free from isthmus; gills 4, spinescent; tongue bony; intracranial joint present; teeth conical, of various lengths set in discrete bony plates that are attached to the bones of the jaws by dense fibrous ligaments; premaxilla cartilaginous, lower jaw with 2 overlapping gular plates not connected along midline. Opercular bones heavy, mostly external to skin, subopercle and interopercle large adapted scales; remaining skull bones light, covered by skin. Body robust, subquadrangular, covered with heavily armoured bony overlapping scales with only one third exposed.

Internal anatomy very primitive, especially the heart; swimbladder elongate, filled with fat; liver fatty; intestine with spiral valve; osmoregulation by retention of urea and trimethylamine oxide in the blood and secretions of the rectal gland; notochord, a large, thick-walled cartilaginous tube filled with liquid, supports the spinal cord. In the adult, the brain is incredibly small, occupying only about 0.01 of the cranial cavity. Male with 2, female with 4 external openings before A; ovoviviparous, gestation period probably about 13 months.

Colour: whole fish mauvish blue rapidly fading to brown; with numerous irregularly shaped white marks over body. It is almost impossible to age coelacanths by scale rings as they vary so much on a single specimen. The discovery of ovoviviparity has shown that coelacanths grow rapidly and are younger than originally estimated. Now it is suggested they reach 8-10 years, at which age they are about 200 cm in length and weigh some 60 kg; females are larger than males. Apart from the first specimen trawled off East London and despite intensive search, the remaining 100 or more specimens have been caught by hook and line, only off Grand Comoro and Anjouan Islands, Comoro group, the favourite bait being *Promethichthys prometheus,* a gempylid fish related to our snoek.

Flesh good, especially when marinated; the fact that it is not esteemed by the Comoro Islanders is probably due to the tropical temperatures causing oil from the fatty layer below the skin to percolate through the flesh, giving it a rancid flavour.

Experts are divided as to whether coelacanths are more closely related to sharks and rays than to bony fishes. The latter view is held here and they are placed in the Class Osteichthyes. A short history of the discovery of this remarkable fish (by many considered to be the closest relative to *Rhipidistia,* recognised as the ancestor of all land animals) follows:

On 22 December 1938 the Irvin & Johnson trawler *Nerine,* with Captain Goosen in charge, trawled the first live coelacanth known to scientists. Saved by Miss Courtenay-Latimer, the young curator of the East London Museum, it was recognised as a coelacanth by Professor J.L.B. Smith, who described and named it *Latimeria chalumnae* in honour of Miss Courtenay-Latimer and the river near where it was trawled. Unfortunately, the soft parts of the first specimen were discarded before they could be studied; consequently to obtain a second, intact specimen was of tremendous importance. By the late 1940s, there was little doubt that the East London coelacanth was a stray; and J.L.B. Smith deduced that the home of the coelacanth was to the north, in the Mozambique Channel. A pamphlet depicting a coelacanth and offering a reward resulted in one caught on 21 December 1952 off Anjouan Island, being saved for science by Captain Eric Hunt.

The South African Prime Minister, Dr D.F. Malan, arranged for a South African Air Force plane to take Professor Smith to the Comoro Islands to fetch the fish. A third coelacanth was caught in the same area during September 1953, and it and the next about 30 specimens went to France.

After the Comoro Islands gained independence, a large female coelacanth was offered to Professor Smith who asked that it be sent to America. Exchanged for $1 000 worth of medical drugs, it was eventually found by American scientists to contain five 32 cm long embryos, each with its depleted yolk-sac.

Even when they were considered to have become extinct about 70-80 million years ago, coelacanths were the longest lived vertebrate group. Today *Latimeria* is still probably the most sought after fish species; not only are scientists still working on its comparative anatomy, but much remains to be learned about the physiology, parasitology, biochemistry and behaviour of this fascinating fish.

35.1 *Latimeria chalumnae:* top: 155 cm male (Comoro Ids.); bottom: 32 cm unborn young with yolk sac attached to stomach.

Subclass ACTINOPTERYGII

Rayfin fishes — Straalvin-visse

With over 22 000 species, the Actinopterygii or rayfin fishes are the largest and most diverse group of vertebrate animals. Most species have two paired fins (pectoral and pelvic), one or more median dorsal fins on the back, a median anal fin on the ventral surface near the tail and a terminal tail or caudal fin. These fins are supported by bilaterally paired, segmented, horny soft-rays (lepidotrichia) or unsegmented spines. The spines are usually stiff and sharp, but in some fishes (e.g. blennies) the spines are soft and flexible. The fin spines are not bilaterally paired or segmented (jointed) like the soft-rays; another difference is that soft-rays are often branched, but spines are not. The internal skeletal supports of the median fins do not extend into the fins.

The Subclass Actinopterygii includes the advanced bony fishes (Infraclass Teleostei), several groups of fossil fishes of uncertain relationship, and four groups of primitive living fishes: the Cladistia (Family Polypteridae, freshwaters of tropical Africa), the Chondrostei (sturgeons and paddlefishes, northern hemisphere, mainly freshwaters), the Ginglymodi (Family Lepisosteidae, the gars of North American waters) and the Halecostomi (Family Amiidae, the bowfin of freshwaters in North America).

Subdivision TELEOSTEI

Teleosts — Teleosts

The teleosts or modern bony fishes are the largest and most diverse group of fishes. Comprising about 20 800 species (Nelson, 1984), the teleosts have radiated into every aquatic niche of our planet, from high mountain streams to the greatest depths of the oceans, from deep caves and tropical swamps to the polar seas. The tremendous diversity of size, body shape, fin development, feeding adaptations, eye structure, scale morphology, skeletal modifications, sound production, bioluminesence, production and detection of electrical currents, behaviour and reproduction is unparalleled among the vertebrates.

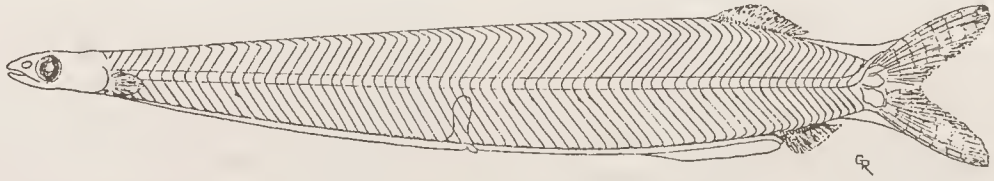
Teleosts are of great importance economically and as members of the aquatic ecosystems of the world. The most common food-fishes (sardines, anchovies, trout, bass, perch, tunas, mackerels, catfishes, snoek, gurnards, soles, etc.) are all teleosts.

Teleosts range in size from minute gobies that are adult at a length of 10 mm to the giant blue marlin, which reaches a length of 5 m and a mass of 820 kg.

The interrelationships of the teleost fishes are the subject of much recent and current research (Lauder & Liem, 1983), but we are still far from a definitive picture of the phylogeny of this incredibly diverse assemblage. Four major groups are currently (G. J. Nelson, 1973; Patterson & Rosen, 1977; Lauder & Liem, 1983; J. S. Nelson, 1984) recognised: Osteoglossomorpha (freshwater fishes, generally regarded as the most primitive of the teleosts), Elopomorpha, Clupeomorpha and the Euteleostei.

Infradivision ELOPOMORPHA

Primitive teleosts in which the angular and retroarticular bones of the lower jaw are fused, the rostral and prenasal ossicles are present; and there is a unique, elongate, compressed larval form known as a "leptocephalus" (Nelson, 1973; Patterson & Rosen, 1977; Greenwood, 1977). Three orders of elopomorph fishes are here recognised: Elopiformes, Anguilliformes and the Notacanthiformes. Some authors (Nelson, 1973; Greenwood, 1977) put the Albulidae in an order (Albuliformes) with the halosaurs and notacanths, which is then combined with the eels (Anguilliformes) to form the Superorder Anguillomorpha.



Elopid leptocephalus larva, 34 mm SL (*Elops* sp. from Angola; after Richards, 1969).

Order ELOPIFORMES

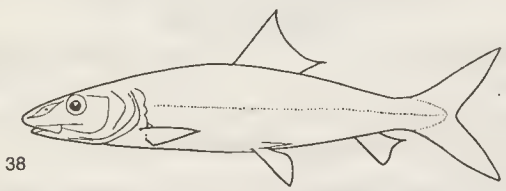
Body elongate; pelvic fins abdominal; gill-openings unrestricted; scales cycloid; no fin spines; paired fins with a long narrow axillary scale; no dorsal adipose fin; parasphenoid bone (on roof of mouth) with teeth; leptocephalus (and adult) with a forked caudal fin.

Three families are here recognised: Elopidae, Megalopidae and Albulidae.

KEY TO FAMILIES

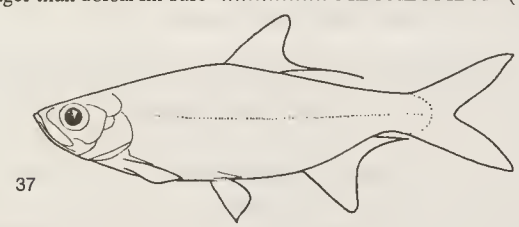
1a Mouth terminal; median gular bone between dentary bones present; upper jaw reaching well past eye 2

1b Mouth subterminal, the snout and upper jaw projecting in front of lower jaw; no median gular bone on underside of lower jaw; upper jaw not reaching eye ..... ALBULIDAE (No. 38)



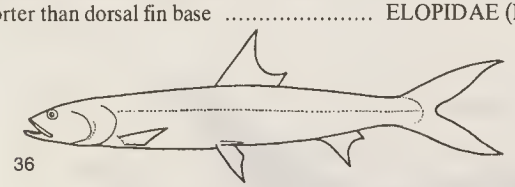
38

2a Body distinctly compressed; scales large, 36-40 in lateral line; anal fin base much longer than dorsal fin base ..... MEGALOPIDAE (No. 37)



37

2b Body round or oval in cross-section; scales small, 72-103 in lateral line; anal fin base slightly shorter than dorsal fin base ..... ELOPIDAE (No. 36)



36

Family No. 36: ELOPIDAE

by M.M. Smith

Ladyfishes **Springers**

Body elongate, oval in cross-section; mouth terminal; a median gular bone on underside of chin; adipose eyelids present; branchiostegal rays up to 30 or more. Bands of fine teeth on jaws and palate bones. Scales small, and lateral line present; a single dorsal fin about midway along body and well before anal fin; dorsal fin base longer than anal fin base; pectoral fins inserted low down on body, pelvic fins inserted below or behind dorsal fin origin; no fin spines. Tropical and warm temperate marine fish, but enter estuaries and can tolerate fresh water; free-swimming predators with planktonic young that use shallow coastal areas and estuaries as nursery areas.

Genus ***Elops*** Linnaeus, 1758

In the original *Sea Fishes of Southern Africa* all *Elops* species were considered to be one widely distributed species. Whitehead (1962) recognises 6 species, 2 in our area.

KEY TO SPECIES

1a Lower GR 17-19; LL 72-83; vertebrae 72-74 ..... *E. lacerta*

1b Lower GR 13-15; LL 90-103; vertebrae 63-66 ..... *E. machnata*

36.1 *Elops lacerta*

Valenciennes, 1846

Atlantic ladyfish Atlantiese springer

Elops lacerta Valenciennes, *in* Cuv. & Val., 1846: 275, Pl. 541 (Senegal); Whitehead, 1981: Elop. 3*.

D 21-23; A 17-19; GR (9+17)-19; LS 74-83; branchiostegal rays 24-26.

Similar in appearance to *E. machnata*. Attains 90 cm. Reported by Whitehead (1981) to occur along the west African coast to at least 23°S.

36.2 *Elops machnata*

(Forsskål, 1775)

PLATE 9

Ladyfish Springer

Argentina machnata Forsskål, 1775: 68 (Djiddae = Jiddah, Red Sea). *Elops saurus (non* Linnaeus): Smith, **SFSA No. 100***. *Elops machnata:* Smith & Smith, 1966: 70*; Fraser, 1973: 1; van der Elst, 1981: 166*.

Diagnosis given from 39 southern African specimens (Fraser, 1973): D 22-27; A 15-18; P 17-18; GR (7-9)+(13-15) depending on size, as in some juveniles some rudiments have not yet developed, but by 60 cm TL all rudiments have grown into rakers. LL 90-103; total vertebrae 63-66; branchiostegal rays 27-36. Body depth 12-19, head length 21-23, snout length 4-7, eye diameter 3-7, upper jaw length 11-16 and lower jaw length 11-17 (all % of SL).

36.2 *Elops machnata:* 75 cm (off Maputo).

E. machnata grows larger than the Atlantic *E. saurus* and attains about 1 m. Mossel Bay in South Africa, to the Red Sea and India, possibly to western Pacific. One of the best-known angling fishes as it fights gamely and jumps repeatedly so that skill is required, and even then two out of three fish escape. The bait is generally flesh (fish or squid) or shrimp/prawn; lures are also used. In the southern Cape caught in late summer, often well up tidal rivers and late at night; in Natal frequently caught from the shore. In Mozambique large breeding shoals congregate during winter; the larvae resemble transparent eel leptocephali but have a forked tail. Flesh rather insipid and full of fine bones; pressure cooking however softens the bones so the fish can be minced to make a palatable dish.

Family No. 37: MEGALOPIDAE

by M.M. Smith

Tarpons **Tarponne**

Mouth superior, lower jaw projecting; a median gular bone on underside of chin; anal fin base much longer than dorsal fin base. A single genus, *Megalops* Lacepède, 1803 with 2 species; sometimes placed in the Elopidae with which it shares a leptocephalus larvae. These elongate, transparent larvae differ from eel leptocephali by having forked tails; leptocephali of both *Elops* and *Megalops* (as well as those of eels) shrink when metamorphosing to the juvenile form. Megalopids differ from elopids externally in having much larger scales, a deeper body and the last dorsal ray considerably elongated. *Megalops atlanticus* Valenciennes, the famous angling fish known as the tarpon of North America and tropical west Africa, grows to a much larger size, attaining 128 kg and about 2 m.

37.1 *Megalops cyprinoides*

(Broussonet, 1782)

Oxeye tarpon Osoog-tarpon

Clupea cyprinoides Broussonet, 1782: Pl. 9 (no pagination; Tanna Ids. New Hebrides). *Megalops cyprinoides:* Smith, **SFSA No. 101*;** van der Elst, 1981: 213*.

D 17-20; A 24-31, last ray slightly elongated; P 15-16; V 10-11; GR (15-17)+(30-35) long, lanceolate; LL 36-40, the tubes with 3 or 4 branches; branchiostegals 23-27; vertebrae 67 or 68; interorbital less than eye; adipose tissue covers eyes; no teeth in jaws.

A silvery, solitary, swift-swimming, predatory fish, takes a spoon readily, and eagerly sought by anglers because of its fighting qualities; prefers quiet waters of mangrove swamps and estuaries; frequently found in isolated freshwater lakes and up rivers many miles from the sea. Reaches at least 1 m in length. Tropical Indo-West Pacific to Natal, with odd strays reaching Algoa Bay. Flesh not esteemed, very bony.

37.1 *Megalops cyprinoides:* 44 cm (Mahé, Seychelles).

38.1 *Albula vulpes:* 90 cm (Port Alfred).

Family No. 38 : ALBULIDAE

by M.M. Smith

Bonefishes **Beenvisse**

Immediately recognisable by the inferior mouth below the bluntly conical snout, single dorsal fin of soft-rays only, low pectoral fin and anal fin far back. Elongate cylindrical bodies with silvery cycloid scales, head naked; chin with a small bony gular plate; 4-5 rows of minute teeth in each jaw and crushing teeth in throat. Pelvic fin of 10-14 rays. Larval fishes are thin, transparent, ribbon-like leptocephali.

Three genera, 2 in our area.

KEY TO GENERA

1a D short, less than 20 rays ..... *Albula*
1b D long, more than 50 rays ..... *Pterothrissus*

Genus ***Albula*** Scopoli, 1777

Until recently *Albula vulpes* was considered to be a single wide-ranging tropical species. Recent work by Dr Shacklee using protein analysis indicates that there may be 5 or more distinct species (Shacklee & Tamaru, 1981). It is possible that our species is not *A. vulpes* but *A. glossodonta* (Forsskål, 1775) from the Red Sea or *A. bananus* (Lacepède, 1803), no locality, possibly Mauritius.

38.1 *Albula vulpes*
(Linnaeus, 1758)

Bonefish Beenvis

Esox vulpes Linnaeus, 1758: 313 (Bahama Ids.). *Albula vulpes:* Smith, **SFSA No. 99*;** Poll, 1953: 13*; van der Elst, 1981: 101*.

D 15-19; A 7-9; P 17; V 9-10; GR (8-10)+(8-12) low tubercles; LL 62-75. Depth 4.0-5.5. Eye equal to or slightly less than interorbital. Adipose eyelids present. P & V axillary scales present. A single long scale each side of membrane between each ray of D & A.

Brilliant silvery fish with dusky fins and yellow at base of P. Tropical seas, south to Algoa Bay. Attains at least 100 cm; largest known specimens are caught in Natal waters. Occurs singly or in small groups in shallow water over sandy areas or mangrove swamps. Spawns throughout the year in deeper water of tropical and subtropical areas. Although a fine gamefish, its flesh has too many fine bones to be esteemed.

Genus ***Pterothrissus*** Hilgendorf, 1877

One species on our west coast, another, *P. gissu* Hildendorf, 1877, from Japan which differs in D originating over middle of P. Mouth small, maxilla does not reach to below front of eye; recurved teeth in fine band in each jaw becoming a single series of about 12 widely spaced fine sharp teeth posteriorly in upper jaw.

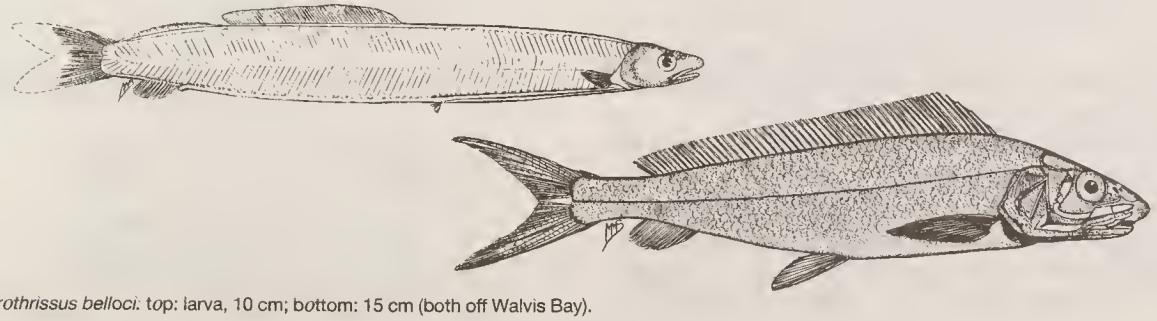
38.2 *Pterothrissus belloci*
Cadenat, 1937

Longfin bonefish Langvin-beenvis

Pterothrissus belloci Cadenat, 1937: 443* (Senegal); Poll, 1953: 16*; Talbot, 1960: 257; Smith, 1961: 565, **No. 99a;** 1965: 14*; 1966: 57; 1966: 65*; Karrer, 1973: 202.

D 51-59; A 12-14; P 15-16; V 10; LL 85-90; GR (4-8)+(12-15) enveloped in membrane, apices free; depth 4.8-5.0; eye 1.2 in interorbital.

Colour preserved: uniform yellowish grey, fins light, tips of C lobes dusky. Attains 35 cm. West Africa, common off Guinea and Senegal, reaches Sandwich Harbour south of Walvis Bay, in 20 - 250 m. Leptocephalus larvae have been found off Walvis Bay, indicating a possible breeding area, maybe in deeper water.



38.2 *Pterothrissus belloci:* top: larva, 10 cm; bottom: 15 cm (both off Walvis Bay).

Order ANGUILLIFORMES

Introduction and Key to Families by P.H.J. Castle

Eels **Palings**

Eels are long-bodied, snake-like fishes with low dorsal and anal fins (absent in a few species) generally long, continuous with caudal fin and supported by soft-rays; gill openings restricted to a slit or hole on each side (on underside of head in some species); pelvic fins absent. No spines in fins. Scales usually absent; if present they are small and embedded in the skin. Pectoral fins absent in many eel groups, and the median fins are sometimes reduced or absent, especially in burrowing species.

These structural features are associated with a crevice-dwelling or sediment-burrowing mode of life, although some eels are pelagic in the open ocean. Generally good swimmers, most eels are rather sedentary and rely on a well-developed sense of smell and large teeth to capture food, mainly crustaceans and small fishes.

Although they occur in all parts of the ocean, eels are more typical of warm waters and are abundant on coral reefs, where they are greatly diverse: there are some 100 genera and about 250 species in the western Indian Ocean, with 52 genera and 101 species in the waters of southern Africa. Perhaps the most familiar of these are freshwater eels (Anguillidae) and the many species of morays (Muraenidae).

All eels, even the freshwater species, breed in the open ocean and spend their early lives in the upper waters as flat, transparent, delicate larvae (leptocephali) which look quite unlike their adults.

A few species grow quite large (the largest being the slender giant moray, *Thyrsoidea macrura*, at 4 m), but most eels are moderate to small-sized fishes. Some, including the freshwater species, make good eating, but eels are not generally regarded as food-fish. Indeed, the flesh of some morays can be poisonous in certain circumstances, but poisoning in this way has not been recorded in southern Africa. Morays and other eels, especially large ones, can be dangerous when cornered, and can inflict nasty wounds with their sharp teeth, but their bite is not in itself venomous. It is foolish to probe with the hands into rocky or coral crevices where morays abound, or to attempt to spear large individuals. An unpleasant experience is likely!

This large and diverse group of fishes is divided into 16 families of which 13 occur in southern Africa. As might be expected of a group in which there has been reduction and convergence in many external features, identification of eels is often not easy. Body proportions, presence or absence of fins, position of fin origins, nature of nostrils and gill openings and number of vertebrae are some of the features by which different species are distinguished. The extended pelagic life as a leptocephalus favours wide dispersal of species, and many of our eels are known throughout the Indo-Pacific. For this reason, continuing additions to our eel fauna are to be expected as their special habitat is explored and collected more fully by scientists and divers, especially offshore in deep water and along the coast of Natal and Mozambique.

KEY TO EEL FAMILIES
(Southern African representatives only)

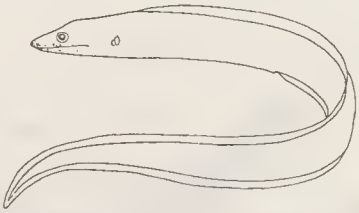
1a LL pores reduced to 1-5 above and before gill opening; gill openings lateral slits or holes; head profile moderately arched above and behind eye 2

1b LL pores present, though sometimes minute, covered with mucus or restricted to front part of body; gill openings semicircular slits that are lateral, ventrolateral, ventral or even confluent below throat; head profile gently sloping, weakly arched above and behind eye 3

2a Rear nostril a simple hole or tube near anterodorsal edge of eye; P absent . MURAENIDAE (No. 41)

41

2b Rear nostril opening ventrally through upper lip, covered by a flap; P present or absent ..... XENOCONGRIDAE (No. 43)



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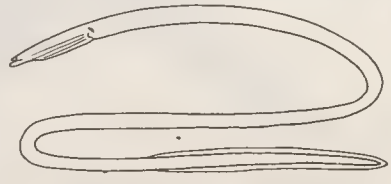
3a A origin well behind anus ..... MORINGUIDAE (No. 44)



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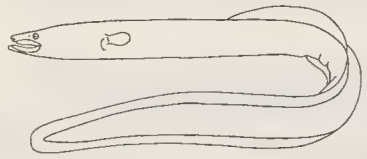
3b A origin immediately behind anus 4

4a Lips thick; P present; adults and large juveniles with minute, embedded scales (not visible until mucus is scraped off skin) ..... ANGUILLIDAE (No. 39)

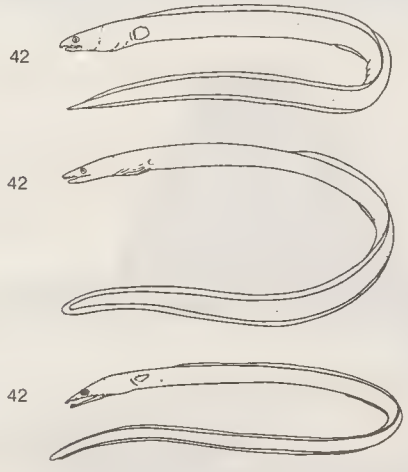


4b Lips relatively thin (except *Conger*); P and scales present or absent 5

5a Rear nostrils on midlateral part of snout just before eye; P present; gill openings ventrolateral and oblique, ventral and horizontal, or confluent midventrally ..... SYNAPHOBRANCHIDAE (No. 46)

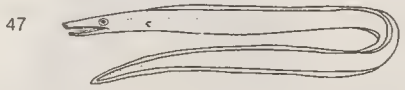
5b Rear nostrils not close to eye; gill openings lateral, wide or restricted (if gill openings are ventral, then P & C are absent) 6

6a One, median, frontal sensory pore between rear edges of eyes; D & A end before C tip or, if C present, rear nostrils a valve-like flap below eye ..... OPHICHTHIDAE (No. 42)



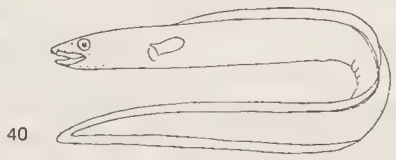
6b No median frontal pore; D & A continuous with C 7

7a P absent; rear nostril either near anterodorsal edge of eye or medial to its posterodorsal edge ..... NETTASTOMATIDAE (No. 47)



7b P present, sometimes reduced; rear nostril on snout level with middle of eye or somewhat below 8

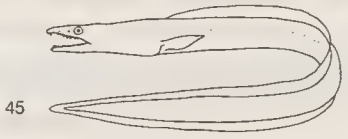
8a Snout not much longer than eye diameter ..... CONGRIDAE (No. 40)



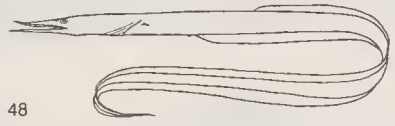
8b Snout length much greater than eye diameter (except *Derichthys*) 9

9a Vomerine teeth prominent, blade-like, in one row 10
9b Vomerine teeth insignificant, in several rows 11

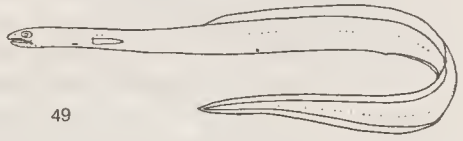
10a D origin over gill opening; P well developed ..... MURAENESOCIDAE (No. 45)



10b D origin behind anus; P a tiny inconspicuous flap ..... SERRIVOMERIDAE (No. 48)

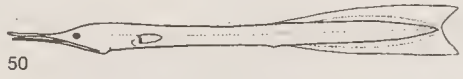


11a Snout and lower jaw blunt or only moderately produced forwards; premaxillary-ethmoid teeth in a broad, flat plate ..... DERICHTHYIDAE (No. 49)

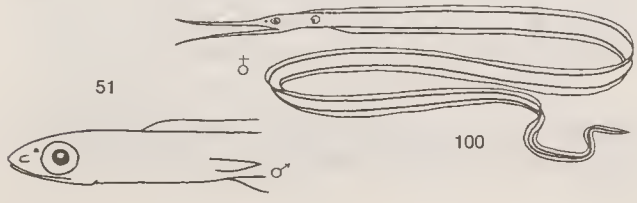


11b Snout and lower jaw elongated, beak-like, tips of beak typically curved apart; premaxillary-ethmoid teeth in a long narrow patch on underside of beak 12

12a Body short, truncated, arrow-like ..... CYEMIDAE (No. 50)



12b Body elongated, delicate, even filamentous ..... NEMICHTHYIDAE (No. 51)



Family No. 39: ANGUILLIDAE

by P.H.J. Castle

Freshwater eels **Varswaterpalings**

Body robust; tail compressed. Small embedded scales present, but not developed in juveniles. Pectoral fins present. Dorsal fin origin about midway between pectoral base and anus, or about over anus; median fins continuous around tail. Mouth reaching to or below rear edge of eye; lips thick; teeth small, in bands on jaws and vomer. Lateral line complete, but pores very small.

Juveniles plain olive to black, lighter below, or mottled; adults silvery below, with eye enlarged. Some species attain 180 cm and a weight of 20 kg. Spawning occurs in the open ocean; after drifting in the surface waters for several weeks, the larvae (called leptocephali) are carried near shore where they metamorphose to the tiny, transparent glass eel stage and enter rivers on our south and east coasts during December-February. Once in freshwater, the glass eel becomes pigmented and is called an elver; the elvers migrate well up the rivers, and have been observed wriggling up wet vertical cliffs and dam walls. After 10-15 years in freshwater, the eels migrate to sea as adults to spawn far offshore and presumably die.

One genus, *Anguilla* Schrank, 1798 with 19 species and subspecies worldwide; 4 species in our area. A fifth species, *A. obscura* Günther, 1871, has been reported from the Buffalo River, Cape Province, from a single specimen (Jubb, 1957). It is "short-finned", having the dorsal origin just in front of the level of the anus and broad bands of teeth. It is therefore very like *A. bicolor bicolor* except that the specimen apparently had 103 vertebrae (compared with 106-115 in *A. bicolor bicolor).* It is possible that the specimen was misidentified, as the data can be interpreted differently. However, it is also possible, though highly unlikely, that *A. obscura* is present in very small numbers in the local eel population. Comprehensive taxonomic review by Ege (1939); Tesch (1977) has summarised the biology, fishery and culture of freshwater eels.

KEY TO SPECIES*

1a D origin above or just in front of anus ..... *A. bicolor bicolor*
1b D origin about midway between P base and anus 2

2a Body plain olive to brownish black above, lighter below; band of teeth on each jaw broad, without a toothless groove between innermost row and outer rows ..... *A. mossambica*
2b Body mottled with yellow and brown markings; band of teeth on each jaw narrow, with a toothless groove between inner row and outer rows 3

3a D origin nearer P base than anus ..... *A. marmorata*
3b D origin nearer anus than P base ..... *A. bengalensis labiata*

* Juveniles of the three "long-finned" species are difficult to identify because the body colour and the definitive pattern of teeth are late to develop.

39.1 *Anguilla bengalensis labiata*

(Peters, 1852)

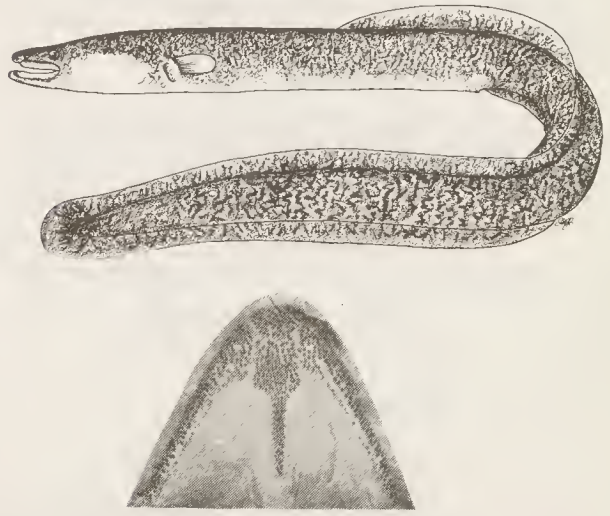
PLATE 7

African mottled eel — Afrikaanse bontpaling

Muraena (Anguilla) labiata Peters, 1852: 684 (Mozambique). *Anguilla labiata* Peters, 1868: 94*. *Anguilla nebulosa labiata:* Ege, 1939: 36*; Smith, 1961: 572; Jubb, 1961: 23*; 1967: 151*. *Muraena mossambica (non* Peters): Smith, **SFSA No. 1094** (in part).

Distance between verticals at D origin and anus 7-15% TL. Vomerine band of teeth narrows conspicuously before its mid-length. Vertebrae 107-115. *A. bengalensis bengalensis* (Gray), with slightly fewer vertebrae, is the Indian subspecies.

Olive-yellow mottled with greenish brown, lighter below. Attains 160 cm and 20 kg. Knysna to Kenya.



39.1 *Anguilla bengalensis labiata:* 43 cm; tooth pattern (after Jubb, 1967).

39.2 *Anguilla bicolor bicolor*

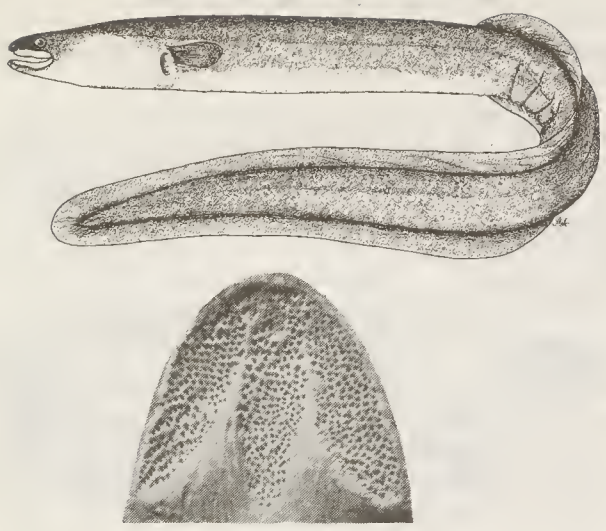
McClelland, 1844

Shortfin eel — Kortvin-paling

Anguilla bicolor McClelland, 1844: 178, Pl. 6, Fig. I (India). *Anguilla australis (non* Richardson): Barnard, 1925: 175. *Anguilla bicolor bicolor:* Ege, 1939: 152*; Smith, 1961: 572; Jubb, 1961: 24*; 1967: 153. *Muraena mossambica (non* Peters): Smith, **SFSA No. 1094** (in part).

D origin slightly before or after anus. Jaws and vomer typically with broad bands of closely packed teeth; vomerine band occasionally narrow posteriorly. Vertebrae 106-115. *A. bicolor pacifica* (Schmidt), with ca. 105-109 vertebrae, is the Pacific subspecies.

Olive to dark bluish-brown above, lighter below from jaw to anus. Attains 100 cm. Knysna to Kenya; Madagascar, Seychelles, Mauritius and India.



39.2 *Anguilla bicolor bicolor:* 44 cm; tooth pattern (after Jubb, 1967).

39.3 *Anguilla marmorata*

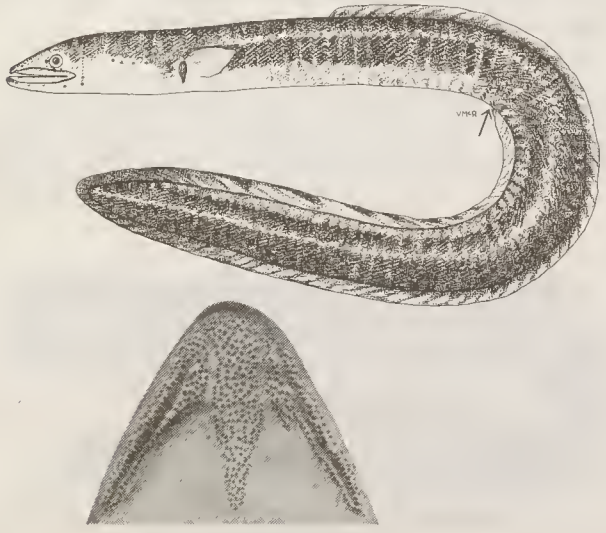
Quoy & Gaimard, 1824

Madagascar mottled eel — Madagaskar-bontpaling

Anguilla marmorata Quoy & Gaimard, 1824: 241, Pl. 51, Fig. 2 (West Irian, Indonesia); Ege, 1939: 36; Smith, 1961: 572; Jubb: 1961: 20*; 1967: 151. *Anguilla mauritiana* Bennett, 1831: 128 (Mauritius). *Muraena mossambica (non* Peters): Smith, **SFSA No. 1094** (in part).

Distance between verticals at D origin and anus 14-19% TL. Vomerine tooth band narrows conspicuously at its middle. Vertebrae 100-110.

Yellowish to olive or brown, mottled with dark greenish brown; lighter below. Attains 150 cm and 20 kg. Western Cape Province to Kenya; Madagascar, Mauritius to Japan and the Pacific.



39.3 *Anguilla marmorata:* 52 cm (Fish River Bridge), tooth pattern (after Jubb, 1967). Arrow indicates anus.

39.4 *Anguilla mossambica*

(Peters, 1852)

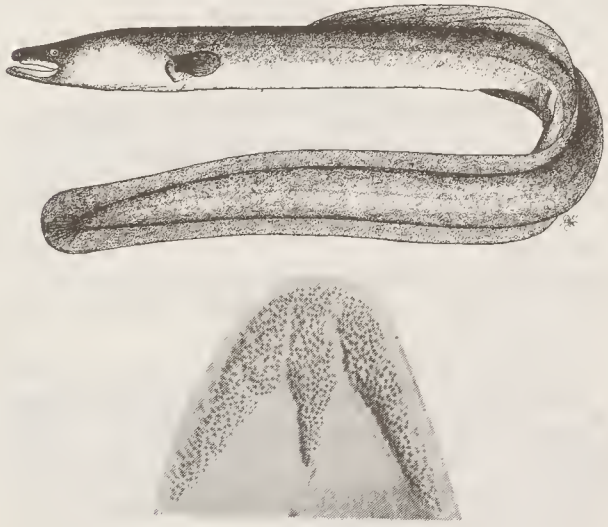
PLATE 7

Longfin eel — Geelbekpaling

Muraena (Anguilla) mossambica Peters, 1852: 684 (Mozambique); 1868: 98*. *Anguilla delalandi* Kaup, 1856: 50 (Great Fish River, Cape). *Anguilla mossambica:* Barnard, 1925: 175; Ege, 1939: 90*; Smith, 1961: 572; Jubb, 1961: 23*; Smith & Smith, 1966: 153*; Jubb, 1967: 153. *Muraena mossambica:* Smith, **SFSA No. 1094*** (in part).

Distance between verticals at D origin and anus 9-17% TL. Vomerine band of teeth rather narrow posteriorly. Vertebrae 100-106.

Olive to greyish black above, lighter below. Attains 120 cm or about 5 kg (females only, males much smaller). Known from most waters of the Cape northwards; east Africa, Madagascar and Mauritius.



39.4 *Anguilla mossambica:* 85.5 cm; tooth pattern (after Jubb, 1967).

Family No. 40: CONGRIDAE

by P.H.J. Castle

Conger eels; congers — **Seepalings**

Body long, tail compressed, often very narrow. Pectorals present. Dorsal origin over, before, or behind pectoral base; median fins continuous around tail. Mouth relatively small, often slightly inferior. Posterior nostril a simple hole before or below front edge of eye. Teeth typically small, sometimes prominent, uniserial to multiserial on jaws and vomer. Lateral line prominent, usually continuing onto head as obvious pores. No scales. Plain cream to black, usually lighter below, with median fins dark-edged.

Adults benthic from shore to deep water; larvae widespread and abundant in open ocean. Some species attain 120 cm and are good eating. All oceans, but nowhere

abundant enough to be commercially significant. About 30 genera worldwide, 9 in our area of which several need further study; 12 species in our area. Reviewed by Castle (1968).

KEY TO GENERA

1a Tail shorter than head and trunk combined ..... *Coloconger*
1b Tail longer than head and trunk combined 2

2a Posterior nostril a slit below front edge of eye ..... *Bathymyrus*
2b Posterior nostril in front of middle of eye 3

3a Snout about equal to eye; tail slightly longer than head and trunk combined ..... *Ariosoma*
3b Snout longer than eye; tail considerably longer than head and trunk combined 4

4a Teeth in 2 rows on jaws, those in outer row longer, compressed, in contact to form a conspicuous cutting edge; thick lips present ..... *Conger*
4b Teeth in several rows on jaws, or if in 2 rows, the teeth not compressed or in contact and not forming a cutting edge 5

5a Upper jaw not projecting in front of lower; body flabby; gill opening an oval hole ..... *Bathyuroconger*
5b Upper jaw projecting in front of lower jaw; body firm; gill opening a near-vertical slit 6

6a Vomerine teeth in only a small cluster of 2-3 on front of palate ..... *Rhechias*
6b Vomerine teeth forming either a uniserial row or a multiserial patch 7

7a Vomerine teeth small, sharp, in a single row, extending far back on roof of mouth ..... *Uroconger*
7b Vomerine teeth in a multiserial patch 8

8a No obvious postorbital pores; epidermal papillae present over body surface ..... *Bassanago*
8a Postorbital pores present; no epidermal papillae ..... *Gnathophis*

Genus ***Ariosoma*** Swainson, 1838

About 10 species, 2 in our area. The Indo-Pacific species require further study and comparison before definitive names can be assigned.

KEY TO SPECIES

1a LL pores before anus 38-42; total vertebrae 114-117; D rays before anus 40-55; total D rays 146-178, A rays 119-135 ..... *A. scheelei*
1b LL pores before anus ca. 56; total vertebrae ca. 143; D rays before anus ca. 66; total D rays ca. 167; A rays ca. 110 ..... *A. mauritianum*

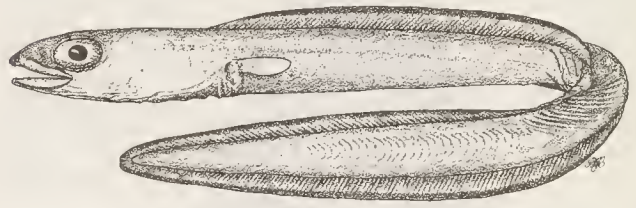
40.1 *Ariosoma mauritianum*
(Pappenheim, 1914)

Blunt-tooth conger — Stomptand-seepaling

Leptocephalus mauritianus Pappenheim, 1914: 189, Fig.8, Pl.10, Fig.2 (east of Madagascar, larval form). *Congermuraena anago (non* Temminck & Schlegel): Barnard, 1925: 190 (in part). *Ariosoma anago:* Smith, **SFSA No. 1112** (in part). *Ariosoma mauritianum:* Castle, 1968: 693*.

Head 6, depth 16. Teeth small, conical; triserial on upper jaw, biserial on lower; in a short, oval patch across front of upper jaws; and in a short, biserial patch on vomer. Upper lip with well-developed upturned flange, partly free above.

Brownish, median fins yellowish with black margin. Attains 30 cm. Occasionally taken by trawl off Natal (10 m) but probably more widespread; known widely in Indo-West Pacific.



40.1 *Ariosoma mauritianum:* 21.5 cm.

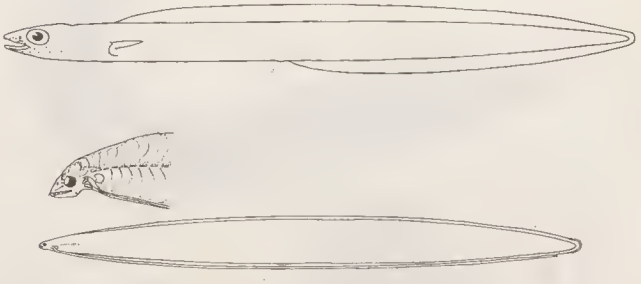
40.2 *Ariosoma scheelei*
(Stromman, 1896)

Tropical conger — Tropiese seepaling

Leptocephalus scheelei Stromman, 1896: 21, Pl.1, Figs. 6-7 (in part; Indonesian specimen and figure only, larval form). *Congermuraena anago (non* Temminck & Schlegel): Barnard, 1925: 190 (in part); Smith, **SFSA No. 1112** (in part). *Ariosoma scheelei:* Castle, 1968: 690*.

Head 5.5-6.5, depth 15-22. Teeth small, conical; biserial in upper and lower jaws; in a short, oval patch across front of upper jaws; biserial, becoming uniserial on vomer. Upper lip with well-developed upturned flange, partly free above.

Plain brownish olive, lighter below, median fins with black margin. Attains 20 cm. Occasionally taken by trawl off Natal and Mozambique and around reefs; known further north and widely in the Indo-Pacific.



40.2 *Ariosoma scheelei:* 17 cm female and larva (after Castle, 1968).

Genus ***Bassanago*** Whitley, 1948

At least 2 species; 1 in our area.

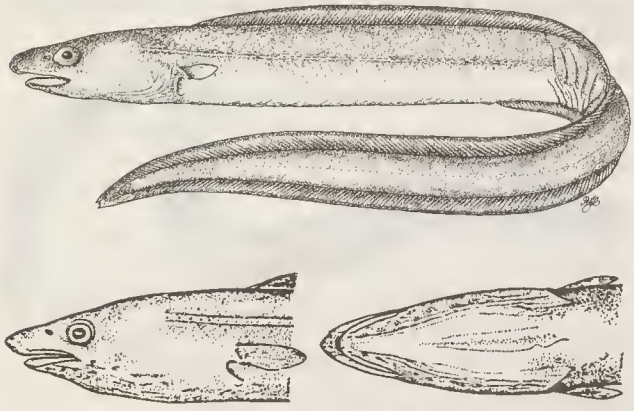
40.3 *Bassanago albescens*
(Barnard, 1923)

Hairy conger — Harige seepaling

Congermuraena albescens Barnard, 1923: 442 (off Cape Point); Barnard, 1925: 189*. *Ariosoma balearica (non* De la Roche): Smith, **SFSA No. 1113*.** *Ariosoma albescens:* Penrith, 1967: 538*. *Pseudoxenomystax albescens:* Castle, 1968: 704*.

A heavy-bodied eel with a rather fleshy snout and skin covered with epidermal papillae which give a distinctive "hairy" appearance to the body; head 6.4-7.1, depth 12-17. Teeth small, in several rows on jaws, in an oval patch on "inter-maxillary", exposed outside the mouth. LL pores subtubular. Vertebrae 168-172.

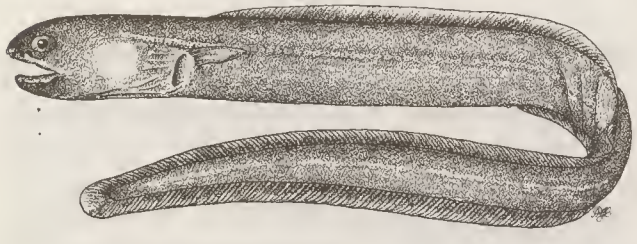
Creamish white, commonly purplish brown after preservation. Attains almost 100 cm. Common off Cape Point; a closely similar, possibly identical species *B. hirsutus* Castle, 1960 and a third *B. bulbiceps* Whitley, 1948 occur in Australasia; others are known from South America.



40.3 *Bassanago albescens:* 85 cm (after Castle, 1968) and head (after Cervigon et al., 1980).

Genus ***Bathymyrus*** Alcock, 1889

Three species; 1 in our area. *B. echinorhynchus* Alcock, 1889 from the northern Indian Ocean and *B. simus* Smith, 1965 from Vietnam, both with more prominent rostral teeth, are the only other species.



40.4 *Bathymyrus smithi:* 51 cm holotype.

40.4 *Bathymyrus smithi*
Castle, 1968

Bathymyrus smithi Castle, 1968: 2, Figs. 1 & 2 (Mozambique); Castle, 1968: 689*.

Head 7, depth 13.5-16.4. Snout short and blunt. Teeth small, uniserial in jaws, a few on front of vomer; "intermaxillary" (rostral) teeth sharp, in a narrow patch that curves up somewhat on front of snout. Vertebrae 150-155.

Greyish brown, lighter below, tips of fins black. Attains 58 cm. Taken by trawl off Limpopo River in 470 - 490 m, but probably more widespread.

Genus ***Bathyuroconger*** Fowler, 1934

Two species; 1 in our area.

40.5 *Bathyuroconger vicinus*
(Vaillant, 1888)

Uroconger vicinus Vaillant, 1888: 86, Pl.6, Figs. 1-1b (East Atlantic); Smith, **SFSA No. 1114;** Castle, 1968: 713*.

Head 8, depth 16. D origin over P tip. Teeth large and sharp, biserial on jaws, those in outer row larger; vomerine teeth few, large, in an anterior group; "intermaxillary" teeth few. Vertebrae 181-182.

Dark brownish black, median fins black. Attains 65 cm. Off Cape Point in 630 m; also from eastern tropical Atlantic.

40.5 *Bathyuroconger vicinus:* 32.5 cm.

Genus ***Coloconger*** Alcock, 1889

The position of *Coloconger* requires some clarification. Although it undoubtedly has congrid affinities, separate subfamily or even family status will probably be accorded to it. Four species, 1 in our area, but all require further study and detailed comparison. *C. raniceps* Alcock, 1889 from the northern Indian Ocean, with fewer vertebrae, is the only other Indo-Pacific species.

40.6 *Coloconger scholesi*
Chan, 1967

Coloconger scholesi Chan, 1967: 99, Figs. 1-14 (South China Sea); Castle, 1969: 6.

A drab, flabby-bodied eel with a large, rounded head; short, blunt snout; anus placed well behind mid-length. Head about 5; depth about 8. Teeth minute, more or less uniserial on jaws, only a few on "intermaxillary". LL pores tubular. Vertebrae 142-157.

Dark blackish brown but integument readily damaged. Attains 51 cm. Natal and southern Mozambique in deep water, but probably much more widespread; also South China Sea and east Australia.

40.6 *Coloconger scholesi:* 39 cm.

Genus ***Conger*** Oken, 1817

About 15 species; 2 in our area.

KEY TO SPECIES

1a D origin over anterior half of P; a sensory pore behind and above angle of mouth ..... *C. cinereus cinereus*

1b D origin over P tip or farther back; a sensory pore behind and in line with angle of mouth ..... *C. wilsoni*

40.7 *Conger cinereus cinereus*

Rüppell, 1830

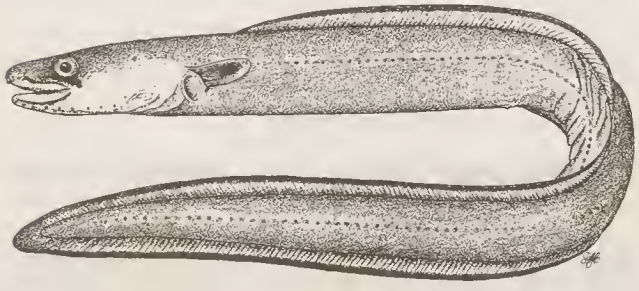
PLATE 7

Blackedged conger — Swartrand-seepaling

Conger cinereus Rüppell, 1830: 115, Pl.29, Fig.1 (Red Sea); Barnard, 1925: 188; Smith, **SFSA No. 1111*.** *Conger cinereus cinereus:* Kanazawa, 1958: 234*; Castle, 1968: 699*.

Head 7.8-8.2, depth 17-23; LL 37-41 pores before anus. Inner row of teeth in jaws indistinct. Vertebrae 141-148.

Brownish grey, yellow below and on fins, median fins with a narrow black edge, a conspicuous black patch on lower rear edge of eye and on P; young specimens often a gleaming gold or show dark, vertical bars on body. Attains 103 cm. Common among coral and coral rubble throughout western Indian Ocean, with odd specimens reaching Knysna; from shore out to 30 m. The only species of *Conger* with a sensory pore above angle of mouth.



40.7 *Conger cinereus cinereus:* 43 cm.

40.8 *Conger wilsoni*

(Bloch & Schneider, 1801)

Cape conger — Kaapse seepaling

Gymnothorax wilsoni Bloch & Schneider, 1801: 529 (Australia). *Conger vulgaris (non* Cuvier): Barnard, 1925: 188. *Conger conger (non* Linnaeus): Smith, **SFSA No. 1110*.** *Conger jordani:* Smith & Smith, 1966: 138*. *Conger wilsoni:* Castle, 1968: 696*.

Head 7.0-8.2, depth 15-20; LL 37-40 pores before anus. Teeth increase in number with age. Vertebrae 140-142.

Brownish grey above, creamy white below, median fins with a wide dusky margin. Attains 150 cm. Cape to southern Mozambique in estuaries or from shore out to 30 m; also in Australasia and possibly Japan. Flesh excellent. "A dangerous fish. Large congers are much dreaded as they are difficult to kill and most vicious, and many a fisherman has been seriously mutilated. A large live conger hauled into a small boat in a rough sea by an inexperienced amateur created a situation full of intense action" (J.L.B. Smith, **SFSA** p.392).

40.8 *Conger wilsoni:* 60 cm (Knysna estuary) and larva.

Genus ***Gnathophis*** Kaup, 1860

About 10 species; 2 in our area.

KEY TO SPECIES

1a LL pores (+ vertebrae) fewer than 127; D rays fewer than 200 ..... *G. habenatus*

1b LL pores (+ vertebrae) more than 127; D rays more than 200 ..... *G. capensis*

40.9 *Gnathophis capensis*

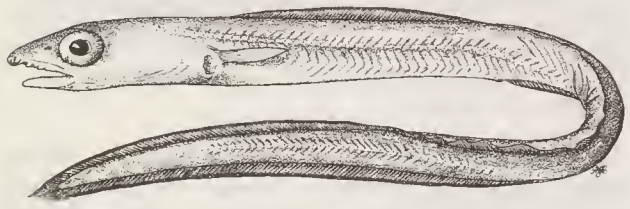
(Kaup, 1856)

Southern conger — Suidelike seepaling

Leptocephalus capensis Kaup, 1856: 153 (larva, Cape of Good Hope). *Congermuraena australis* Barnard, 1923: 442 (Cape); 1925: 190. *Ariosoma balearica (non* De la Roche): Smith, **SFSA No. 1113** (in part). *Ariosoma australis:* Penrith, 1967: 538*. *Gnathophis capensis:* Castle, 1968: 142*; 1968: 700*.

Head 5.9-6.6, depth 16-21. Front nostril with a scroll-like margin. Teeth small, in several rows on jaws and roof of mouth, those on vomer blunt. Vertebrae 128-135.

Olive brown above, silvery on head, lighter below; median fins with a dusky margin. Attains 37 cm. False Bay to Plettenberg Bay in about 100 m; also at Tristan da Cunha.



40.9 *Gnathophis capensis:* 29 cm.

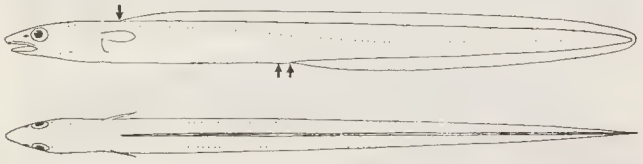
40.10 *Gnathophis habenatus*
(Richardson, 1848)

Strap conger — Platriem-seepaling

Congrus habenatus Richardson, 1848: 109, Pl. 50, Figs. 1-5 (New Zealand). *Gnathophis habenatus:* Castle, 1968: 703; 1969: 1*.

Head 5.2-6.8, depth 14-18. Front nostril with a scroll-like margin. Teeth small, in several rows on jaws and roof of mouth, those on vomer blunt. Vertebrae 119-126.

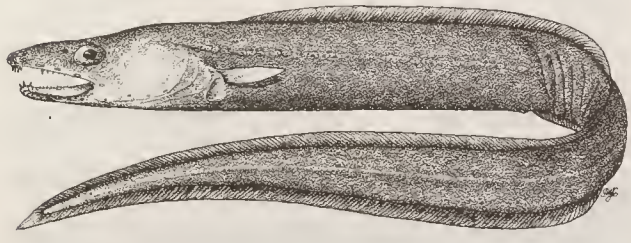
Olive above, silvery on head, lighter below, median fins with dusky margin. Attains 43 cm. Southern Cape coast to East London in 80 - 100 m; also southern Indian Ocean and Australasia.



40.10 *Gnathophis habenatus:* 43 cm (Wellington harbour; after Castle, 1963). Arrows indicate D origin, anus and A origin.

Genus ***Rhechias*** Jordan, 1921

Several species worldwide, 1 in our area.



40.11 *Rhechias wallacei:* 52 cm holotype.

40.11 *Rhechias wallacei*
(Castle, 1968)

Congrina wallacei Castle, 1968: 709, Pl. 107B; Fig. 1a-b (Mozambique).

Head 6.0-6.4, depth 15-17. Teeth triserial on jaws; outer teeth large, especially anteriorly; vomerine teeth few, in a small patch; "intermaxillary" teeth in a distinct patch in front. Vertebrae ca. 168.

Grey above, lighter below; median fins black posteriorly. Attains 55 cm. Natal to southern Mozambique in 500 m, but probably more widespread.

Genus ***Uroconger*** Kaup, 1856

Two species; 1 in our area.

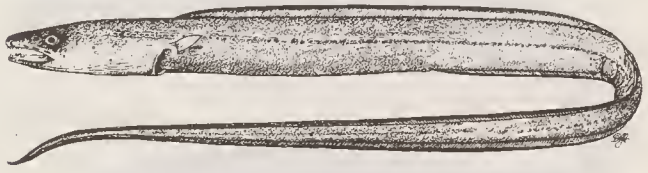
40.12 *Uroconger lepturus*
(Richardson, 1845)

Longtail conger — Langstert-seepaling

Congrus lepturus Richardson, 1845: 106, Pl. 56, Figs. 1-6 (Canton, China). *Uroconger lepturus:* Smith, **SFSA No. 1115*;** Castle, 1968: 711*.

Head 7.4-8.3, depth 20-25. Teeth generally prominent and sharp, biserial on jaws, the inner row larger; about 20 small teeth in one row on vomer; "intermaxillary" teeth in a small patch, the anterior ones forming a transverse row outside of mouth when closed. Vertebrae ca. 210.

Light grey-brown, lighter below, fins darker, LL pores pale. Attains 45 cm. Natal and Mozambique Channel in about 20 m; to Red Sea and Indo-Pacific.



40.12 *Uroconger lepturus:* 32 cm.

Family No. 41: MURAENIDAE

by P.H.J. Castle & J.E. McCosker

Moray eels, morays — **Bontpalings**

Body robust in most species, scaleless, tail compressed. Pectoral fins absent. Dorsal fin origin usually before gill opening; median fins continuous around tail. Mouth moderate, incapable of closing completely in some large species. Posterior nostrils either a slit or tube before or above eye. Teeth variable: small, conical and pointed, or molariform pavement, or long depressible fangs; teeth on jaws and usually on vomer, often multiserial. Lateral line of 1-3 pores before gill opening; head pores obvious. Gill opening a mid-lateral hole.

Variable in coloration, including plain, freckled, spotted and striped. Adults benthic, generally in shallow water among rocks and coral heads; larvae epipelagic, widespread and abundant. Vicious reputation undeserved, although some species will bite if provoked. None is venomous, but in some areas certain large species can cause tropical fish poisoning (ciguatera) if eaten. In all oceans, some entering estuaries. About 13 genera and 200 species worldwide; 6 genera and 33 species in our area, several of which need further study and comparison with extralimital specimens.

Western Indian Ocean species revised by Smith (1962) who with others has divided *Gymnothorax* into *Lycodontis* for those morays without, and *Gymnothorax* for those with, serrations on the lateral jaw teeth. Because some species are intermediate in this condition, we here recognise only *Gymnothorax*.

The genus *Monopenchelys* is included in the key because its rare single species *M. acuta* (Parr) is known from the Seychelles and Comoro Islands (Böhlke and McCosker, 1982) and may be found in our area.

KEY TO GENERA

1a D short, either a skin-covered ridge on end of tail or well behind anus; teeth needle-like and pointed 2
1b D and A skin-covered but distinct, beginning ahead of gill opening and just behind anus, respectively; teeth either pointed, blunt, or chisel-like 4

2a Rear nostril contiguous with enlarged interorbital pore, so that it appears double; adults small, less than 30 cm long ..... *Anarchias*
2b Rear nostril not contiguous with interorbital pore; adults may be longer than 30 cm 3

3a D origin in mid-tail region; A origin behind anus; a single gill opening low on throat; adults small, less than 25 cm long ..... [*Monopenchelys*]
3b D and A short, skin-covered ridges on end of tail; gill opening single or double, either low or at mid-throat; adults often longer than 30 cm ..... *Uropterygius*

4a Some teeth molariform or granular, at least on vomer; no canine teeth ..... *Echidna*
4b Teeth not noticeably molariform; usually some canine teeth present 5

5a Body 1.5-2 in tail length; body nearly uniformly coloured; depth about 40 in TL ..... *Thyrsoidea*
5b Body and tail nearly subequal, tail not more than 1.5 times body length; numerous species, variable in coloration, dentition and body depth 6

6a One or more depressible fangs in middle of front of upper jaw; teeth on vomer usually in a single row ..... *Gymnothorax*
6b No median depressible fangs in upper jaw; 2 rows of low, conical teeth on vomer ..... *Siderea*

Genus ***Anarchias*** Jordan & Starks, 1906

About 9 species; 1 in our area. Smith's (1980) record of *A. fuscus* Smith, 1962 is apparently erroneous. *Anarchias vermiformis* Smith, 1962, is a species of *Uropterygius*, cf. *U. concolor* (Erling Holm, personal communication).

41.1 *Anarchias seychellensis*
Smith, 1962

Marbled reef-eel — Marmer-rifpaling

Anarchias seychellensis Smith, 1962: 429, Pl. 53 F (Seychelles).

A slender, variously coloured little moray; head 8.1-9.6, depth 20-25. D and A restricted to tail tip. Teeth sharp, slender, recurved; those on jaws biserial, outer row smaller; a few larger, inner depressible teeth; several larger depressible teeth on intermaxillary; 7-8 uniserial small teeth on vomer. Vertebrae 115-121.

Body varying from nearly uniform brown to brown mottled with lighter brown, or with 3-4 stellate pale blotches; chin, head pores and tail tip pale. Attains 28.5 cm. Sodwana Bay, Seychelles and South Pacific.

41.1 *Anarchias seychellensis:* 18.5 cm holotype (Assumption Id.). Arrows indicate gill opening and anus.

Genus ***Echidna*** Forster, 1777

Fifteen species; 4 in our area. *E. unicolor* Schultz, 1953 was reported from northern Mozambique, Zanzibar and Kenya (Smith, 1962); it is uniformly yellowish brown, with a narrow dark ring around eye.

KEY TO SPECIES

1a Body with black rings 2
1b Body either spotted or plain 3

2a Anus notably behind middle of length; body with 40-80 narrow black rings ..... *E. zebra*
2b Anus near middle or slightly before middle of length; body of juveniles with 25-30 black rings; adults mottled dark brown with angle of mouth dark ..... *E. polyzona*

3a Body cream coloured, overlain with 2 rows of 20-30 star-like dark blotches with pale centres ..... *E. nebulosa*
3b Body uniform, dark brownish, sharply contrasting with white vertical fins ..... *E. leucotaenia*

41.2 *Echidna leucotaenia*
Schultz, 1943

Whiteface moray — Witgesig-bontpaling

Echidna leucotaenia Schultz, 1943: 22, Pl. 3 (Enderbury, Phoenix Ids.); Smith, 1962: 423*; Winterbottom, 1976: 60.

Head 7, depth 15. Teeth molariform, uniserial in upper jaw, biserial in lower; biserial to multiserial on vomer, forming a pavement. Vertebrae 121-124.

Plain brown, tip of snout white, irregular white patches on jaws; darker behind eye and on corner of mouth. Attains 53 cm. Natal northwards and east to central Pacific.

41.2 *Echidna leucotaenia:* 31 cm (Sodwana Bay). Arrow indicates anus.

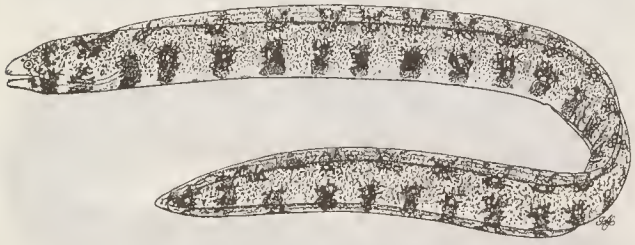
41.3 *Echidna nebulosa*
(Ahl, 1789)
PLATE 7

Floral moray — Blompaling

Muraena nebulosa Ahl, 1789: 5, Pl. 1, Fig. 2 (Indonesia). *Echidna nebulosa:* Smith, **SFSA No. 1122*;** 1962: 423*.

Head about 7, depth 15-20. Teeth broadly conical, blunter with age; uniserial on jaws, becoming biserial with age; a patch on intermaxillary; biserial on vomer. Vertebrae 121-123.

Colour variable but commonly white or yellowish, marked by 25-30 brownish black, vertical blotches, each made up of 2-3 yellow-centred, flower-shaped spots; scattered flecks between the spots. Attains 70 cm. East London to southern Mozambique, Indo-Pacific.



41.3 *Echidna nebulosa:* 32 cm.

41.4 *Echidna polyzona*
(Richardson, 1845)

Barred moray — Balk-bontpaling

Muraena polyzona Richardson, 1845: 112 (Pacific). *Echidna polyzona:* Smith, **SFSA No. 1121*;** 1962: 423*; Smith, 1969: 294*; 1980: 185.

Head 6.5, depth about 13. Teeth broadly conical, blunter with age; biserial on jaws; oval patch of molars on vomer. Vertebrae 113-120.

Rich brown; young with 25-30 greyish yellow, vertical bars that become progressively more obscure until the body is mottled dark brown in adults; angle of mouth dark. Attains 60 cm. Natal northwards; Indo-Pacific.

41.4 *Echidna polyzona:* 35 cm (Inhaca Id.).

41.5 *Echidna zebra*
(Shaw, 1797)
PLATE 8

Zebra moray — Sebra-bontpaling

Gymnothorax zebra Shaw, 1797: Pl. 322 (Pacific). *Echidna zebra:* Smith, **SFSA No. 1120*;** 1962: 423*.

Head 15, depth 20. Anus at two thirds of body length. Teeth molariform, in 2-3 rows on lower jaw and in an almost continuous pavement on upper jaw and vomer. Vertebrae 132-137.

Deep blackish brown with many narrow, yellowish vertical bars. Attains 150 cm. From Durban northward; Indo-Pacific.

41.5 *Echidna zebra:* 40 cm.

Genus ***Gymnothorax*** Bloch, 1795

Numerous species; 20 in our area.

KEY TO SPECIES

1a D origin closer to anus than to gill opening; (colour light brown overlain with numerous dark spots) ..... *G. fuscomaculatus*
1b D origin over or in front of gill opening 2

2a Body plain, lacking mottling, spots or bars 3
2b Body with light or dark spots, mottling, bands or bars 5

3a Body uniform golden, with conspicuous dark spot surrounding gill opening; vomer with blunt, molariform teeth ..... *G. melatremus*
3b Body brown to yellow; no distinct spot over gill opening; small conical teeth on vomer 4

4a Body depth 30-33 in length; head 4-5 times in trunk; D margin light blue ..... *G. phasmatodes*
4b Body depth about 19-22 in length; head 2.7-2.9 in trunk; D margin faint yellow, as is body ..... *G. monochrous*

5a Two nearly subequal rows of teeth at sides of upper jaw, an outer row of small teeth and an inner row of 8 or more larger ones; 5 longitudinal rows of teeth (including 1 row on vomer) at front of upper jaw; (tip of tail white) 6
5b One continuous row of teeth at sides of upper jaw, although 1-6 long, needle-like teeth may seem to form an incomplete inner row; 3 longitudinal rows of teeth (including 1 row on vomer) at front of upper jaw 8

6a Head, body and fins with small white spots on black background; gill opening with black margin ..... *G. meleagris*
6b Colour pattern variously mottled, often including white spots, but not solely of round white spots on a black background; margin of gill opening not black 7

7a Body dark brown, covered with small yellow spots; chin and throat marked like rest of head; jaws of adults cannot be closed completely ..... *G. eurostus*
7b Body dark brown, with vague dark spots anteriorly; chin and throat region plain; jaws close completely .. *G. buroensis*

8a Colour variable, usually brownish to nearly black, with diffuse white wavy bars or anastomosing lines, especially prominent posteriorly (lines become diffuse in large specimens); A usually with white border best developed posteriorly ..... *G. undulatus*
8b Body dark or light, lacking narrow, white wavy lines 9

9a Body faintly coloured, overlain with distinct or diffuse bands or bars; (gill opening not in a dark spot) 10
9b Body overlain with lighter spots, or darker spots or mottling, not forming vertical bars or bands 12

10a Body with 16-22 black rings separated by pale interspaces, especially behind mid-body 11
10b Body pale brownish with dark spots on sides arranged in vertical bars, those bars continuing on fins as oblique spots; (lower jaw distinctively barred with white and brown; 2 distinctive white streaks behind eye) ... *G. zonipectis*

11a Black rings completely encircle body, even under head and before anus, and extend to edge of fins; front nostrils pale ..... *G. enigmaticus*
11b Black rings not continuous under head and before anus, and do not extend to white fin edge posteriorly; front nostrils dark ..... *G. rueppelliae*

12a Body with distinct spots, contrasting with paler or darker background 13
12b Body with blotches, mottling or freckling, not distinct spots 17

13a Colour pattern of brown or dark spots on yellowish background 14
13b Colour pattern of pale yellowish, white or cream spots on a green, brown or black body 15

14a Dark blotches much bigger than eye; body depth 18-22 in TL ..... *G. permistus*
14b Dark marks, especially on head, not much bigger than eye and in a honeycomb pattern; body depth 13-15 in TL ..... *G. favagineus*

15a Vomerine teeth absent; snout short and blunt ..... *G. nudivomer*
15b Vomerine teeth present 16

16a Gill openings dark; light spots form narrow vertical bands on hind half of tail ..... *G. elegans*
16b Gill openings not dark; spots distinct on tail, larger than spots on head and trunk ..... *G. johnsoni*

17a Body brownish, irregularly marked with yellowish blotches and diffuse vertical bars on tail; a row of 2-7 dark brown oval blotches behind eye ..... *G. margaritophorus*
17b Body either brownish or greyish, with irregular darker mottling; no row of dark blotches behind eye 18

18a Body dark brown or greyish with darker mottling; chin and throat region pale; gill opening not in a dark spot; vomerine teeth biserial ..... *G. richardsoni*
18b Body brown to dark chocolate, mottled with dark flecks; gill opening in a dark spot; vomerine teeth small and concealed, or absent 19

19a A conspicuous black mark behind eye, continuous with a short oblique black bar to behind mouth; pale fin edging restricted to tip of tail ..... *G. breedeni*

19b No black bar or stripe behind eye; median fins yellow- or green-edged ..... *G. flavimarginatus*

41.6 *Gymnothorax breedeni*

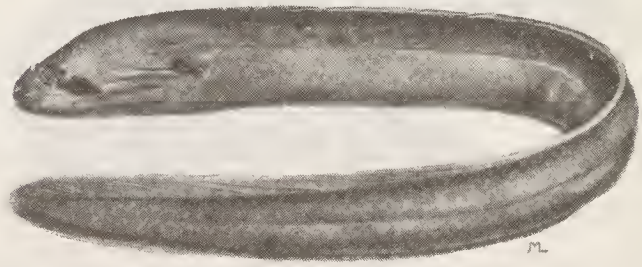
McCosker & Randall, 1977

Blackcheek moray — Swartwang-bontpaling

Gymnothorax breedeni McCosker & Randall, 1977: 162, Figs. 1-3 (Grand Comoro Id.)

A robust, mostly plain moray; head about 7.5, depth about 14. Uniserial, finely serrate, stout, conical teeth in jaws; 2 or 3 pairs of sharp, slender, depressible teeth on intermaxillary; a few median fangs on vomer. Vertebrae 128-129.

Brown, speckled darker; anus and gill opening dark. Attains 65 cm. Sodwana Bay; Comores, and Maldives to the eastern central Pacific.



41.6 *Gymnothorax breedeni:* 49.5 cm (Amirantes Ids.).

41.7 *Gymnothorax buroensis*

(Bleeker, 1857)

Lattice-tail moray — Ruitjiesstert-bontpaling

Muraena buroensis Bleeker, 1857: 79 (Indonesia); 1864: 99*. *Lycodontis buroensis:* Smith, 1962: 439*. *Gymnothorax buroensis:* Winterbottom, 1978: 42.

Head about 6.7, depth 9-15. Uniserial, sharp, recurved teeth on lower jaw, biserial on upper, the inner row larger; a few large fangs on intermaxillary; uniserial, small, blunt teeth on vomer. Vertebrae 111-120.

Colour dark brown, with irregular black spots anteriorly; lighter granulations which form diffuse crossbars on tail. Attains 31 cm. Common from Natal northwards; Indo-Pacific.

41.7 *Gymnothorax buroensis:* 27.5 cm (Tahiti; photo by J.E. Randall).

41.8 *Gymnothorax elegans*
Bliss, 1883
PLATE 7

Elegant moray — Elegante bontpaling

Gymnothorax elegans Bliss, 1883: 60 (Mauritius). *Lycodontis goldsboroughi (non* Jordan & Evermann): Smith, **SFSA No. 1124a*.** *Lycodontis elegans:* Smith, 1962: 436*.

Head about 8, depth 17. Uniserial, sharp teeth on jaws; large fang on intermaxillary; uniserial, much smaller teeth on vomer. Vertebrae 141.

Colour greenish, spots yellowish; a brown stripe ventrally from chin to anus and alongside anal; gill opening dark; median fins light edged. Attains 53 cm. From deep-water, Inhaca, Mauritius and Samoa; probably rare.

41.9 *Gymnothorax enigmaticus*
McCosker & Randall, 1982

Tiger moray — Tier-bontpaling

Lycodontis ruppelli (non McClelland): Smith, 1962: 434*. *Gymnothorax enigmaticus* McCosker & Randall, 1982: 18, Fig. 1 (Palau, western Caroline Ids.).

Head 8, depth 16-23. Teeth sharp, slender, uniserial on jaws and vomer; young with a few larger teeth in an inner row in upper jaw; a few depressible fangs on intermaxillary. Vertebrae 128-131.

Colour pale brown, yellowish in front; tail tip and anterior nostrils pale; about 17-21 dark brown vertical bands, wide in young, narrowing with age, those on head complete under chin and throat. Attains 58 cm. Juveniles from Natal, Indo-Pacific.

41.10 *Gymnothorax eurostus*
(Abbott, 1861)

Salt and pepper moray — Sout-en-peper-bontpaling

Thyrsoidea eurosta Abbott, 1861: 478 (Hawaii). *?Lycodontis meleagris (non* Shaw & Nodder, 1795): Smith, **SFSA No. 1130*;** Smith, 1962: 435* (in part, Fig. only). *Gymnothorax eurostus:* Winterbottom, 1978: 42.

Head 9, depth 17. Sharp, prominent teeth on jaws, biserial on upper jaw and larger in inner row, uniserial on lower; several large fangs on premaxillary; a few uniserial, small teeth on vomer. Vertebrae 120-123.

Colour dark purplish brown, covered with small yellow spots, crowded in front, more sparse on tail; anteriorly a scattering of larger, black spots. Attains 38 cm. Transkei to Bazaruto; Indo-Pacific.

41.10 *Gymnothorax eurostus:* 37.5 cm (Sodwana Bay). Arrow indicates anus.

41.11 *Gymnothorax favagineus*
(Bloch & Schneider, 1801)

Honeycomb moray — Heuningkoek-bontpaling

Gymnothorax favagineus Bloch & Schneider, 1801: 525 (Pacific). *Lycodontis tessellata (non* Richardson): Smith, **SFSA No. 1127a*.** *Gymnothorax tesselata:* Smith, 1961: 572, **No. 1127a.** *Lycodontis favagineus:* Smith, 1962: 433*.

Head 8-9, depth 13-15. Uniserial, sharp, prominent teeth on jaws; several large, depressible fangs on intermaxillary; uniserial, smaller teeth on vomer, becoming biserial with age. Vertebrae 140-143.

Colour: dark brown-black blotches separated by a honeycomb network of yellowish or white lines, the pattern continuing into mouth. Attains 250 cm. Algoa Bay to southern Mozambique; Indo-Pacific.

41.9 *Gymnothorax enigmaticus:* 38 cm (Aldabra Id.).

41.11 *Gymnothorax favagineus:* top: 55 cm (Inhaca Id.); bottom: 12.5 cm (St. Pierre Id.).

41.12 *Gymnothorax flavimarginatus*
(Rüppell, 1830)
PLATE 7

Yellow-edged moray — Geelrand-bontpaling

Muraena flavimarginata Rüppell, 1830: 119, Pl. 30, Fig. 3 (Red Sea). *Lycodontis lemayi* Smith, 1949: 108 (Inhaca); **SFSA No. 1129a*.** *Lycodontis flavomarginatus:* Smith, **SFSA No. 1128*.** *Lycodontis flavimarginatus:* Smith, 1962: 435*.

Head 9.5, depth 13. Uniserial, sharp teeth on jaws (biserial in young); a few depressible fangs on intermaxillary; uniserial, small, concealed teeth on vomer. Vertebrae 129-137.

Mostly speckled dark brown to black, median fins variously yellow- or green-edged; gill opening dark. Attains 80 cm. Common from Transkei northwards; Indo-Pacific.

41.12 *Gymnothorax flavimarginatus:* 51 cm (Mahé, Seychelles). Arrow indicates anus.

41.13 *Gymnothorax fuscomaculatus*
(Schultz, 1953)

Freckled moray — Gevlekte bontpaling

Rabula fuscomaculata Schultz, 1953: 147, Fig. 30 (Rongerik Atoll, Marshall Ids.). *Gymnothorax fuscomaculatus:* Winterbottom, 1978: 43.

Head 7.1-7.5, depth 16-19. D origin somewhat forward of anus. Conical, sharp teeth on jaws; 2 rows on upper jaw, inner row larger; 1 row laterally on lower jaw, with double row of large, stout teeth anteriorly; about 10 conical teeth on vomer. Vertebrae 110-118.

Colour pale brown, evenly marked with rather diffuse, round, dark brown spots. Attains 17 cm. Natal; central Pacific.

41.13 *Gymnothorax fuscomaculatus:* 16.5 cm (Sodwana Bay). Arrow indicates anus.

41.14 *Gymnothorax johnsoni*
(Smith, 1962)

Whitespotted moray — Witgespikkelde bontpaling

Lycodontis punctatus (non Bloch & Schneider): Smith, **SFSA No. 1124.** *Lycodontis johnsoni* Smith, 1962: 438, Pl. 56 C & D (Algoa Bay).

Head 7-7.5, depth 12-16. Uniserial, sharp, recurved teeth on jaws; a few larger depressible fangs on intermaxillary; uniserial, much smaller teeth on vomer. Vertebrae 135-137.

Colour pale brown with crowded, irregular, light spots in front, larger and more rounded on tail and in young; corner of mouth and gill opening dusky. Attains 81 cm. Known only from Algoa Bay to Sodwana Bay in 20 - 70 m.

41.14 *Gymnothorax johnsoni:* top: 57 cm holotype (Algoa Bay); bottom: 20 cm (Inhambane). Arrow indicates anus.

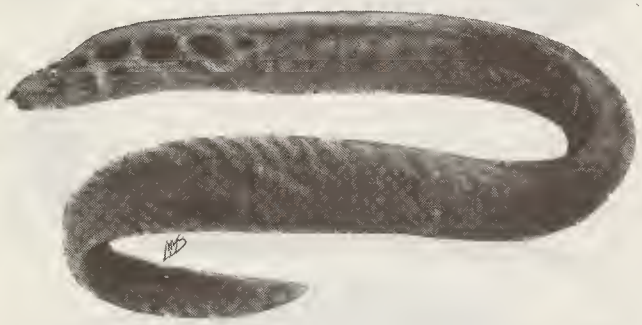
41.15 *Gymnothorax margaritophorus*
(Bleeker, 1865)
PLATE 8

Trunk-eyed moray — Lyfoog-bontpaling

Gymnothorax margaritophorus Bleeker, 1865: 53 (Amboina, Indonesia). *Lycodontis stelliferus:* Smith, **SFSA No. 1126*.** *Lycodontis margaritophorus:* Smith, 1962: 434*.

Head 7, depth 18-20. Sharp, recurved teeth in jaws; 1 row in lower jaw, partly biserial in upper; a few depressible fangs on intermaxillary; uniserial, small, conical teeth on vomer. Vertebrae 126-133.

Colour brownish, irregularly marked with yellowish blotches and diffuse, vertical bars on tail; several distinctive, dark brown, oval blotches behind eye; corner of mouth dusky. Attains 36 cm. Transkei to Bazaruto Id., Mozambique; Indo-Pacific.



41.15 *Gymnothorax margaritophorus*: 22 cm (Mafia Id.).

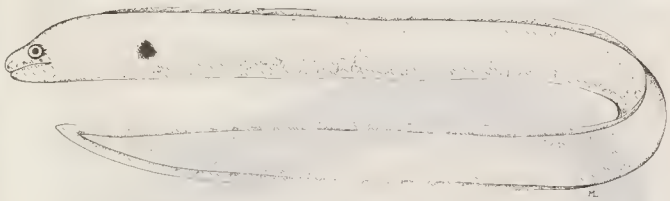
41.16 *Gymnothorax melatremus*
(Schultz, 1953)

Blackspot moray — Swartgespikkelde bontpaling

Gymnothorax melatremus Schultz, 1953: 120, Figs. 23d, 25 (Bikini, Marshall Ids.).

Head 7.1-8.9, depth 15-20. Teeth stout, conical; 2 rows on upper jaw, inner teeth larger; lower jaw teeth uniserial, with a few large, extra teeth in front; 10 on intermaxillary; biserial blunt molars on vomer. Vertebrae 127-130.

Colour golden fading quickly to white on preservation; conspicuous dark spot surrounding gill opening. Attains 26 cm. Known only from Sodwana Bay and the type-locality.



41.16 *Gymnothorax melatremus*: 15 cm (Sodwana Bay).

41.17 *Gymnothorax meleagris*
(Shaw & Nodder, 1795)

Guineafowl moray — Tarentaal-bontpaling

Muraena meleagris Shaw & Nodder, 1795: A2, Pl. 220 (Pacific); ?Gilchrist & Thompson, 1911: 53. *Lycodontis meleagris*: Smith, 1962: 435* (in part, not Fig.); *Gymnothorax meleagris*: Winterbottom, 1978: 42.

Head 7-8, depth 12-19. Sharp, prominent teeth on jaws; 2 rows in upper jaw, inner teeth larger; about 10 large fangs on intermaxillary; uniserial, small teeth on vomer and lower jaw. Vertebrae 127-131.

Colour dark purplish brown covered with small yellow spots, crowded in front, more sparse on tail; gill opening black. Attains 57 cm. Algoa Bay to southern Mozambique; Indo-Pacific.

41.17 *Gymnothorax meleagris*: 63.5 cm (N. Mozambique).

41.18 *Gymnothorax monochrous*
(Bleeker, 1856)

Drab moray — Vaal bontpaling

Muraena monochrous Bleeker, 1856: 384 (Indonesia); 1864: 106*. *Lycodontis monochrous*: Smith, 1962: 437*.

Head 8-9, depth 19-22. Sharp, small teeth in jaws, partly biserial in upper jaw with 1-4 inner fangs and a few larger intermaxillary fangs; 1 row of small teeth on vomer and lower jaw. Vertebrae 134-145.

Colour pale brown above, lighter below. Attains 56 cm. Delagoa Bay northward, in sheltered, turbid water; Indo-Pacific.

41.18 *Gymnothorax monochrous*: 15.5 cm (near Maputo). Arrow indicates anus.

41.19 *Gymnothorax nudivomer*
(Günther, 1867)

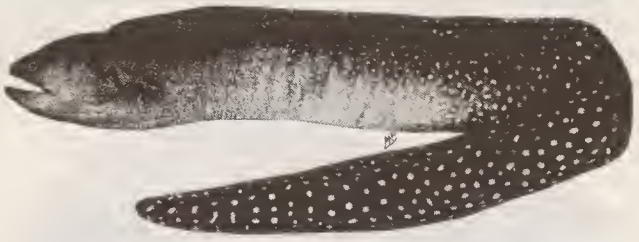
Starry moray — Sterretjies-bontpaling

Muraena nudivomer Günther, *in* Playfair & Günther, 1867: 127, Pl. 18 (Zanzibar). *Lycodontis nudivomer*: Smith, **SFSA No. 1125*;** 1962: 438*.

Head about 8, depth 11. Uniserial, teeth on jaws; small teeth on premaxillary; no teeth on vomer of adults. Vertebrae 126-129.

Colour brownish yellow, a network of fine lines anteriorly, yellow or white spots on tail; gill opening in a dusky

or black blotch; inside of mouth bright yellow. Attains 100 cm. Known only from Transkei to Zanzibar, Red Sea and Hawaii.



41.19 *Gymnothorax nudivomer*: 65 cm (Inhaca Id.).

41.20 *Gymnothorax permistus*
(Smith, 1962)

Reticulated moray — Netpatroon-bontpaling

Lycodontis favagineus (non Bloch & Schneider): Smith, **SFSA No. 1127*;** 1962: 433*. *Lycodontis tessellata (non* Richardson): Smith, **SFSA No. 1127a*.** *Lycodontis permistus* Smith, 1962a: 433, Pl. 55 A & B (Mahé, Seychelles).

Head 7.5-8.2, depth 18-22. Uniserial, sharp teeth on jaws, the front few larger; a few depressible fangs on intermaxillary; uniserial, much smaller teeth on vomer. Vertebrae 143-144.

Colour yellowish white, marked with large, irregular, dark brownish blotches which are fewer and more rounded in young. Attains 66 cm. Transkei to Delagoa Bay; Tanzania and Seychelles but nowhere abundant.

41.20 *Gymnothorax permistus*: top: 54.5 cm holotype; bottom: 13 cm juvenile (both Mahé, Seychelles).

41.21 *Gymnothorax phasmatodes*
(Smith, 1962)

Ghost moray — Spook-bontpaling

Lycodontis phasmatodes Smith, 1962: 436, Pl. 53 B, C & I (Inhaca); Smith, 1969: 296.

Head 10-11, depth 30-33. Uniserial teeth on jaws; a few depressible fangs on intermaxillary; uniserial, smaller teeth on vomer. Vertebrae 166-170.

Colour pale yellow, lighter below, D margin light blue. Attains 46 cm. Lives in sand or rubble; Delagoa Bay and Pinda, Mozambique.

41.21 *Gymnothorax phasmatodes*: 46.5 cm holotype (Inhaca Id.). Arrows indicate gill opening and anus.

41.22 *Gymnothorax richardsoni*
(Bleeker, 1852)

Spotted-lip moray — Spikkellip-bontpaling

Muraena richardsoni Bleeker, 1852: 296 (Indonesia); 1864: 100*. *Gymnothorax richardsoni:* Smith, 1961: 572, **No. 1125a.** *Lycodontis richardsoni:* Smith, 1962: 438*.

Head 6-7, depth 14-16. Uniserial teeth on jaws; a few larger, depressible teeth on intermaxillary; biserial conical teeth on vomer. Vertebrae 112-117.

Colour dark brown or greyish with darker mottling; chin and throat lighter, lip pores within white spots. Attains 31 cm. Delagoa Bay northwards; Indo-Pacific.

41.22 *Gymnothorax richardsoni*: 31 cm (N. Mozambique). Arrow indicates anus

41.23 *Gymnothorax rueppelliae*
(McClelland, 1845)

Banded moray — Band-bontpaling

Dalophis rueppelliae McClelland, 1845: 213 (Bengal, India). *Lycodontis petelli:* Smith, 1962: 435*. *Gymnothorax rueppelliae:* McCosker & Randall, 1982: 19*.

Head 7-8, depth 15-20. Uniserial sharp teeth on jaws; young with 2-4 inner larger teeth at side of upper jaw; 2 or 3 large, depressible fangs on intermaxillary; a row of 5 or 6 low conical teeth on vomer. Vertebrae 132-135.

Body tan with dark brown or black bands, those on head and front part of body not continuous ventrally, the posterior bands not reaching edge of A; dark spot at corner of mouth. Attains 55 cm. Indo-West Pacific from Hawaii to the Red Sea and south to Bazaruto Id., Mozambique (22°S).

41.23 *Gymnothorax rueppelliae:* 34 cm (Enewetak; photo by J.E. Randall).

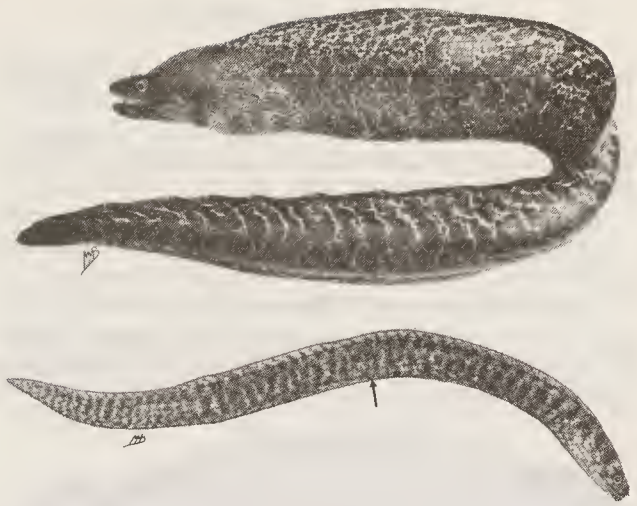
41.24 *Gymnothorax undulatus*
(Lacepède, 1803)
PLATE 8

Leopard moray — Luiperd-bontpaling

Muraenophis undulatus Lacepède, 1803: 629, Fig. 2 (locality unknown). *Lycodontis undulatus:* Smith, **SFSA No. 1129*;** 1962: 439*.

Head 6.5-8, depth 10-20. Uniserial, sharp teeth on jaws; upper jaw in young with extra medial fangs; 1-2 depressible fangs on intermaxillary; uniserial conical teeth on vomer. Vertebrae 129-138.

Highly variable in colour, but mostly light and dark brown, yellow, grey and white; young with diffuse vertical bars, especially on tail; adults irregularly mottled. Attains at least 150 cm. Very common from Port Alfred to southern Mozambique; Indo-Pacific.



41.24 *Gymnothorax undulatus:* top: 68 cm (N. Mozambique); bottom: 22.5 cm (Kenya); arrow indicates anus.

41.25 *Gymnothorax zonipectis*
Seale, 1906

Bar-tail moray — Balkstert-bontpaling

Gymnothorax zonipectis Seale, 1906: 7, Fig. 1 (Tahiti).

Head 7-8, depth 18.5. Teeth sharp, slender; uniserial teeth on jaws and vomer; some larger teeth in inner row on upper jaw; a few depressible fangs on intermaxillary. Vertebrae 122-126.

Colour pale brown; darker brown spots on body, joining and becoming darker on tail to form conspicuous, oblique bars on fins; irregular white blotches and bars on head. Attains 31 cm. Sodwana Bay; central Pacific. New record for South Africa.

41.25 *Gymnothorax zonipectis:* drawing from *Albatross* Philippine collections. Arrow indicates anus.

Genus ***Siderea*** Kaup, 1856

Two species; both in our area.

KEY TO SPECIES

1a Tail about 1.4-1.6 times body length; body uniform or marbled, with conspicuous lines of black dots on head ..... *S. grisea*
1b Tail about equal to body; body greyish, closely speckled with irregular dark markings ..... *S. picta*

41.26 *Siderea grisea*
(Lacepède, 1803)

Geometric moray — Geometriese bontpaling

Muraenophis grisea Lacepède, 1803: 629, Pl. 19, Fig. 3 (Madagascar). *Siderea schonlandi* Smith, 1949: 109 (Delagoa Bay); **SFSA No. 1131a*.** *Siderea grisea:* Smith, 1962: 441*.

Head 8.5-10, depth 17-22. Teeth stout, conical, 2 rows on upper jaw and vomer; 1 row on lower jaw; 2 teeth on intermaxillary. Vertebrae 131-136.

Colour: head brownish with conspicuous lines of black dots; lilac body with brown marbling; young paler. Attains 38 cm. Transkei northwards to the Red Sea and throughout the western Indian Ocean.

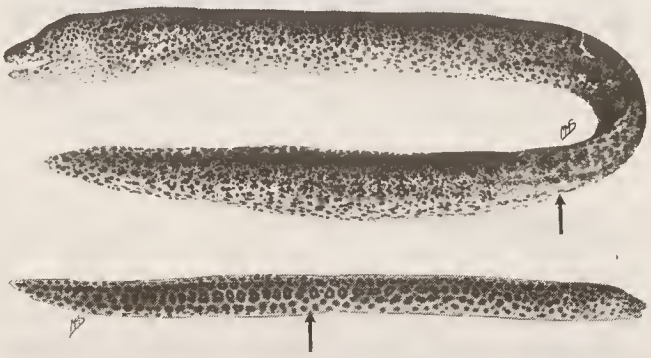
41.26 *Siderea grisea:* 53 cm (Mauritius; photo by J.E. Randall).

41.27 *Siderea picta*
(Ahl, 1789)

Paintspotted moray — Verfspikkel-bontpaling

Muraena picta Ahl, 1789: 6 (Indonesia). *Gymnothorax polyophthalmus* Gilchrist & Thompson, 1917: 305 (Natal). *Siderea picta:* Smith, **SFSA No. 1131*;** 1962: 440*.

Head 7-8, depth 15-20. Teeth stout, conical, uniserial on jaws; 1 tooth on intermaxillary; biserial on vomer. Vertebrae 128-133.



41.27 *Siderea picta:* top: 48 cm (Inhaca Id.); bottom: 15 cm (Kenya). Arrows indicate anus.

Colour greyish, closely speckled with irregular, dark markings; young yellowish with regularly spaced, roundish, hollow-centred spots, becoming less definite with age. Attains 68 cm. Natal northwards and throughout whole of the Indo-Pacific.

Genus ***Thyrsoidea*** Kaup, 1856

A single species.

41.28 *Thyrsoidea macrura*
(Bleeker, 1854)

Slender giant moray — Slank reuse bontpaling

Muraena macrurus Bleeker, 1854: 324 (Indonesia); 1864: 111*. *Thyrsoidea macrura:* Smith, **SFSA No. 1123*;** 1962: 424*.

A very elongate, slender moray; head 12, depth about 40. Biserial sharp teeth on jaws, those in front and in inner row larger; a few depressible fangs on intermaxillary; uniserial, much smaller, teeth on vomer. Vertebrae ca. 210.

Colour brownish grey above, lighter below. The longest known eel, one of 375 cm reported from Queensland, Australia. Widespread in tropical Indo-Pacific, reaches south to the Bashee, mostly in estuaries.

41.28 *Thyrsoidea macrura:* 76 cm.

Genus ***Uropterygius*** Rüppell, 1838

Median fins restricted to rear end of tail. About 23 species; 5 in our area. Most records in our area and elsewhere of *Uropterygius marmoratus* (Lacepède) have been based on *U. micropterus*. *U. marmoratus* is a larger, more robust species, widespread in the Indo-Pacific and western Indian Ocean, and differs from *U. micropterus* in its colour, dentition and vertebrae (133-136).

KEY TO SPECIES

1a Tail about 3 in TL; body with small and large blotches ..... *U. tigrinus*

1b Tail about 2 or less in TL; body plain or mottled, not spotted 2

2a Colour uniform brown, tip of tail yellow ..... *U. concolor*
2b Markings present 3

3a A prominent white band connecting eyes and passing to lower lip; nostrils white, a white stripe connecting their bases ..... *U. kamar*
3b No white bands on head 4

4a Colour uniform mottled brown with numerous white specks on head; C yellow; body 1.3-1.5 in tail ..... *U. xanthopterus*
4b Colour drab yellow or brown, mottled with a web-like network of thin dark lines; white head specks absent; C not distinctly coloured; body subequal to tail ..... *U. micropterus*

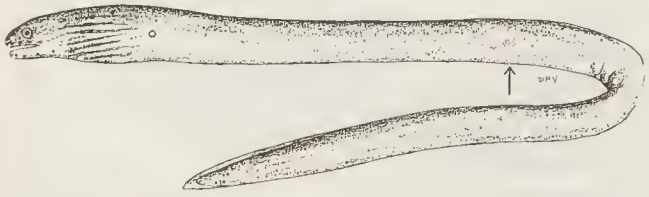
41.29 *Uropterygius concolor*
Rüppell, 1838

Uniform reef-eel — Eenkleurige rifpaling

Uropterygius concolor Rüppell, 1838: 83, Pl. 20, Fig. 4 (Red Sea); Smith, **SFSA No. 1133*;** 1962: 427*. *Anarchias vermiformis* Smith, 1962: 429, Pl. 53, Fig. H (Zanzibar); McCosker et al., 1984: 262.

Head about 9, depth 25-30. Teeth slender, sharp; 2 rows on jaws, those in front and in inner series larger; a few depressible fangs on intermaxillary; 1 row on vomer. A single anterior LL pore. Vertebrae 117-119.

Colour drab brown, tip of tail yellow. Attains 32 cm. Durban northwards to Red Sea.



41.29 *Uropterygius concolor:* 22 cm (Kenya). Arrow indicates anus.

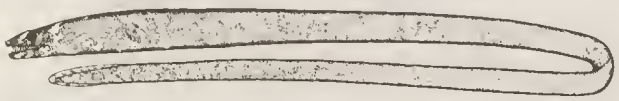
41.30 *Uropterygius kamar*
McCosker & Randall, 1977

Barlip reef-eel — Balklip-rifpaling

Uropterygius kamar McCosker & Randall, 1977: 154, Figs. 3b & 4 (Comores); Smith, 1980: 185.

Head about 10, depth 26. Teeth sharp, slender, recurved; 3 rows in upper jaw, outer teeth progressively larger medially and becoming depressible; lower jaw teeth biserial laterally, triserial in front, similar to those above; a few depressible fangs on intermaxillary; vomerine teeth uniserial. A pair of anterior LL pores. Vertebrae 134-138.

Colour dark brown; snout, chin and head marked by irregular white bars and patches. Attains 37 cm. Sodwana Bay; Indo-Pacific.



41.30 *Uropterygius kamar:* 41 cm (Sodwana Bay).

41.31 *Uropterygius micropterus*
(Bleeker, 1852)
PLATE 8

Shortfinned reef-eel — Kortvin-rifpaling

Muraena micropterus Bleeker, 1852: 298 (Indonesia). *Uropterygius marmoratus (non* Lacepède): Smith, **SFSA No. 1134*;** 1962: 427*. *Uropterygius micropterus:* McCosker et al., 1984: 265*.

Head 8.5-10, depth 16-20. Teeth slender, sharp; 2 rows in jaws, those in front and in inner series larger; a few depressible fangs on intermaxillary; uniserial teeth on vomer. A single anterior LL pore. Vertebrae 114-118.

Head and body drab yellow or brown, overlain with a web-like network of dark thin lines. Attains 28 cm. Durban northwards; Indo-Pacific.

41.31 *Uropterygius micropterus:* 23.5 cm (N. Mozambique). Arrow indicates anus.

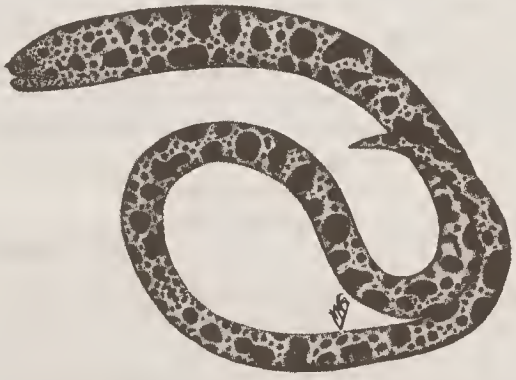
41.32 *Uropterygius tigrinus*
(Lesson, 1829)
PLATE 7

Tiger reef-eel — Tier-rifpaling

Ichthyophis tigrinus Lesson, 1829: 399 (Indonesia). *Uropterygius tigrinus:* Smith, **SFSA No. 1132*;** 1962: 426*.

Head 13, depth 30. Teeth slender, sharp; 2 rows on jaws, at least anteriorly; those in front of upper jaw and in inner series larger; a few, depressible teeth on intermaxillary; uniserial, small teeth on vomer. A single anterior LL pore. Vertebrae 169-172.

Colour yellowish to russet brown, marked with roundish, yellow-edged black spots; snout and jaw speckled with black. Attains 105 cm. Natal to southern Mozambique; Indo-Pacific.



41.32 *Uropterygius tigrinus:* 109 cm (Zanzibar).

41.33 *Uropterygius xanthopterus*
Bleeker, 1859

Freckleface reef-eel — Sproet-rifpaling

Uropterygius xanthopterus Bleeker, 1859: 350 (Amboina, Indonesia); McCosker & Randall, 1982: 22. *Uropterygius alboguttatus* Smith, 1962: 427, Fig. 4, Pl. 60E (Assumption Id.).

Head 7.5, depth 25-30. Teeth sharp, slender, recurved; 2 rows in upper jaw, inner teeth larger and depressible; lower jaw teeth similar; a few depressible fangs on intermaxillary; uniserial, small teeth on vomer. A pair of anterior LL pores. Vertebrae 131-133.

Colour uniform, dully mottled brown, with numerous tiny white specks, especially on head; C yellow. Attains 35 cm. Sodwana Bay, to southern Mozambique; Indo-Pacific.

41.33 *Uropterygius xanthopterus:* 35 cm holotype of *U. alboguttatus* (Assumption Id.); head from 24.5 cm specimen (Pacific; photo by J.E. Randall). Arrows indicate LL pores.

Family 42: OPHICHTHIDAE

by J.E. McCosker & P.H.J. Castle

Snake-eels and worm-eels — **Slangpalings en wurmpalings**

Two subfamilies (Myrophinae and Ophichthinae) share a combination of osteological and external characters such as a supraorbital pore and a supratemporal pore along the dorsal midline of the head, numerous overlapping branchiostegal rays, and posterior nostrils that usually lie along the lip and open into the mouth. Many new species have been collected in recent years by divers using rotenone ichthyocides.

Worm-eels (Subfamily Myrophinae) typically possess: body scaleless and compressed posteriorly. Pectoral fins present or absent. Dorsal fin origin from mid-trunk to rear tail region; median fins continuous around caudal. Gill openings small, midlateral, and constricted. Teeth small, varying from uniserial to bands on jaws and vomer. Lateral line complete. Coloration plain, slightly darker dorsally. Typically small (less than 30 cm), worm-like sand- and mud-burrowing forms. No commercial significance. Ten genera (1 undescribed) and about 45 species worldwide; 1 genus and 3 species in our area. Reviewed by McCosker (1970, 1977, 1982) and by Smith (1962).

Snake-eels (Subfamily Ophichthinae) are very diverse, but typically possess: body scaleless, from moderately robust to extremely elongate, usually somewhat compressed behind. Pectoral fins present or absent. If present, dorsal fin arises from head to mid-trunk. Median fins not reaching caudal tip which is hard and pointed. Gill openings midlateral to entirely ventral, unconstricted. Teeth uniserial or multiserial, either fangs, molariform, or conical. Coloration variable, either plain, spotted, banded, or striped. Mostly small (less than 1 m, although *O. serpens* may reach 250 cm) sand-burrowing species. No commercial significance, although edible. Forty-four genera and more than 175 species worldwide; 16 genera and 26 species known in our area. Reviewed by McCosker (1977) and by Smith (1962). We have included the genera *Myrophis* and *Phaenomonas* (in brackets in the key) which, although not yet collected in this area, are nearby and expected to occur here.

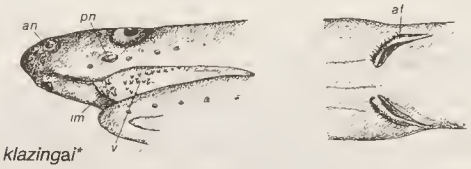
KEY TO GENERA

1a C rays conspicuous, tail tip flexible; gill openings small, midlateral to ventrolateral (Subfamily Myrophinae) 2
1b Tail tip a hard or fleshy finless point; gill openings often elongate, midlateral to entirely ventral (Subfamily Ophichthinae) 3

2a P present . . . . . [*Myrophis*]
2b P absent . . . . . *Muraenichthys*

3a Body entirely finless (snout sharply conical; gill openings ventral, converging forward) 4
3b At least a low D present 5

4a Rear nostril opening outside mouth, with a flap; front nostril tubular; eye moderately developed . . . . *Apterichtus*



*Apterichtus klazingai**

4b Rear nostril opening inside mouth, with or without a flap; front nostril not tubular; eye minute . . . . . *Ichthyapus*

*Ichthyapus acuticeps**

*Ventral views of snout and gill region: af = anterior fold of gill opening; an = anterior nostril; im = intermaxillary teeth; pn = posterior nostril; v = vomerine teeth.

5a P absent 6
5b P present 10

6a Snout conical; D origin above or slightly behind gill openings . . 7
6b Snout blunt to slightly conical, rounded at tip; D origin well before gill openings 8

7a Body stout, slightly longer than tail; depth 30-42 in TL; vomerine teeth enlarged, pointed and recurved . *Lamnostoma*

*Lamnostoma orientalis**

7b Body slender, slightly shorter than tail, depth 41-45 in TL; vomerine teeth conical, not enlarged . . . . . *Yirrkala*

*Yirrkala lumbricoides**

8a Only fin a low D, extending from just behind occiput to less than 3 head lengths behind gill opening . . . [*Phaenomonas*]
8b D extending from head nearly to tail tip; A present 9

9a Snout blunt; gill openings nearly horizontal, as long as distance between them . . . . . *Bascanichthys*
9b Snout subconical; gill openings lateral to ventral, much longer than distance between them . . . . . *Callechelys*

10a Upper lip noticeably fringed 11

10a

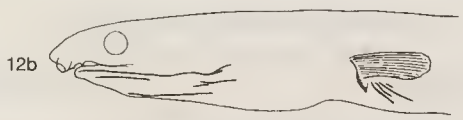
10b Upper lip entire, although nasal barbels may be present 12

11a Both lips fringed; body as long as tail; canine teeth in jaws and on vomer . . . . . *Brachysomophis*
11b Lower lip entire; tail much longer than body; no canine teeth . . . . . *Cirrhimuraena*

12a Teeth molariform or granular; P broad based 13

12a

12b Teeth pointed; P base restricted, opposite upper half of gill opening 14


12b

13a D origin well before gill opening; eye twice or less in P length . . . . . *Myrichthys*
13b D origin above or behind gill openings; eye twice or more in P length . . . . . *Pisodonophis*

*Ventral views of snout and gill region: af = anterior fold of gill opening; an = anterior nostril; im = intermaxillary teeth; lp = labial papillae; pn = posterior nostril; v = vomerine teeth.

14a Vomerine teeth absent, or at most 1-3 small teeth 15
14b A series of teeth on the vomer 16

15a Conspicuous leaf-like appendages on anterior nostrils; head and trunk equal to or longer than tail; coloration uniform . . . . . *Phyllophichthus*
15b No leaf-like appendages on anterior nostrils; head and trunk equal to or less than tail; body with numerous saddles . . . . . *Leiuranus*

16a Snout of adults elongate, attenuate, clavate at tip, its length greater than ¼ of head; jaws slender and elongate, those of adults incapable of closing completely; vertebrae more than 190 . . . . . *Ophisurus*
16b Snout of adults blunt, not conical, ¼ of head length or less; jaws not slender and elongate; vertebrae less than 190 17

17a Eye superior, before middle of jaws; snout constricted, then with an expansion, tip spoon-shaped . . . . . *Mystriophis*
17b Eye not superior, over middle of jaw; snout narrows evenly to tip . . . . . *Ophichthus*

Genus ***Apterichtus*** Duméril, 1806

About 9 species; 1 in our area, which we cautiously identify as *A. klazingai.* A worldwide revision of this complicated genus is necessary.

42.1 *Apterichtus klazingai*
(Weber, 1913)

Snake-eel Slangpaling

Sphagebranchus klazingai Weber, 1913: 47 (Indonesia); Weber & de Beaufort, 1916: 321*.

Head 13-14; depth 60-72; tail 1.8-1.9. Body entirely finless. All teeth small, sharp, uniserial on jaws and vomer. Head and snout covered with minute papillae. Vertebrae 136-140.

Light tan, with fine brown spots or specks on head and throat. Attains 39 cm. Off Durban in 20 m (new record for South Africa); also Indonesia and western Pacific.

42.1 *Apterichtus klazingai:* 39 cm.

Genus ***Bascanichthys*** Jordan & Davis, 1892

Thirteen recognised species; 1 in our area.

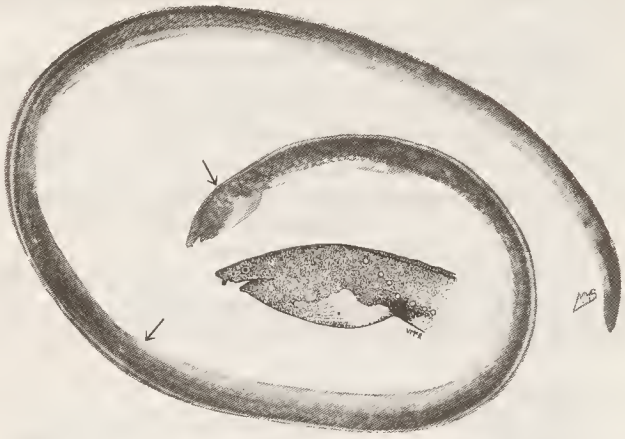
42.2 *Bascanichthys kirkii*
Günther, 1870

Longtailed sand-eel Langstert-sandpaling

Ophichthys kirkii Günther, 1870: 89 (Rovuma Bay, Mozambique). *Caecula kirki:* Smith, **SFSA No. 1095;** 1962: 454*. *Bascanichthys kirkii:* McCosker, 1977: 71.

Head 17-21; depth 63-90; tail 1.8-1.9. No P; D origin on nape. Gill openings sublateral. All teeth small, sharp, uniserial. Vertebrae 193-202.

Olive above, lighter below. Attains 54 cm. Natal northwards to Aden.



42.2 *Bascanichthys kirkii:* 45 cm ripe female (Natal). Arrows indicate D origin and anus.

Genus ***Brachysomophis*** Kaup, 1856

Five recognised species; 1 in our area.

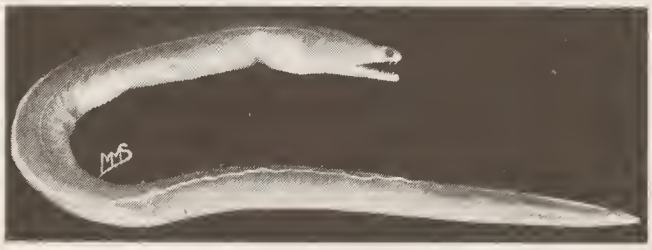
42.3 *Brachysomophis crocodilinus*
(Bennett, 1833)

Crocodile snake-eel — Krokodil-slangpaling

Ophisurus crocodilinus Bennett, 1833: 32 (Mauritius). *Brachysomophis crocodilinus:* Smith, 1957: 842; 1962: 454*.

Head 7; depth 19; tail 2.2. P present; D origin well behind head. Snout short; eyes prominent and bulged; gape very large. Teeth fang-like, biserial on upper jaw, the inner series larger; a cluster of large teeth on intermaxillary; uniserial on vomer and lower jaw. Lips fringed. Vertebrae 116-120.

Brownish, lighter below and on fins. Attains 106 cm. Natal (specimen discarded, known only from a photograph); also Tanzania, Seychelles, Mauritius and Indo-Pacific.



42.3 *Brachysomophis crocodilinus:* 13.5 cm (Aldabra Id.).

Genus ***Callechelys*** Kaup, 1856

A median groove on underside of snout. Fifteen species; 1 in our area.

42.4 *Callechelys marmorata*
(Bleeker, 1853)
PLATE 8

Marbled snake-eel — Marmer-slangpaling

Dalophis marmoratus Bleeker, 1853: 37 (Indonesia); 1864: 66*. *Callechelys marmoratus:* Smith, 1955: 26*; 1961: 572, **No. 1099d***; 1962: 451*; Smith, 1980: 185.

Head 10-14; depth 31-42; tail 2.8. No P; D origin on nape. Gill openings lateral to ventral. Teeth sharp, slender; 7-9 uniserial teeth in upper jaw, 10-12 uniserial in lower jaw; a few recurved conical teeth on intermaxillary; vomerine teeth larger, biserial in front, then uniserial. Vertebrae 173-183.

Yellowish white, speckled and spotted with darker, coalescing spots. Attains 57 cm. Central Indo-Pacific, south to Natal.

42.4 *Callechelys marmorata:* 46.5 cm (Bazaruto Id.). Arrow indicates anus.

Genus ***Cirrhimuraena*** Kaup, 1856

P present; D origin on nape; a fringe of cirri along upper lip. Nine species; 2 in our area.

KEY TO SPECIES

1a P 3.5-3.8 in head; head 3.0-3.8 in trunk . . . . . *C. playfairii*
1b P 1.8-2 in head; head 2.0-2.2 in trunk . . . . . *C. inhacae*

42.5 *Cirrhimuraena inhacae*
(Smith, 1962)

Inhaca fringelip — Inhaca-fraiinglip

Jenkinsiella inhacae Smith, 1962: 449, Fig. 1, Pl. 66, Figs. D & E (Inhaca). *Cirrhimuraena inhacae:* McCosker, 1977: 75.

Head 9.5-10; depth 28-30; tail 1.4. Teeth small, slender, sharp; uniserial or biserial on jaws and vomer. Vertebrae 166-167.

In preservative, dark brown, lighter below. Attains 23 cm. Inhaca Island and Madagascar.

42.5 *Cirrhimuraena inhacae:* 18.5 cm holotype (Inhaca Id.), arrow indicates anus; head from 23 cm eel (Madagascar).

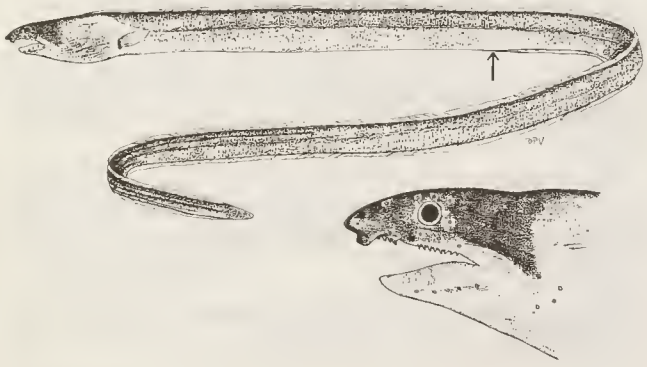
42.6 *Cirrhimuraena playfairii*
(Günther, 1870)

Fringelip snake-eel — Fraiinglip-slangpaling

Ophichthys playfairii Günther, 1870: 76 (Zanzibar). *Cirrhimuraena playfairii:* Smith, **SFSA No. 1099.** *Jenkinsiella playfairii:* Smith, 1957: 840*; 1962: 449*.

Head 11-14; depth 35-40; tail 1.5. All teeth small, slender, sharp; uniserial or biserial on jaws and vomer in young, increasing to 3-4 series with age; a few teeth on intermaxillary. Vertebrae 180-187 (Hawaiian and Marquesan specimens).

Olive brown, lighter below. Attains 39 cm. Indo-Pacific; Zanzibar to Kosi Bay.



42.6 *Cirrhimuraena playfairii:* 29 cm (Aldabra Id.). Arrow indicates anus.

Genus ***Ichthyapus*** de Barneville, 1847

No fins. Six or 7 species; 1 in our area.

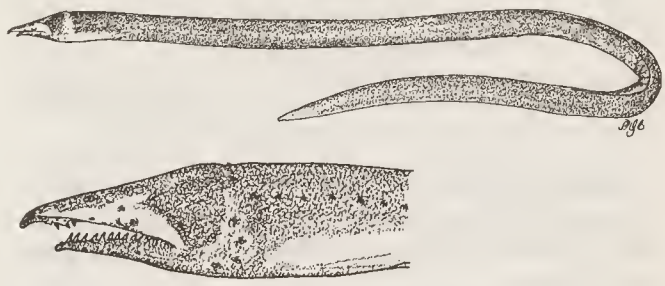
42.7 *Ichthyapus acuticeps*
(Barnard, 1923)

Sharpnose sand-eel — Skerpneus-sandpaling

Sphagebranchus acuticeps Barnard, 1923: 444 (off Tugela R., Natal, 37 fms). *Caecula orientalis (non* McClelland): Smith, **SFSA No. 1098.** *Caecula acuticeps* Smith, 1962: 453*.

Head 7.8-8.7; depth 40-50; tail 1.9-2.0. Gill openings ventral, longitudinal, close together. Teeth sharp, recurved, uniserial on jaws and vomer; a group of about 3 on intermaxillary. Vertebrae 101-108.

Uniform light brown, lighter below, darker markings on head, extreme tip of snout dark. Attains 40 cm. Known only from Zululand to Durban. A similar species *I. vulturis* (Weber & de Beaufort, 1916), with 117-134 vertebrae is known widely in the Indo-Pacific.



42.7 *Ichthyapus acuticeps:* 31 cm.

Genus ***Lamnostoma*** Kaup, 1856

Snout pointed, underside grooved. Four species; 1 in our area.

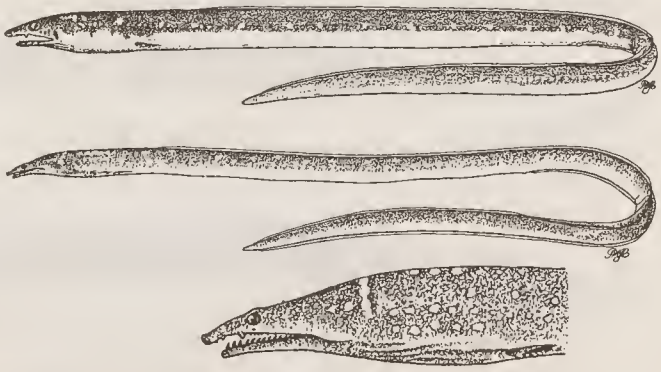
42.8 *Lamnostoma orientalis*
(McClelland, 1844)

Finny sand-eel — Gevinde sandpaling

Dalophis orientalis McClelland, 1844: 213. *Lamnostoma pictum* Kaup, 1856: 23*. *Caecula pterygera (non* Vahl): Smith, 1966: 93.

Head 8; depth 31-42; tail 2. Posterior nostril guarded by a downward-facing papilla. No P; D origin a little behind gill openings which are ventral, longitudinal and have a fold of skin alongside. Teeth sharp, recurved, uniserial. Vertebrae 132-141.

Dark above LL, lighter below with light spots as shown. Attains 36 cm. Natal, and probably elsewhere in turbid water; also India to central Indo-Pacific.



42.8 *Lamnostoma orientalis:* top: 18.5 cm; bottom: 27 cm.

Genus ***Leiuranus*** Bleeker, 1853

Groove on underside of snout; front nostrils tubular; gill openings vertical. One species.

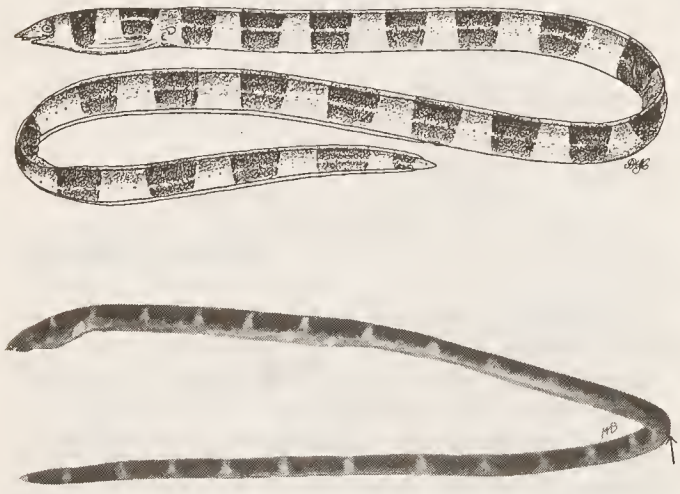
42.9 *Leiuranus semicinctus*
(Lay & Bennett, 1839)

Halfbanded snake-eel — Halfband-slangpaling

Ophisurus semicinctus Lay & Bennett, 1839: 66 (Polynesia). *Leiuranus semicinctus:* Smith, **SFSA No. 1099a*;** 1962: 455*. *Leiuranus phoenixensis:* Smith, 1961: 572, **No. 1099ab;** Smith, 1962: 455*.

Head 11.5-14.5; depth 33-70; tail 1.9-2.1. D origin above P. Jaw teeth sharp, conical, uniserial; a few stout teeth on intermaxillary and on vomer, sometimes absent on vomer in young. Vertebrae 162-170.

Body with 25-30 black saddles which meet below only on tail, ground colour white to yellow. Attains 60 cm. Indo-Pacific; south to Knysna, common in tropical western Indian Ocean.



42.9 *Leiuranus semicinctus:* top: 29 cm; bottom: *L. phoenixensis* colour variety, 46.5 cm (Inhaca Id.). Arrow indicates anus.

Genus ***Muraenichthys*** Bleeker, 1853

No prominent, median, ventral snout groove; C rays conspicuous; tail tip flexible; no P. About 20 species; 3 in our area.

KEY TO SPECIES

1a D origin nearly a head length before anus; head and tail orange . . . . . *M. xorae*
1b D origin above or behind anus; head and tail not orange 2

2a Snout acute; D origin distinctly behind anus . . . . . *M. gymnotus*
2b Snout bluntly rounded; D origin well before, to just behind, anus . . . . . *M. laticaudata*

42.10 *Muraenichthys gymnotus*
Bleeker, 1864

Slender worm-eel — Slank wurmpaling

Muraenichthys gymnotus Bleeker, 1864: 33, Pl. 50, Fig. 3 (Indonesia); Barnard, 1934: 228; Smith, **SFSA No. 1135*;** 1962: 461*; Smith, 1980: 185.

Head 9-10; depth about 40; tail 1.7. D origin about a half head length behind anus. All teeth small, sharp; biserial on upper jaw, uniserial on lower; a few slender canines on intermaxillary; biserial, becoming uniserial on vomer. Vertebrae 128-134.

Olive green above, belly yellow. Attains 17 cm. Bredasdorp to Zululand; east Africa to central Pacific.

42.11 *Muraenichthys laticaudata*
(Ogilby, 1897)

Redfin worm-eel — Rooivin-wurmpaling

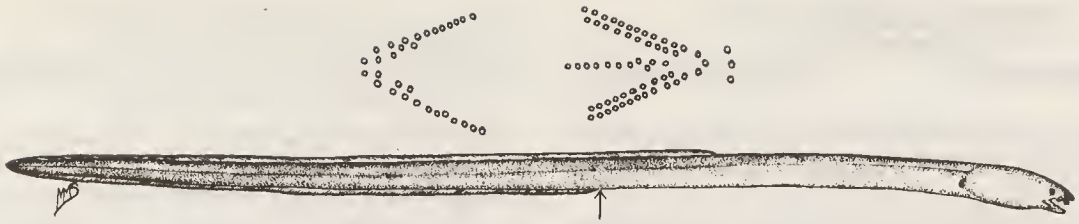
Myropterura laticaudata Ogilby, 1897: 247 (Fiji). *Muraenichthys laticauda:* Smith, 1958: 127; 1961: 572, **No. 1135b;** 1962: 462*; Smith, 1980: 185.

Head 9-10; depth 25-35; tail 1.8. D origin from nearly a head length before to just behind anus. Teeth small, sharp; mostly biserial on upper jaw, uniserial on lower; a few teeth on intermaxillary; biserial to uniserial on vomer. Vertebrae 126-139.

Olive green above, median fins reddish. Attains 35 cm. Indo-Pacific; south to East London.

42.10 *Muraenichthys gymnotus:* 33 cm (N. Mozambique).

42.11 *Muraenichthys laticaudata:* 33 cm (N. Mozambique). Arrow indicates anus.



42.12 *Muraenichthys xorae:* 25 cm holotype (Transkei), arrow indicates anus; tooth pattern, lower jaw on left.

42.12 *Muraenichthys xorae*
Smith, 1958

Orangehead worm-eel — Oranjekop-wurmpaling

Muraenichthys xorae Smith, 1958: 126, Fig. 1 (Xora, Transkei); 1961: 572, **No. 1135a*;** 1962: 462*.

Head 9-10; depth 35; tail 1.8. Snout blunt. Teeth small, sharp, biserial on upper jaw, uniserial on lower; a few teeth on intermaxillary; biserial, becoming uniserial on vomer. Vertebrae 139-144.

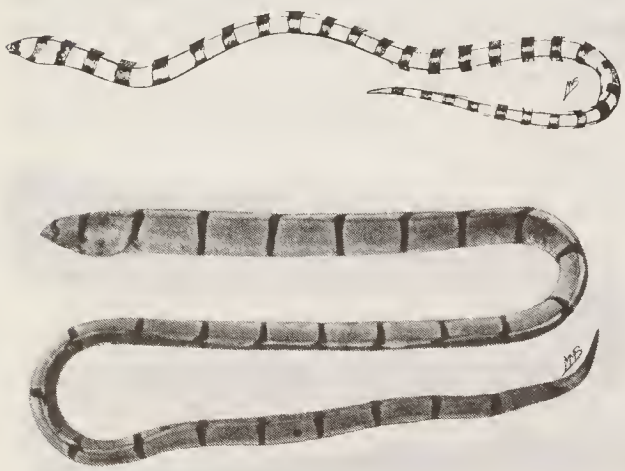
Olive yellow body; head and tail tip orange, belly greenish. Attains 25 cm. Algoa Bay to Natal.

Genus ***Myrichthys*** Girard, 1859

Teeth molariform or granular; D origin on nape; P rudimentary. Seven species; 2 in our area.

KEY TO SPECIES

1a Dark rings encircling head and body; A ends well before end of D . . . . . *M. colubrinus*
1b Several longitudinal series of dark spots along sides and dorsal surface; D & A end a short distance from tail tip . . . . . *M. maculosus*



42.13 *Myrichthys colubrinus:* top: 50 cm (Inhaca Id.); bottom: 76 cm (N. Mozambique).

42.13 *Myrichthys colubrinus*
(Boddaert, 1781)

Ringed snake-eel — Geringde slangpaling

Muraena colubrina Boddaert, 1781: 56, Pl. 2, Fig. 3 (Pacific). *Myrichthys colubrinus:* Smith, 1958: 135*; **SFSA No. 1099b*;** 1962: 448*.

Head 17.5-20; depth 48-55; tail 1.8-1.9. Teeth all blunt; biserial on jaws; a few on intermaxillary, 1-2 rows on vomer. Vertebrae 190-201.

Milky yellow with 25-32 narrow black rings, mostly meeting underneath; black spots may develop between rings with age. Attains 88 cm. Indo-Pacific; south to Delagoa Bay.

42.14 *Myrichthys maculosus*
(Cuvier, 1816)

Ocellated snake-eel — Swartogies-slangpaling

Muraena maculosa Cuvier, 1816: 232 (Indonesia). *Myrichthys maculosus:* Smith, 1962: 448*; Winterbottom, 1978: 44.

Head 12-16; depth 35-50; tail 1.7. Teeth all blunt; biserial on jaws and vomer; a few on intermaxillary. Vertebrae 189-194.

Pale cream with conspicuous large and small, round to oval black spots; young with black saddles. Attains 50 cm. Transkei to Kenya, Indo-Pacific and eastern Pacific.

42.14 *Myrichthys maculosus:* 48 cm (Kenya).

Genus ***Mystriophis*** Kaup, 1856

Two species; 1 in our area.

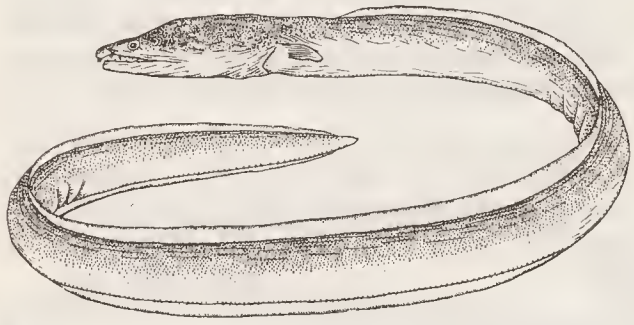
42.15 *Mystriophis rostellatus*
(Richardson, 1844)

West coast snake-eel — Weskus-slangpaling

Ophisurus rostellatus Richardson, 1844: 105 (Senegal). *Mystriophis rostellatus*: Kaup, 1856: 45; Smith, **SFSA No. 1105.** *Ophichthys rostellatus*: Günther, 1870: 56.

Head 8.1-10.5; depth 26-38; tail 1.6-1.8. Snout conical, clavate at its tip. D origin over end of P. Teeth pointed, unequal, a larger inner row on upper jaw, a larger outer row on lower jaw; uniserial on vomer, large fangs anteriorly. Vertebrae 154-158.

Brownish above, lighter below. Attains 136 cm. West Africa to Walvis Bay, to 40 m depth.



42.15 *Mystriophis rostellatus*: (E. Atlantic; after Böhlke, 1981).

Genus ***Ophichthus*** Ahl, 1789

Pectoral fins well developed. About 60 species; 7 in our area.

KEY TO SPECIES

1a Body coloration nearly uniform or darker on dorsal surface, not distinctly marked 2
1b Body coloration either marked, spotted, banded or saddled 5

2a Body slender and elongate, depth 44-55 in length . . . *O. marginatus*
2b Body stouter, depth 25-36 in length; 3

3a D origin a head length behind gill opening; head 15-16 in TL . . . . . *O. bennettai*
3b D origin less than a head length behind gill opening; head 9-11 in TL 4

4a Jaw teeth in 2 or 3 serial rows . . . . . *O. unicolor*
4b Jaw teeth in a single row . . . . . *O. apicalis*

5a Body overlain with 18-27 brown bands or saddles that are slightly wider than their interspaces . . . . . *O. bonaparti*
5b Body overlain with numerous ocellated or irregular dark spots, not regularly placed bands or saddles 6

6a Head and body overlain with numerous ocellated spots; D origin above middle of P . . . . . *O. polyophthalmus*
6b Head and body overlain with numerous solid dark spots; D origin above gill opening . . . . . *O. erabo*

42.16 *Ophichthus apicalis*
(Bennett, 1830)
PLATE 8

Bluntnose snake-eel — Stompneus-slangpaling

Ophisurus apicalis Bennett, 1830: 694 (Celebes). *Opichthus unicolor (non* Regan): Fowler, 1934: 416 (in part). *Ophichthus apicalis*: Smith, **SFSA No. 1103*;** 1962: 458*.

Head 9-11; depth 26-33; tail 1.6. D origin over or behind P. Teeth small, sharp; uniserial on jaws, in a cluster on intermaxillary and irregularly biserial on vomer. Vertebrae 136-139.

Pale brownish yellow, lighter on fins. Attains 45 cm. St. Francis Bay northwards, to Kenya, Madagascar and Indo-Pacific; from shore to 22 m depth.

42.17 *Ophichthus bennettai*
McCosker, 1986

Slender snake-eel — Slank slangpaling

Ophichthus bennettai McCosker, 1986: 1, Figs. 1 & 2 (32°14′S, 16°32′E).

Head 15.6; body depth at anus 32, depth behind gill openings 35.8; tail 1.6 in TL. P rounded, 3.9 in depth; D origin well behind P tip but in anterior trunk region. Teeth small, conical, biserial in upper jaw, uniserial on vomer and mandible. Vertebrae 167.

Live colour unknown; preserved uniform brown, darker dorsally; fins and tail tip yellow. Known from the single specimen, 68 cm in length, trawled in 372 m off the Cape Province west coast.

42.17 *Ophichthus bennettai*: 68 cm holotype showing head, anterior trunk region and dentition (western Cape coast).

42.16 *Ophichthus apicalis*: 45 cm (Natal). Arrows indicate D origin and anus.

42.18 *Ophichthus bonaparti*
(Kaup, 1856)

Saddled snake-eel — Saal slangpaling

Poecilocephalus bonaparti Kaup, 1856: 5, Fig. 3 (Indonesia). *Ophichthus bonaparti:* Smith, 1962: 459*.

Head 12-13; depth 33-38; tail 1.9. P small; D origin over P tip. Teeth stout, conical, sharp; uniserial on jaws and vomer, a few larger ones on intermaxillary. Vertebrae 157-163.

Golden yellow to cream along body with 18-27 prominent black saddles, a few meeting below; margin of D and A with irregular spots; conspicuous golden marbling and spots on snout and head. Attains 75 cm. Off Durban in 20 m (new record for South Africa); also known from Mauritius to Indonesia.

42.18 *Ophichthus bonaparti:* 55 cm.

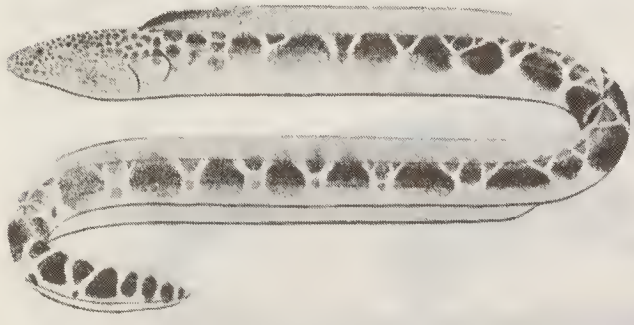
42.19 *Ophichthus erabo*
(Jordan & Snyder, 1901)
PLATE 8

Blotched snake-eel — Gevlekte slangpaling

Microdonophis erabo Jordan & Snyder, 1901: 870, Fig. 17 (Misaki, Japan). *Ophichthus erabo:* McCosker & Randall, 1982: 23*. *Ophichthus retifer* Fowler, 1935: 368, Fig. 9 (Durban); Smith, 1962: 459*. *Ophichthus triserialis (non* Kaup): Smith, **SFSA No. 1101*.**

Head 12; depth 23; tail 2.2. Teeth stout, conical; uniserial on jaws and vomer; a few on intermaxillary. Vertebrae 143-155.

Pale yellow, boldly marked with rich brown subcircular spots, smaller and more numerous on head. Attains 72 cm. Off Durban; Indo-Pacific to Hawaii.



42.19 *Ophichthus erabo:* 72 cm (Durban; after Fowler, 1935).

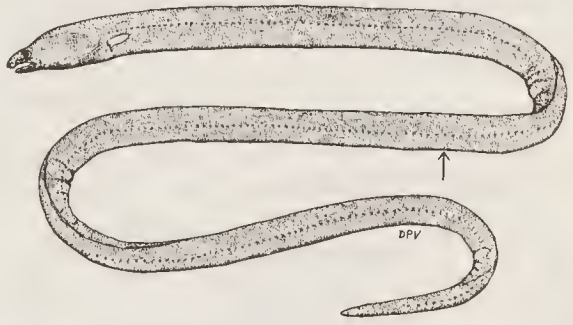
42.20 *Ophichthus marginatus*
(Peters, 1855)

Shorthead snake-eel — Kortkop-slangpaling

Ophisurus marginatus Peters, 1855: 272 (Mozambique). *Ophichthus marginatus:* Smith, **SFSA No. 1104;** 1962: 459*.

Head 14-18, depth 43-48, tail 1.6-1.8. Mouth cleft to behind eye; teeth in 2 or 3 rows on jaws and vomer; D origin behind P tip. Vertebrae 174, 186 (2 specimens).

Uniform olive-green dorsally, paler below. Attains at least 47 cm. Aldabra to Inhaca; once reported from Knysna (Smith, **SFSA**), but this specimen has been lost.



42.20 *Ophichthus marginatus:* 43 cm (Seychelles). Arrow indicates anus.

42.21 *Ophichthus polyophthalmus*
Bleeker, 1864
PLATE 7

Many-eyed snake-eel — Veeloog-slangpaling

Ophichthys polyophthalmus Bleeker, 1864: 43 (Indonesia). *Ophichthus polyophthalmus:* Smith, **SFSA No. 1101a*;** 1962: 459*.

Head 10.5; depth 22; tail 2.2. D origin slightly before middle of P. Teeth stout, conical; uniserial on jaws and vomer; a few on intermaxillary. Vertebrae 141-148.

Pale salmon red, yellow spots on head, yellowish ocelli with dark margins on body. Attains 50 cm. Off Delagoa Bay; Indo-Pacific to Hawaii.

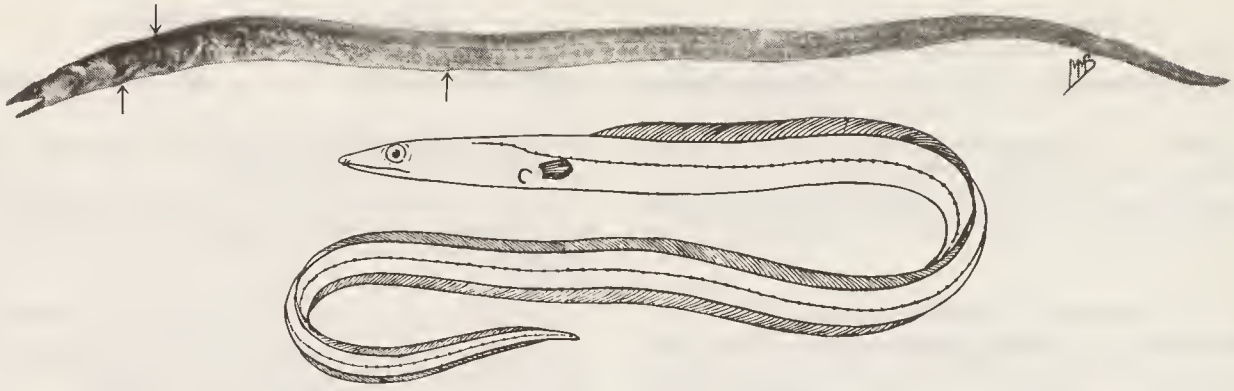
42.22 *Ophichthus unicolor*
Regan, 1908

Plain snake-eel — Effekleurige slangpaling

Ophichthys unicolor Regan, 1908: 250, Fig. 1 (16 mi. NE of Bird Id., Algoa Bay). *Ophichthys algoensis* Barnard, 1925: 498 (Algoa Bay). *Ophichthus unicolor:* Smith, **SFSA No. 1102*;** 1962: 458*.

Head 9.4, depth 30, tail 1.6. D origin above end of P. Teeth sharp, in 2-3 series on jaws and biserial on vomer.

Uniform brownish in preservative. Attains 30 cm. Known only from Algoa Bay. Said by Smith (1962) to be "remarkably close to *celebicus* Bleeker, 1856" from Indonesia.



42.22 *Ophichthus unicolor:* top: 30 cm holotype of *O. algoensis*; bottom: 26 cm (after Regan, 1908) (both Algoa Bay). Arrows indicate D origin, anus and gill opening.

Genus ***Ophisurus*** Lacepède, 1800

Two species; 1 in our area.

42.23 *Ophisurus serpens*
(Linnaeus, 1766)
PLATE 7

Sand snake-eel — Sandslangetjie

Muraena serpens Linnaeus, 1766: 425 (Atlantic). *Leptorhynchus capensis* Smith, 1849: Pl. 6 (Cape). *Ophisurus serpens:* Smith, **SFSA No. 1106*;** 1962: 455*; Smith & Smith, 1966: 137*.

Head 11.5-13.0; depth 40-60; tail 1.5-1.6. D origin 1-2 P lengths behind P. Teeth mostly canines on intermaxillary; uniserial, large fangs on vomer. Vertebrae 200-213.

Body olive green to brown above, paler below; head pores black; young silvery. Attains 120 cm (250 cm in New Zealand). Angola to southern Mozambique; Mediterranean, eastern Atlantic, Japan and Australasia.

Genus ***Phaenomonas*** Myers & Wade, 1941

Three species; 1 expected in our area.

42.24 *Phaenomonas cooperae*
Palmer, 1970

Short-maned sand-eel — Kortmaanhaar-slangpaling

Phaenomonas cooperae Palmer, 1970: 219 (Gilbert Islands).

Head 26-31; depth 117-150; tail 3.2-3.4. P & A absent. D origin on nape, disappearing after about 3 head lengths. Eye minute. Teeth small, pointed, uniserial. Vertebrae 243-270.

Pinkish in life, brown in preservative. Attains 59 cm. Red Sea and Aldabra to central Pacific; expected to occur in our area.

42.24 *Phaenomonas cooperae:* 59 cm (Palau; after McCosker, 1975). Arrow indicates anus.

42.23 *Ophisurus serpens:* 68 cm (Port Alfred). Arrow indicates anus.

Genus ***Phyllophichthus*** Gosline, 1951

Monotypic.

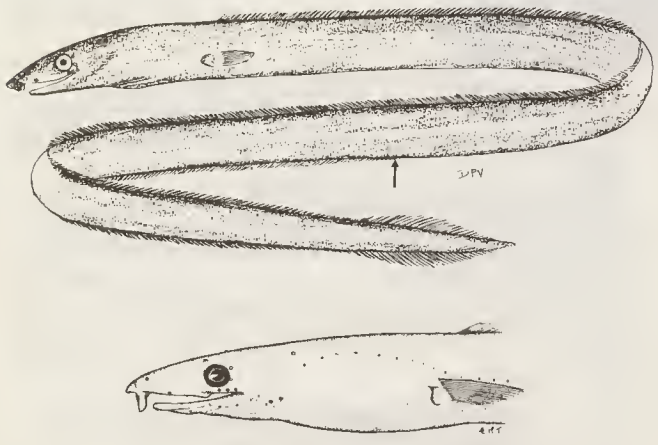
42.25 *Phyllophichthus xenodontus*
Gosline, 1951

Flappy snake-eel — Flappie-slangpaling

Phyllophichthus xenodontus Gosline, 1951: 316, Fig. 17 (Hawaii); Smith, 1957: 841*; Smith, 1961: 572, **No. 1098a**; 1962: 456*.

Head 10.7; depth about 40; tail about 2. D origin over mid-P. Front nostril with a leaf-like flap. Teeth small, sharp; jaw teeth uniserial; intermaxillary teeth biserial; none on vomer. Vertebrae 157-179.

Body olive yellow, head lighter. Attains 42 cm. Indo-Pacific; south to Delagoa Bay.



42.25 *Phyllophichthus xenodontus*: 27 cm (Kenya). Arrow indicates anus.

Genus ***Pisodonophis*** Kaup, 1856

Eight to 10 species; 2 in our area.

KEY TO SPECIES

1a D origin about P length behind P tip . . . . . *P. boro*
1b D origin above base or middle of P . . . . . *P. cancrivorus*

42.26 *Pisodonophis boro*
(Hamilton-Buchanan, 1822)

Estuary snake-eel — Strandmeer-slangpaling

Ophisurus boro Hamilton-Buchanan, 1822: 20 (Ganges). *Pisodonophis boro:* Smith, **SFSA No. 1100***; 1962: 457*.

Head 9-12; depth 30-36; tail 1.6-1.8. Teeth molariform, in multiserial bands on jaws, intermaxillary and vomer; teeth sharper and fewer in young. Vertebrae 171-180.

Olive brown above, lighter below. Attains 100 cm. Mostly in estuaries but enters freshwater. Indo-Pacific; south to Knysna.

42.26 *Pisodonophis boro:* 50 cm (Natal).

42.27 *Pisodonophis cancrivorus*
(Richardson, 1844)

Longfin snake-eel — Langvin-slangpaling

Ophisurus cancrivorus Richardson, 1844: 97, Pl. 50, Figs. 6-9 (Singapore). *Pisodonophis cancrivorus:* Smith, **SFSA No. 1100a***; 1962: 456*.

Head 9; depth 28; tail 1.7. Teeth molariform, in multiserial bands on jaws, intermaxillary and vomer; teeth sharper and fewer in lower jaw and in young. Vertebrae 155-159.

Olive above, lighter below; D with fine black edge. Attains 75 cm. Indo-Pacific; south to Algoa Bay.

42.27 *Pisodonophis cancrivorus:* 55 cm (Inhaca Id.).

Genus ***Yirrkala*** Whitley, 1940

Pectoral fins absent. About 12 species; 2 in our area. *Caecula brevirostris* (Peters, 1855), listed by Smith (**SFSA No. 1097***), is probably a synonym of *Yirrkala fusca* (Zuiew, 1793), which does not occur in our area.

KEY TO SPECIES

1a Origin of D above gill openings; body depth 41-45; vertebrae 167-174 . . . . . *Y. tenuis*
1b Origin of D slightly before gill openings; body depth 65-75; vertebrae 150-153 . . . . . *Y. lumbricoides*

42.28 *Yirrkala lumbricoides*
(Bleeker, 1853)

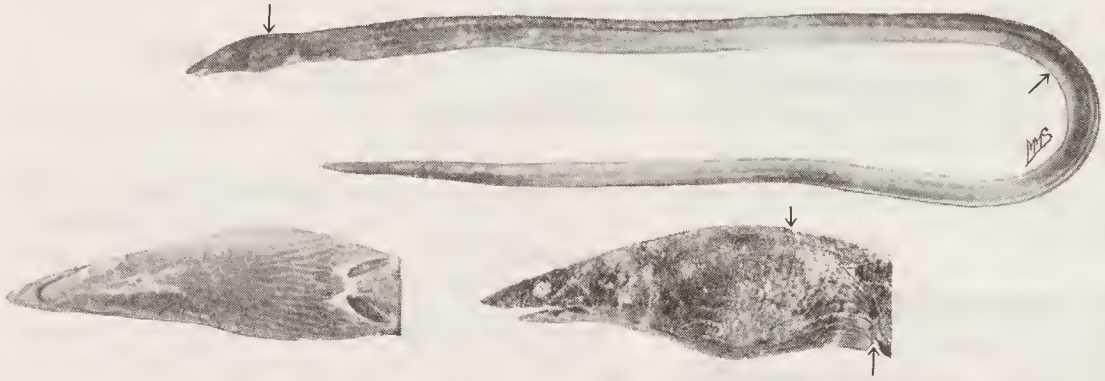
Earthworm snake-eel — Erdwurm-slangpaling

Ophisurus lumbricoides Bleeker, 1853: 32 (Indonesia).

Head 15-16; depth 65-75; tail 2.0. Gill openings sublateral, transverse. Teeth small, sharp; uniserial on jaws; biserial to uniserial on vomer; a few larger ones on premaxillary, well separated from those on vomer. Head and snout covered with minute papillae. Vertebrae 150-153.

Plain light brown, fins white. Attains 44 cm. Off Durban in 20 m (new record for South Africa); known also from northern Australia and elsewhere in Indo-Pacific.

42.28 *Yirrkala lumbricoides*: 43.5 cm.



42.29 *Yirrkala tenuis*: top: 48.5 cm (Inhaca Id.), arrows indicate D origin and anus; bottom: ventral and lateral views of head, arrows indicate gill openings and D origin.

42.29 *Yirrkala tenuis*
(Günther, 1870)

Thin sand-eel — Maer sandpaling

Ophichthys tenuis Günther, 1870: 83 (no locality, possibly Mauritius). *Caecula natalensis* Fowler, 1934: 416, Fig. 5 (Umgeni, Natal); Smith, **SFSA No. 1096***; Smith, 1962: 453*. *Pantonora tenuis*: Smith, 1965: 719*.

Head 13-15; depth 41-45; tail 2.1-2.3. Gill openings sublateral, transverse. Teeth small, sharp, uniserial on jaws; biserial to uniserial on vomer. Vertebrae 167-174.

Olive brown above, dusky on head, lighter below. Attains 53 cm. Natal to southern Mozambique in estuaries; also Red Sea and possibly Mauritius.

Family No. 43: XENOCONGRIDAE

by P.H.J. Castle

False morays — **Vals bontpalings**

Pectoral fins present or absent. Dorsal fin origin over gill opening or just behind; median fins continuous around tail. Mouth reaching beyond rear margin of eye; posterior nostril opening downwards through lip, sometimes covered by a flap below eye. Teeth small, stout, pointed, recurved, in about 3 rows on jaws, in 2 separate rows on vomer. No scales. Plain coloured or mottled.

Most species less than 20 cm; burrow in sand at depths of 1 - 200 m. Rarely collected and of no commercial significance. Eight genera and 17 species; 2 genera and species in our area, but others can be expected to occur. Reviewed by Smith (1965) and Böhlke & Smith (1968).

KEY TO GENERA

1a P present; 6 pores along side of lower jaw before mouth angle; colour plain . . . . . *Kaupichthys*
1b P absent; 5 pores along side of lower jaw before mouth angle; colour mottled in adult, distinct dark saddles in young . . . . . *Chlopsis*

Genus ***Chlopsis*** Rafinesque, 1810

Four species; 1 in our area.

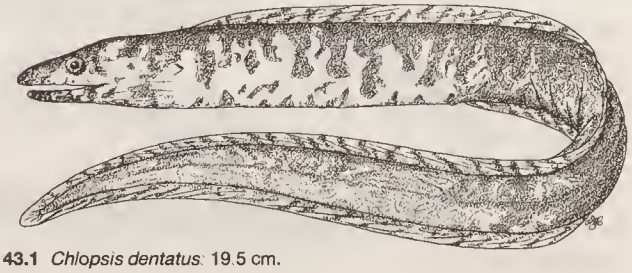
43.1 *Chlopsis dentatus*
(Seale, 1917)

Mottled false moray — Gevlekte vals bontpaling

Garmanichthys dentatus Seale, 1917: 80 (western North Atlantic). *Chlopsis dentatus*: Böhlke & Smith, 1968: 31*.

Head 7-8, depth about 20. Teeth small, biserial to triserial on jaws, in 2 separate parallel bands on vomer. Vertebrae 121-124.

Brown to dark brown saddles on light background in young, becoming irregularly mottled in adult. Attains 20 cm. Known from 135 m off Delagoa Bay; also off Kenya and western Atlantic.



43.1 *Chlopsis dentatus*: 19.5 cm.

Genus ***Kaupichthys*** Schultz, 1943

Three species; 1 in our area.

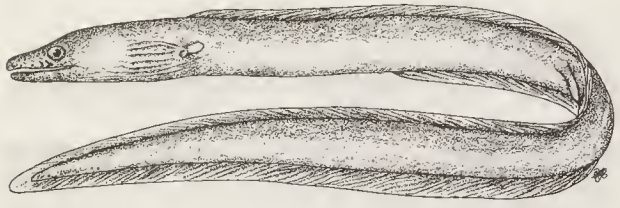
43.2 *Kaupichthys hyoproroides*
(Stromman, 1896)

Plain false moray — Eenkleurige vals bontpaling

Leptocephalus hyoproroides Stromman, 1896: 39, Pl. 4, Fig. 5-6 (larva, North Atlantic). *Kaupichthys diodontus:* Smith, 1965: 48*. *Kaupichthys hyoproroides:* Böhlke & Smith, 1968: 28; Winterbottom, 1978: 42.

Head about 7, depth 22. Teeth small, triserial in jaws, 2 diverging rows on vomer. Vertebrae 98-123 (114-115 in two South African specimens).

Greenish brown above, lighter below. Attains 30 cm. Natal only; also western Indian Ocean, central and North Pacific and Caribbean.



43.2 *Kaupichthys hyoproroides:* 12.5 cm.

Family No. 44: MORINGUIDAE

by P.H.J. Castle

Spaghetti eels — **Spaghetti-palings**

Body, very long, slender. Pectoral absent or markedly reduced, but well developed in mature males. Dorsal and anal fins well behind anus; continuous around tail, vestigial in immature males and females, entirely absent along their mid-portions in mature males. Mouth small; lower jaw projecting. Teeth small, sharp, more or less uniserial on jaws and vomer. Eye enlarged in mature males. Lateral-line pores obvious. No scales.

Olive, yellow to orange, bluish below; males longitudinally bicoloured. Some species attain 90 cm. Immature fishes and females usually on shallow, soft bottom shores, in estuaries or in coral sand; mature males pelagic; larvae distinctive, in open ocean. Tropical seas only; of no commercial significance. Two genera, 1 in our area; about 12 species. Reviewed by Castle (1968).

Genus ***Moringua*** Gray, 1831

About 10 species; 3 in our area.

KEY TO SPECIES

1a P absent; head 16-19, depth 75-105 in TL; about 100 LL pores before anus; vertebrae 153-160 . . . . . *M. javanica*
1b P present though reduced to a minute flap; head 10-15, depth 36-63 in TL 2

2a Depth 36-51 in TL; about 63 LL pores before anus; vertebrae 105-113 . . . . . *M. microchir*
2b Depth 49-63 in TL; about 73 LL pores before anus; vertebrae 115-125 . . . . . *M. ferruginea*

44.1 *Moringua ferruginea*
Bliss, 1883
PLATE 8

Rusty spaghetti eel — Roosrooi spaghetti-paling

Moringua ferruginea Bliss, 1883: 57 (Mauritius); Castle, 1968: 25. *Moringua javanica (non* Kaup): Smith, **SFSA** Fig. 1094a only; 1962: 463* (in part).

Head 13-15 in TL.

Attains about 40 cm. Southern Mozambique, common northwards; also throughout Indo-Pacific to Easter Island.

44.1 *Moringua ferruginea:* 120.5 cm (Inhaca Id.). Arrow indicates anus.

44.2 *Moringua javanica*
(Kaup, 1856)

Java spaghetti eel — Javaanse spaghetti-paling

Aphthalmichthys javanicus Kaup, 1856: 105, Pl. 14, Fig. 71 (Java). *Moringua javanica:* Smith, **SFSA No. 1094a** (in part, not figure); 1962: 463* (in part); Castle, 1968: 25.

Head 16-19 in TL.

Attains 90 cm. Southern Mozambique northwards; also throughout Indo-West Pacific to Japan.

44.2 *Moringua javanica:* 56 cm.

44.3 *Moringua microchir*
Bleeker, 1853

Spaghetti eel — Spaghetti-paling

Moringua microchir Bleeker, 1853: 124 (Indonesia); Smith, 1961: 572, **No. 1094a** (in part); 1962: 463* (in part); Castle, 1968: 25.

Head 10-15 in TL. Juveniles orange-yellow, belly bluish.

Attains about 30 cm. Natal, common northwards; Indo-West Pacific to Japan.

Family No. 45: MURAENESOCIDAE

by P.H.J. Castle

Pike congers — **Snoekpalings**

Body elongate, tail compressed. Pectoral fins present. Dorsal origin slightly before pectoral base; median fins continuous around tail. Mouth relatively large, terminal. Posterior nostril a simple hole in front of eye. Teeth relatively large, especially those on front of jaws and on vomer. Lateral-line pores indistinct, head pores absent. No scales.

Plain grey-brown, lighter below with median fins dark-edged. Adults on bottom offshore. Our single species attains 180 cm and is good eating. All oceans, abundant enough in India and southeast Asia to be commercially significant. Seven genera worldwide, 1 genus and species in our area. Reviewed by Castle & Williamson (1975).

Genus ***Muraenesox*** McClelland, 1843

Two species; 1 in our area. *M. cinereus* (Forsskål, 1775), of the Red Sea and northern Indian Ocean to Japan, has 66-78 D rays before a vertical at the anus, 40-47 LL pores before the anus, interorbital width about 8.2 in head length, and 145-159 vertebrae.

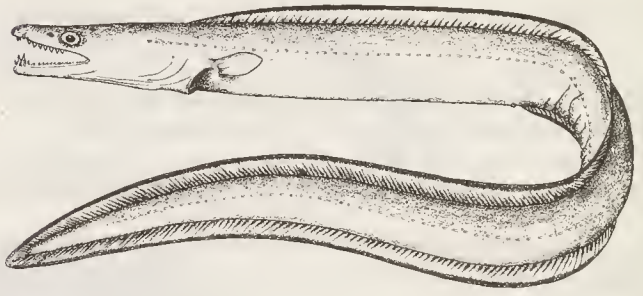
45.1 *Muraenesox bagio*
(Hamilton-Buchanan, 1822)

Pike conger — Snoekpaling

Muraena bagio Hamilton-Buchanan, 1822: 364 (India). *Muraenesox cinereus (non* Forsskål): Smith, **SFSA No 1117*;** Castle, 1967: 7*. *Muraenesox bagio:* Castle & Williamson, 1975: 4*.

D rays before anus 47-59; LL pores before anus 33-39. Head 5.5-6; depth 16-22 in TL. Mouth extends beyond eye. Interorbital 9-11 in head. Teeth large; those in middle row of vomer very prominent, blade-like, with anterior and posterior basal cusps; those in principal row of lower jaw similar, erect, not turned outwards. Vertebrae 128-141.

Body greyish brown, lighter below; median fins edged with black. Attains 180 cm. Known from Knysna eastwards, caught occasionally by hook and line off Port Elizabeth or Durban, in 100 m; also Madagascar, Mauritius and elsewhere in the Indo-Pacific. "A nasty brute to handle", according to J.L.B. Smith, who also described the scene on a trawler (under the title "The Cook Cooked") when the cook was examining the catch to select fish to fry for the crew. Suddenly he was chased by a large pike conger and could only escape the snapping jaws by leaping onto the stove.



45.1 *Muraenesox bagio:* 150 cm.

Family No. 46: SYNAPHOBRANCHIDAE

by P.H.J. Castle

Cutthroat eels — **Keelsnypalings**

Pectoral fins present. Dorsal origin more or less over pectoral base to behind anus; anus far forwards, close to pectoral; median fins continuous around tail. Mouth a small, terminal slit or more often large, extending to beyond eye. Rear nostril very close to front of eye. Teeth small, uniserial to multiserial on jaws; teeth on vomer much larger, few to multiserial. Gill openings ventrolateral, or variously ventral to entirely confluent below throat. Lateral line complete or reduced to a few pores in front. Scales present or absent. Grey to black. Mostly on bottom in 100 - 2 000 m. Larvae very distinctive, in open ocean. Some species attain 120 cm. All oceans; of no commercial significance. Twelve genera, 18 species; 6 genera and 7 species in our area. Reviewed by Robins & Robins (1976).

KEY TO GENERA

1a Snout short, blunt, mouth a small transverse slit; scales present . . . . . *Simenchelys*
1b Snout normal, mouth extends to below rear margin of eye or beyond; scales present or absent 2

2a LL reduced to a few pores anteriorly; anus about level with P tip; scales absent . . . . . *Dysomma*
2b LL complete; anus considerably behind P base (except *Diastobranchus);* scales present 3

3a Gill openings ventrolateral, oblique . . . . . *Diastobranchus*
3b Gill openings ventral, horizontal 4

4a Vomerine teeth few, very large, uniserial; gill openings separate . . . . . *Ilyophis*
4b Vomerine teeth many, more or less irregularly biserial; gill openings joined below throat, at least anteriorly 5

5a D origin over P base; anus in about middle of TL . . *Histiobranchus*
5b D origin over or behind anus; anus in anterior third of TL . . . . . *Synaphobranchus*

Genus ***Diastobranchus*** Barnard, 1923

Monotypic.

46.1 *Diastobranchus capensis*
Barnard, 1923

Diastobranchus capensis Barnard, 1923: 441 (Cape Point); 1925: 185*; Castle, 1961: 23*. *Ilyophis capensis:* Smith, **SFSA No. 1091*.** *Diastobranchus danae* Whitley, 1951: 27.

Head 7, depth 14. Body compressed along tail. D origin well behind anus; anus just behind P tip. Small elongate scales arranged in basket-weave fashion. LL pores before anus about 27. Vertebrae ca. 172.

Dark purplish black. Attains 180 cm. Off Cape Point, in 860 m; also Australia and New Zealand.

46.1 *Diastobranchus capensis:* 112 cm.

Genus ***Dysomma*** Alcock, 1889

Six species; 1 in our area.

46.2 *Dysomma anguillare*
Barnard, 1923

Arrowtooth eel — Pyltandpaling

Dysomma anguillaris Barnard, 1923: 443 (off Tugela River, Natal); 1925: 195*; Smith, **SFSA No. 1116.** *Dysomma anguillare:* Böhlke, 1949: 36; Robins & Robins, 1970: 313*; 1976: 263.

Head 7, depth 20. D origin over gill opening; anus below P. Snout and lower jaw covered with small papillae. Teeth on upper jaw small, in a narrow band; much larger, fewer and uniserial in lower jaw; 3 or 4 large canines on vomer. Vertebrae ca. 127.

Greyish white, median fins darker behind. Attains 36 cm. Known from the holotype from 115 m off Tugela River, Natal and another specimen from the same area, reported here; also known from Gulf of Mexico and western Pacific.

46.2 *Dysomma anguillare:* 22 cm.

Genus ***Histiobranchus*** Gill, 1883

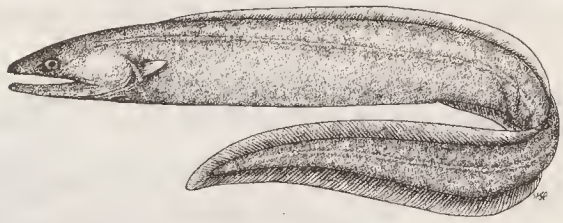
Considered by Robins & Robins (1976) to be a synonym of *Synaphobranchus*. Scales present. Two species; 1 in our area.

46.3 *Histiobranchus bathybius*
(Günther, 1877)

Synaphobranchus bathybius Günther, 1877: 445 (North Pacific); 1887: 254*. *Synaphobranchus australis* Regan, 1913: 235, Pl. 8, Fig. 5 (Indian Ocean, ca. 46°S, 45°E; 2 515 m). *Histiobranchus bathybius:* Smith, **SFSA No. 1090*;** Castle, 1964: 36*.

Head ca. 7, depth 11. D origin over P base. Teeth small, sharp, in bands on jaws, in a distinct intermaxillary patch and in an irregularly biserial row on vomer. Vertebrae 126-131.

Plain brown to black. Attains 65 cm. Off Durban, in 2 720 m; also in Atlantic and Indo-Pacific.



46.3 *Histiobranchus bathybius:* 65.5 cm.

Genus ***Ilyophis*** Gilbert, 1892

Gill openings horizontal ventral slits. Two species; 1 in our area. *Ilyophis arx* Robins & Robins, 1976 with no scales and 131-135 vertebrae, is known only from the East Pacific.

46.4 *Ilyophis brunneus*
Gilbert, 1892

Ilyophis brunneus Gilbert, 1892: 352 (East Pacific); Goode & Bean, 1896: 141*; Smith, **SFSA No. 1092*;** Castle, 1964: 39*; Robins, 1971: 168.

Head 8.5, depth 21. D origin over P base. Teeth small, sharp, in bands on jaws, in a distinct intermaxillary patch, and in one row of large teeth on vomer. Vertebrae 144-151.

Dark brown, tinged with violet on snout. Attains 58 cm. Off the Cape, in 1 500 m; also from central Atlantic and Pacific.

46.4 *Ilyophis brunneus:* 55.5 cm.

Genus ***Simenchelys*** Gill, 1879

Monotypic.

46.5 *Simenchelys parasiticus*
Gill, 1879

Simenchelys parasiticus Gill, 1879: 27 (western North Atlantic); Goode & Bean, 1896: 139*; Smith, **SFSA No. 1093***; Castle, 1961: 16*.

Body strongly compressed behind vent; head 11, depth 11. Snout blunt; mouth a small terminal transverse slit. Teeth few, broad, uniserial on jaws, none on vomer. D origin over P tip. Gill openings small, oblique slits below throat. Vertebrae 118-120.

Uniform grey to greyish brown, darker on edges of fins and along LL. Reported to feed on the flesh of large fish and probably also on dead fish and invertebrates. Attains 53 cm. Known off the Cape in 1 480 m; also from central East and West Atlantic, New Zealand and Japan.

46.5 *Simenchelys parasiticus:* 48 cm.

Genus ***Synaphobranchus*** Johnson, 1862

Four species; 2 in our area.

KEY TO SPECIES

1a D origin above anus; D rays ca. 230, A rays ca. 230, vertebrae 128-139; scales oval, loosely packed . . . . . *S. affinis*
1b D origin well behind anus; D rays ca. 270, A rays ca. 260, vertebrae 142-151; scales elongate-oval, tightly packed . . *S. kaupii*

46.6 *Synaphobranchus affinis*
Günther, 1877

Synaphobranchus affinis Günther, 1877: 445 (Japan); Castle, 1961: 20*; Smith, 1968: 20*. *Synaphobranchus pinnatus (non* Gray): Smith, **SFSA No. 1089** (in part).

Head 7-8, depth 12.5. Teeth small, sharp, in bands on jaws; a distinct intermaxillary patch of larger teeth; uniserial on vomer. Vertebrae 128-139.

Uniform dark grey. Attains 52 cm. Off Durban, in 475 m; also from New Zealand, North Pacific, Gulf of Mexico and Gulf of Guinea.

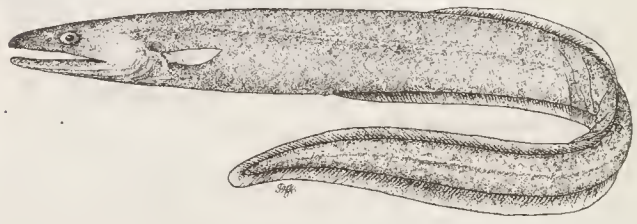
46.6 *Synaphobranchus affinis:* 47.5 cm.

46.7 *Synaphobranchus kaupii*
Johnson, 1862

Synaphobranchus kaupii Johnson, 1862: 169 (Madeira); Castle, 1964: 37*; Robins, 1971: 166*. *Synaphobranchus pinnatus (non* Gray): Smith, **SFSA No. 1089*** (in part).

Head 7-8, depth 16.5. Teeth small, sharp, in bands on jaws, in a distinct intermaxillary patch of larger teeth, uniserial on vomer. Vertebrae 142-151.

Dark purplish grey. Attains 80 cm. Off the Cape, in about 800 m; also from the Atlantic and Indo-Pacific.



46.7 *Synaphobranchus kaupi:* 44 cm.

Family No. 47: NETTASTOMATIDAE

by P.H.J. Castle

Witch eels **Heks-palings**

Body long, slender, tail narrow, even thread-like. Pectoral fins absent. Dorsal fin origin about over gill openings; median fins continuous around tail. Gill openings small, separate, ventrolateral. Mouth large; jaws produced, upper sometimes with a delicate, fleshy tentacle. Teeth small, multiserial on jaws and vomer. Lateral-line pores prominent, continuing onto head. No scales.

Dark grey to black, median fins black around tail. Adults on or near bottom in 500 - 2 000 m; larvae in open ocean. Some species attain 100 cm. All oceans, but of no commercial significance. Five genera worldwide, 2 genera and 2 species in our area.

KEY TO GENERA

1a Rear nostril above rear edge of eye; no fleshy tentacle on snout . . . . . *Nettastoma*
1b Rear nostril above front edge of eye; snout with a long, fleshy tentacle at tip . . . . . *Venefica*

Genus ***Nettastoma*** Rafinesque, 1810

Three species; 1 in our area. Revised by Smith, Böhlke & Castle (1981).

47.1 *Nettastoma parviceps*
Günther, 1877

Nettastoma parviceps Günther, 1877: 446 (Japan); 1887: 253*; Barnard, 1925: 194; Smith, **SFSA No. 1119***; Smith, Böhlke & Castle, 1981: 540*.

Head 7.5, depth 25. Vertebrae ca. 250. Snout tip with a small dorsal protuberance.

Body buff to purplish grey, paler below; median fins black-edged; snout and lower jaw pinkish grey. Attains 82 cm. Occasionally taken by trawl from southeast coast to southern Mozambique in up to 750 m; also known from Japan, Hawaii, Australia and New Zealand.

47.1 *Nettastoma parviceps:* 62 cm.

Genus ***Venefica*** Jordan & Davis, 1892

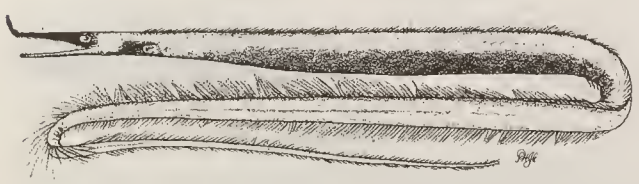
Four poorly known species; 1 in our area.

47.2 *Venefica proboscidea*
(Vaillant, 1888)

Nettastoma proboscidea Vaillant, 1888: 84, Pl. 7, Fig. 3 (off Atlantic Morocco). *Venefica proboscidea:* Smith, **SFSA No. 1118.**

Head 11.5, depth 37. Preanal vertebrae ca. 60. Teeth small, in bands on jaws and vomer.

Greyish black, darker on snout, throat and belly. Attains 100 cm. Known off the Cape, in 1 500 m; also eastern Atlantic and elsewhere.



47.2 *Venefica proboscidea:* 63 cm.

Family No. 48: SERRIVOMERIDAE

by P.H.J. Castle

Sawtooth eels **Saagtand-palings**

Pectoral fins rudimentary. Dorsal origin behind anus; median fins continuous around tail. Jaws elongate, narrow, with rows of minute teeth; vomer with a saw-like row of enlarged lancet-like teeth. Gill openings lateral, subvertical. Lateral-line pores minute. No scales.

Uniform black, overlaid with silver. Occurs in midwater down to 4 500 metres, larvae and juveniles nearer surface. Attain 60 cm. No commercial significance. Three genera; several species worldwide but all require further study before definitive names can be applied; 1 genus in our area.

Genus ***Serrivomer*** Gill & Ryder, 1883

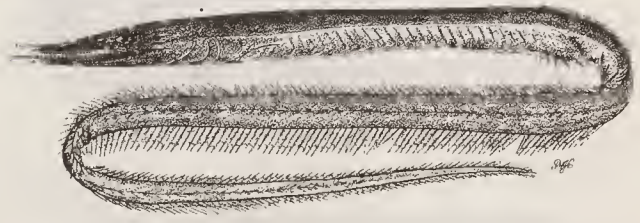
A single species in our area.

48.1 *Serrivomer beanii*
Gill & Ryder, 1883

Serrivomer beanii Gill & Ryder, 1883: 261 (North Atlantic); Goode & Bean, 1896: 155*; Smith, **SFSA No. 1109***; Grindley & Penrith, 1965: 283; Hulley, 1972: 232.

Head 7, depth 50. D & A very delicate; D origin behind anus which is about a head length behind gill opening. Vertebrae 154-165.

Head, abdomen and tail brown to black or silvery, but skin readily abraded. Attains 78 cm. Known from midwater depths off the Cape and Natal; also in Indian Ocean and North Atlantic.



48.1 *Serrivomer beanii:* 78 cm.

Family No. 49: DERICHTHYIDAE

by P.H.J. Castle

Longneck eels **Langhals-palings**

Body long, slender, rather narrow in pectoral region, laterally compressed. Pectoral fins present. Dorsal origin behind pectoral; median fins continuous around tail. Snout either short and broad, or long and slender; jaws long; anterior nostrils are short tubes on end of snout, directed

forwards. Teeth small, in broad bands on jaws and vomer. Gill openings nearly horizontal, under throat, but quite separate. Lateral line and head pores obvious. No scales. Uniform brown to black. Attains 40 cm.

Occurs in midwater of open ocean in depths greater than 500 m. No commercial significance. Two genera; 2 of the 3 valid species are found in our area.

KEY TO GENERA

1a Snout blunt, rounded, jaws about equal; D origin well behind P, about midway between snout and anus . . . . *Derichthys*
1b Snout narrow, its tip expanded, lower jaw much shorter than upper; D origin just behind P tip . . . . . *Nessorhamphus*

Genus ***Derichthys*** Gill, 1884

Monotypic.

49.1 *Derichthys serpentinus* Gill, 1884

Derichthys serpentinus Gill, 1884: 443 (North Atlantic); Goode & Bean, 1896: 161*; Castle, 1970: 444. *Grammatocephalus kempi* Norman, 1930: 339, Fig. 34 (off Cape Town).

Head 7.5, depth 20. Snout overlapping lower jaw; a series of longitudinal striations behind eye; about 55 pores in LL before anus. Vertebrae 126-134.

Uniform black, LL pores light. Attains 40 cm. A single specimen from west of Cape Town, in 850 - 950 m; occurs worldwide.

49.1 *Derichthys serpentinus:* 22.5 cm.

Genus ***Nessorhamphus*** Schmidt, 1930

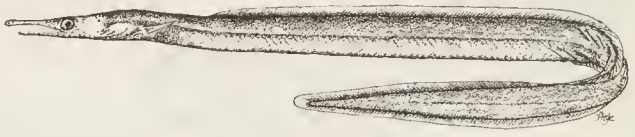
Two species; *N. danae* Schmidt, 1931 (with 136-146 vertebrae and a dark, midventral streak from head to anus) is known from the tropical Atlantic and Indian oceans.

49.2 *Nessorhamphus ingolfianus* (Schmidt, 1912)

Leptocephalus ingolfianus Schmidt, 1912: 49, Pl. 3, Fig. 8 (larva, North Atlantic). *Nessorhamphus ingolfianus:* Schmidt, 1930: 371; 1931: 4*.

Head 7, depth 23. Anus at about midpoint of body. Snout and upper jaw extended well forwards, the tip spatulate and expanded; vomerine teeth in a broad patch in front of lower jaw with mouth closed. Vertebrae 150-159.

Dark brown. Attains 40 cm. Known in moderately deep water off the Cape; also worldwide.



49.2 *Nessorhamphus ingolfianus:* 35 cm.

Family No. 50: CYEMIDAE

by P.H.J. Castle

Arrow eels **Pylpalings**

Body short, truncated, arrow-shaped, delicate. Pectoral fins present. Dorsal fin origin over anus; median fins continuous around tail. Mouth extends well behind eye; jaws elongated. Teeth small to very minute, in many rows, forming rasp-like, tooth-bearing surfaces on jaws and vomer. Gill openings lateral, below pectoral. Lateral line and head pores when present are delicate tubes. No scales. Uniform black or red.

Occurs in midwater from 800 to 5 000 m, the larvae nearer the surface and very distinctive. No commercial significance. Two monotypic genera, both in our area.

KEY TO GENERA

1a Body black; C truncate; eye small; vertebrae 68-80 . . . . . *Cyema*
1b Body red; C pointed; eye greatly reduced; vertebrae 101-108 . . . . . *Neocyema*

50.1 *Cyema atrum* Günther, 1878

Cyema atrum Günther, 1878: 251 (southern Indian Ocean and East Pacific); 1887: 265*; Bertin, 1937: 25.

Body distinctively short and arrow-shaped, with a squarish tail and much elongated jaws. Vertebrae 68-80.

Body black. Attains 60 cm. A distinctive midwater species known from deep-water off our southwest coast; occurs worldwide.

50.1 *Cyema atrum:* 11 cm.

50.2 *Neocyema erythrosoma*
Castle, 1978

Neocyema erythrosoma Castle, 1978: 70, Figs. 1-4, 7-9 (South Atlantic: 37°S, 5°E).

Body somewhat arrow-shaped; jaws not much elongated. Nostrils quite separate, above upper lip; eye deep under skin and much reduced. Vertebrae 101-108.

Body bright red. Attains 16 cm. A distinctive midwater species known from only 2 specimens taken west of Cape Town in 2 000 - 2 200 m.

50.2 *Neocyema erythrosoma:* 14 cm.

Family No. 51: NEMICHTHYIDAE

by P.H.J. Castle

Snipe eels **Snippalings**

Body extremely long, even filamentous, delicate. Pectoral fins present. Dorsal fin origin more or less over pectoral; anus far forwards, somewhat behind or nearly under pectoral base; median fins continuous around tail. Jaws greatly produced forwards, and typically curving apart, but in mature males the jaws are greatly shortened. Teeth, minute, in many rows, forming rasp-like surfaces on jaws and vomer. Lateral line and head pores conspicuous. No scales.

Uniform brownish-black or with scattered pigment, above or below lateral line. Attains 120 cm. Snipe eels are mesopelagic fishes captured from the surface down to 2 000 m or more. No commercial significance. Three genera and 8 species worldwide; 2 genera and 4 species in our area. Comprehensively reviewed by Nielsen & Smith (1978). Predorsal and preanal distances are measured from rear edge of orbit to dorsal and anal fin origins respectively.

KEY TO GENERA

1a LL of a single row of pores; anus about a head length behind P base . . . . . *Avocettina*
1b LL of 3 rows of pores; anus almost directly below P base . . . . . *Nemichthys*

Genus ***Avocettina*** Jordan & Davis, 1892

No caudal filament; elongate sensory ridges behind eyes; anus well behind P. Four species; 2 in our area.

KEY TO SPECIES

1a LL pores 198-216; predorsal 27-35% of preanal; D rays 325-436; A rays 280-368 . . . . . *A. acuticeps*
1b LL pores 176-188; predorsal 17-25% of preanal; D rays 254-297; A rays 218-257 . . . . . *A. paucipora*

51.1 *Avocettina acuticeps*
(Regan, 1916)

Leptocephalus acuticeps Regan, 1916: 140, Pl. 7, Fig. 5 (larva, South Atlantic). *Avocettina infans (non* Günther): Smith, SFSA **No. 1108** (in part); Grindley & Penrith, 1965: 283; Hulley, 1972: 232. *Borodinula infans (non* Günther): Castle, 1969: 18. *Avocettina acuticeps:* Nielsen & Smith, 1978: 31*.

D origin over P. Vertebrae 198-216.

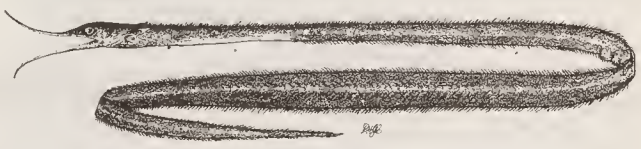
Dark brown to black. Attains 77 cm. Known offshore from the Cape to Natal; also from Brazil, northern New Zealand and equatorial Pacific.

51.2 *Avocettina paucipora*
Nielsen & Smith, 1978

Avocettina infans (non Günther): Smith, SFSA **No. 1108** (in part). *Avocettina paucipora* Nielsen & Smith, 1978: 33, Fig. 19 (New Zealand).

D origin over P. Vertebrae 176-188.

Dark brown to black. Attains 55 cm. One specimen off Durban; also from southwest Atlantic, South Indian and South Pacific oceans.



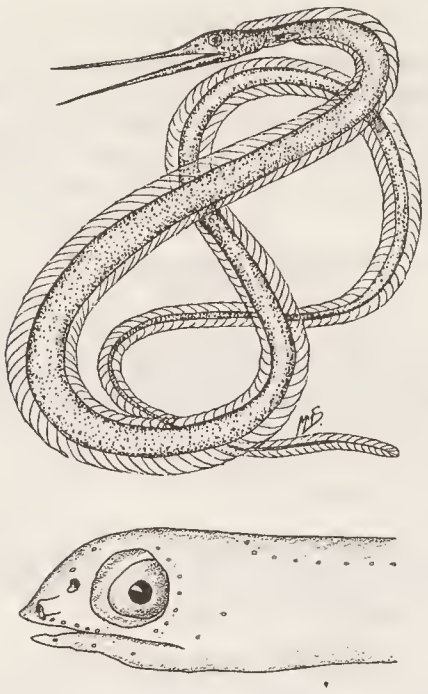
51.2 *Avocettina paucipora:* 51 cm.

Genus ***Nemichthys*** Richardson, 1848

Tail greatly attenuated, filamentous in females; no sensory ridges on head; anus under P. Three species; 2 in our area.

KEY TO SPECIES

1a Body pale with large melanophores on belly and subcutaneous, vertical black lines between vertebrae; postorbital pores 5-14; preopercular pores 2-6 . . . . *N. curvirostris*
1b Body dark brown or grey; postorbital pores 3-20, preopercular pores 2-18 . . . . . *N. scolopaceus*



51.3 *Nemichthys curvirostris:* 20 cm female; head of mature male.

51.3 *Nemichthys curvirostris*
(Stromman, 1896)

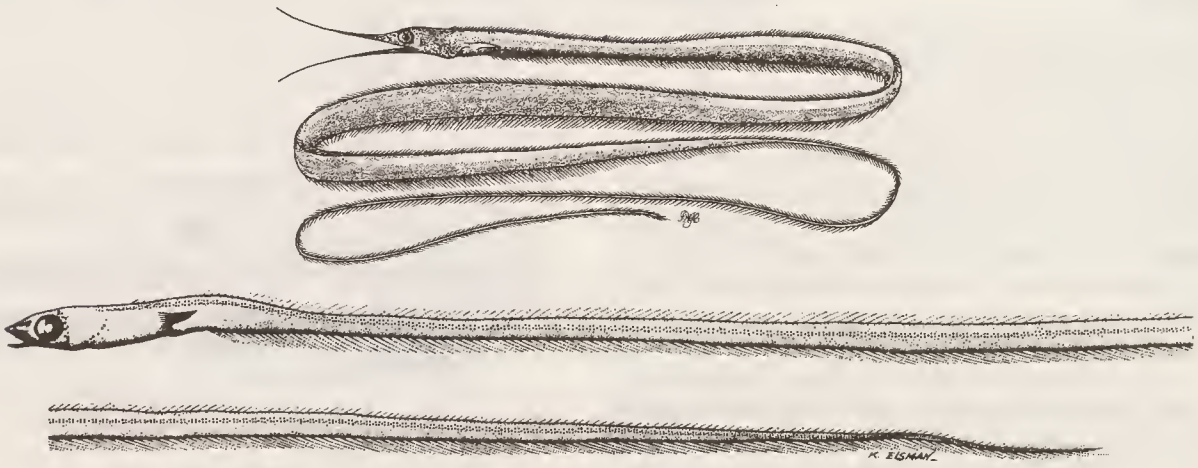
Leptocephalus curvirostris Stromman, 1896: 41, Pl. 5, Fig. 1-2 (larva, western North Atlantic). *Nemichthys scolopacea (non* Richardson): Smith, **SFSA No. 1107*** (in part); Castle, 1969: 37. *Nemichthys curvirostris:* Nielsen & Smith, 1978: 47*.

Colour generally pale with black lines between vertebrae. Attains ca. 140 cm (females). Known off the Cape; also widely in the Atlantic and Indo-Pacific.

51.4 *Nemichthys scolopaceus*
Richardson, 1848

Nemichthys scolopacea Richardson, 1848: 25, Pl. 10, Fig. 1-3 (off Brazil); Smith, **SFSA No. 1107** (in part); Nielsen & Smith, 1978: 38*.

Colour dark brown or grey, often darker ventrally. Vertebrae as many as 750. Attains ca. 120 cm. Known off the Cape to Natal; also very widely in all oceans.



51.4 *Nemichthys scolopaceus:* top: 50 cm female; bottom: 46 cm male (after Nielsen & Smith, 1978).

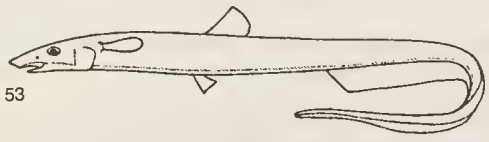
Order NOTACANTHIFORMES

Maxilla with a retrorse spine on dorsal edge of distal part; pelvic fins abdominal, connected by a membrane (at least at the base); eye covered with transparent skin continuous with that of the head; tail long and tapering; "caudal fin" minute or absent; mouth inferior; swimbladder present; oviducts absent, the eggs being released into the abdominal cavity to be passed out via a pair of abdominal pores near the anus.

This order comprises 3 families, of which 2 are represented in our area. The Lipogenyidae (one species, known from both sides of the North Atlantic) is characterised by a small, round, sucker-like mouth with no teeth; maxillae curved downward and forward round the corner of the mouth; and the short dorsal fin of 9-11 rays, the anterior 4-6 rays spine-like and contiguous with the posterior, segmented, branched soft-rays.

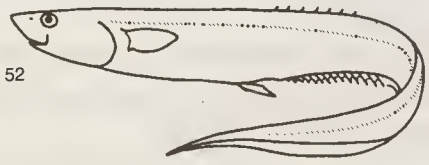
KEY TO FAMILIES

1a Dorsal fin base short, entirely before anal fin; dorsal and anal fins without distinct spines; maxillae toothed ..... HALOSAURIDAE



53

1b Dorsal fin of numerous, short, isolated spines; anterior anal fin rays are spine-like; maxillae toothless ..... NOTACANTHIDAE



52

Family No. 52: NOTACANTHIDAE

by K. Sulak

Spiny eels **Stekelpalings**

Small to moderate-sized eel-like fishes with numerous, short, isolated dorsal fin spines. Body and head strongly compressed, completely covered with minute, adherent cycloid scales. Mouth small and inferior; snout projecting. Anal fin very long, grading from spines anteriorly to soft-rays posteriorly. Pelvic fins abdominal. Caudal fin minute. Head lacking prominent sensory canals. Branchiostegal membranes united. Premaxillary teeth set in a single comb-like row.

Spiny eels hover just above the bottom at depths of 125 - 3 500 m; they range from tropical seas to subpolar waters, and feed on benthic polychaetes and coelenterates, as well as small nektonic crustaceans. Breeding condition males have darkened nostrils. Females greatly outnumber males. Giant leptocephalus larvae probably pertain to notacanth species (Castle, 1959; Nielsen & Larson, 1970; Smith, 1970). Two genera with 3 species in our area. Recent systematic treatment by McDowell (1973).

KEY TO GENERA

1a D spines 6-15 ..... *Notacanthus*
1b D spines 26-40 ..... *Polyacanthonotus*

Genus ***Notacanthus*** Bloch, 1788

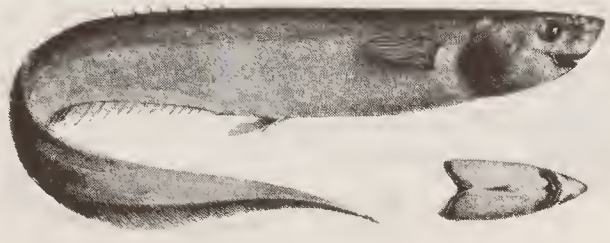
Six species; 1 in our area.

52.1 *Notacanthus sexspinis* Richardson, 1846

Notacanthus sexspinis Richardson, 1846: 54, Pl. 32, Fig. 4 (King George's Sound, Australia); Smith, **SFSA No. 166*;** Karrer, 1973: 217; McDowell, 1973: 186*. *Notacanthus moseleyi*: Smith, **SFSA No. 167.** *Notacanthus annectens* Boulenger, 1904: 167* (off Cape Peninsula, 457 m); Thompson, 1916: 84. *Notacanthus* sp. Pakhorukov, 1976: 326.

D V-IX; A X-XVIII,150-160; V I-II,6-8; P 9-12; BR 7-11; pyloric caeca 6-7; premaxillary teeth 24-31, tips in contact and forming a continuous serrate cutting edge. Palatine and dentary teeth in 1 row. V spines never bifid. Branchiostegal membranes broadly united, free from isthmus.

Colour brown, mouth and soft-rayed portion of A darker. A small, slender species; attains 50-60 cm. Walvis Bay to Durban, 360 - 1 100 m; and off southern Brazil, Chile, New Zealand and Australia.



52.1 *Notacanthus sexspinis*: 35.5 cm (after Boulenger, 1904).

Genus ***Polyacanthonotus*** Bleeker, 1874

Three species, 2 in our area.

KEY TO SPECIES

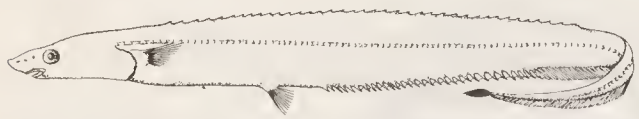
1a Maxilla reaches to or beyond front margin of eye . . . . *P. africanus*
1b Maxilla not reaching eye . . . . . *P. rissoanus*

52.2 *Polyacanthonotus africanus*
(Gilchrist & von Bonde, 1924)

Macdonaldia africana Gilchrist & von Bonde, 1924: 11, Pl. 3, Fig. 4 (off Table Bay, 2 231 m); Barnard, 1925: 173. *Macdonaldia rostrata (non* Collette): Barnard, 1925: 172 (in part, not Fig.); Smith, **SFSA No. 168** (in part, not description or Fig.). *Polyacanthonotus (Gnathonotacanthus) africanus:* McDowell, 1973: 164*.

D XXVI-XL; V I,6-9; P I,10-14; BR 6-8; pyloric caeca 3, very short; GR (total) 16-19; premaxillary teeth 25-46, hooked and movable; not expanded distally. Snout length ca. twice eye diameter. Nostrils broadly separate. First D spine inserted behind P origin.

Body a uniform off-white, tan or grey; LL darker; soft-rayed portion of A dark brown. Mouth bluish in front, black behind. Opercular flap and underside of head bluish. Attains ca. 36 cm. Off Cape Point, 2 231 m. Occurs widely in eastern Atlantic and in western Atlantic from New Jersey to Caribbean (700 - 3 000 m).



52.2 *Polyacanthonotus africanus:* 11 cm RPL.

52.3 *Polyacanthonotus rissoanus*
(Filippi & Vérany, 1859)

Notacanthus rissoanus Filippi & Vérany, 1859: 190 (Mediterranean, off Nice); McDowell, 1973: 174*. *Macdonaldia rostrata:* Barnard, 1925: 172 (in part); Smith, **SFSA No. 168*** *(Macdonaldia africana* listed incorrectly as a synonym).

D XXVI-XXXVI; V I,7-11; P I,10-16; BR 7-9; pyloric caeca 3, very short; GR (total) 23-28; premaxillary teeth 17-25, hooked, immovable, not expanded distally. Snout length ca. 3 times eye diameter. Nostrils closely set. First D spine inserted before P origin.

Body coloration as in *P. africanus,* except LL lighter, less distinct. Off Cape Point to Table Bay, in 1 463 - 1 858 m; also in Mediterranean and eastern Atlantic from Ireland to our area. In western Atlantic from Davis Strait south to Cape Hatteras. Depth range 500 - 2 800 m.

52.3 *Polyacanthonotus rissoanus:* ca. 9.5 cm RPL.

Family No. 53: HALOSAURIDAE

by K. Sulak

Halosaurs **Halosaurs**

Elongate, eel-like fishes. Trunk and tail compressed; snout depressed, projecting beyond an inferior mouth. Body covered with large cycloid scales; scales of lateral line commonly enlarged. A single, short-based soft dorsal fin, set forward of body midpoint. Anal fin base very long. Pelvic fins abdominal. Pectoral fins set high on sides of body. No caudal fin. Head with prominent sensory canals. Teeth minute, inconspicuous. Branchiostegal membranes separate.

Halosaurs are benthopelagic inhabitants of the continental slope, rise and abyssal plain (400 - 5 000 m) beneath warm seas. They feed on varied benthic and nektonic invertebrates, especially crustaceans and polychaetes. Sexes are separate; sex ratios highly skewed in favour of females. Fish in breeding condition are dimorphic; males display enlarged and/or darkly pigmented nostrils. The larval stage is a leptocephalus. Three genera; with 16 species; 4 in our area. Recent systematic treatments by Harrison (1972), McDowell (1973) and Sulak (1977).

KEY TO GENERA

1a Top of head between eyes and nostrils scaled; one LL scale for each vertical row of body scales . . . . . *Halosaurus*
1b Top of head between eyes and nostrils naked; one LL scale for every 2 or 3 vertical rows of body scales 2

2a LL a distinct, wide black stripe; pyloric caeca unpigmented . . . . . *Halosauropsis*
2b LL unpigmented; pyloric caeca black . . . . . *Aldrovandia*

Genus ***Aldrovandia*** Goode & Bean, 1896

Six species; 2 in our area; *A. rostrata* (Günther, 1878) and *A. oleosa* Sulak, 1977, also probable.

KEY TO SPECIES

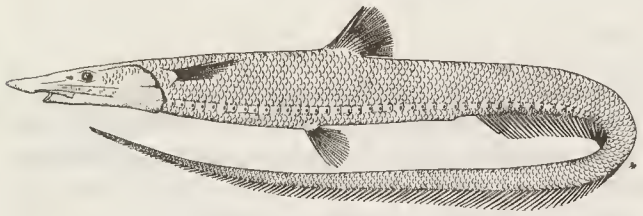
1a GR 19-23; palatine tooth patches separate . . . . . *A. phalacra*
1b GR 13-15; palatine tooth patches in contact along midline of palate . . . . . *A. affinis*

53.1 *Aldrovandia affinis*
(Günther, 1877)

Halosaurus affinis Günther, 1877: 444 (south of Japan, 1 033 m). *Halosauropsis affinis:* Smith, **SFSA No. 171*.** *Aldrovandia affinis:* McDowell, 1973: 91*; Sulak, 1977: 12.

D I,10-12; P I,11-14; V I,7-9; LL scales anterior to vent 25-31; GR (total) 13-15; pyloric caeca 6-9. V inserted slightly in advance of D. Preoral portion of snout long; ca. ½ total snout length.

Body white to grey-brown, underside darker; top of snout and anterior nostrils darkly pigmented in breeding males. Attains ca. 55 cm. Known from both coasts of South Africa (1 061 - 2 560 m); circumglobal at tropical and temperate latitudes.



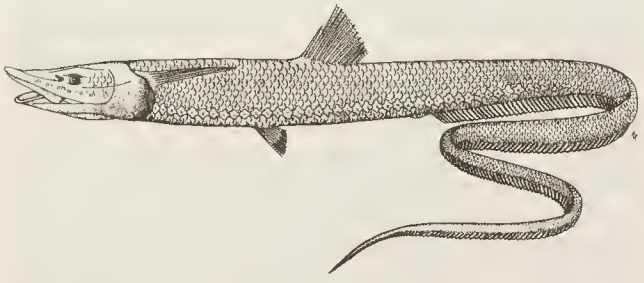
53.1 *Aldrovandia affinis:* 18 cm RPL.

53.2 *Aldrovandia phalacra*
(Vaillant, 1888)

Halosaurus phalacrus Vaillant, 1888: 45, Pl. 15, Fig. 3, Pl. 16, Fig. 1 (Atlantic, south of Azores, 1 442 m). *Halosaurus* sp. Gilchrist, 1908: 171. *Aldrovandia phalacra:* McDowell, 1973: 91*; Sulak, 1977: 12*.

D I,9-11; P I,11-13; V I,8; LL scales anterior to vent 24-28; GR (total) 19-23; pyloric caeca 5-8. V inserted well before D. Preoral portion of snout short, ca. ⅓ total snout length. The closely related *A. oleosa* Sulak, 1977, which may occur in our area, has fewer LL scales (16-21) anterior to the vent.

Body light grey; head silvery blue on top and sides, darker below and on gill covers. Anterior nostrils of breeding males black. Attains ca. 47 cm. One specimen off Cape Point (1 390 m). On both sides of Atlantic, off Hawaii and India. Depth range 500 - 2 300 m.



53.2 *Aldrovandia phalacra:* 15 cm RPL.

Genus ***Halosauropsis*** Collett, 1896

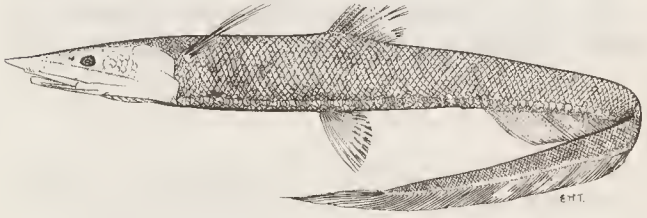
Monotypic.

53.3 *Halosauropsis macrochir*
(Günther, 1878)

Halosaurus macrochir Günther, 1878: 250 (off Gibraltar, 1 993 m); Günther 1887: 232*. *Halosaurus niger* Gilchrist, 1908: 170* (off Cape Point, 1 463 - 1 701 m); Gilchrist & von Bonde, 1924: 10. *Halosauropsis macrochir* Smith, **SFSA No. 170;** McDowell, 1973: 74*; Golovan, 1976: 307; Pakhorukov, 1976: 326; Sulak, 1977: 11.

D 11-13; P I,11-12; V I,9; LL scales anterior to vent 26-32; GR (total) 15-16; pyloric caeca 10-12. V inserted just before D. Preoral portion of snout short, ca. ⅓ or less of total snout length. Snout broad, rounded; mouth large. Scales present on opercular bone. Pyloric caeca unpigmented and arranged in a double row.

Body deep greyish black to bluish black; top of head, gill isthmus and branchiostegal membranes black. The largest of the halosaurs, it attains ca. 90 cm. Off Cape Point and Beira; also in 1 100 - 3 200 m along continental margins in Atlantic, at Prince Edward Id., Indian Ocean and off New Zealand.



53.3 *Halosauropsis macrochir:* 29 cm (off Cape of Good Hope).

Genus ***Halosaurus*** Johnson, 1863

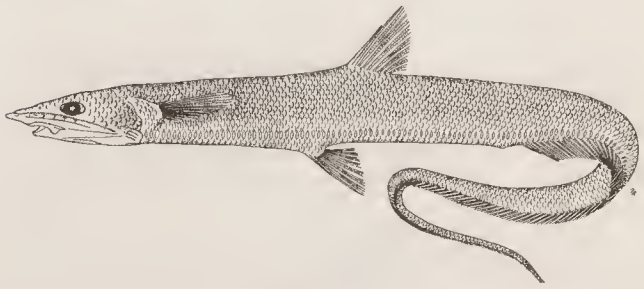
Eight species; 1 in our area. *H. attenuatus* Garman, 1899 recorded in the eastern Atlantic (Sulak, 1977), lives deeper (ca. 2 200 - 2 600 m) than *H. ovenii*; it has a cylindrical body and only 4-5 short, black pyloric caeca.

53.4 *Halosaurus ovenii*
Johnson, 1863

Halosaurus ovenii Johnson, 1863: 406, Pl. 36, Fig. 2 (off Madeira); Smith, **SFSA No. 169*;** McDowell, 1973: 56*; Golovan, 1976: 307; Sulak, 1977: 11.

D I,8-9; P I, 13-16; V I,9; LL scales anterior to the vent 59-68; GR (total) 11-14; pyloric caeca 12-20. Body compressed.

Colour pinkish with silvery reflections, upper half conspicuously darker. Lining of mouth with characteristic pale areas; pyloric caeca unpigmented. Attains ca. 45-50 cm. Off Cape Point to Walvis Bay and both sides of Atlantic, in 400 - 1 700 m.



53.4 *Halosaurus ovenii:* 16 cm RPL.

Infradivision CLUPEOMORPHA

Primitive teleosts with a connection between the swimbladder and the ears in which the swimbladder is bifurcate anteriorly to form two sacs contained within bony swellings of the prootic and pterotic bones on each side of the skull; this particular type of connection between the ears and the swimbladder is unique among fishes (Greenwood et al., 1966). Clupeomorph fishes also have a unique caudal fin skeleton and some characteristic features of the cranium (Greenwood et al., 1966; Lauder & Liem, 1983). Pelvic fins abdominal; pectoral fins low on body; no dorsal adipose fin; no fin spines; scales cycloid; lateral line absent on body (except in *Denticeps*); no teeth on parasphenoid.

All of the recent (living) species are placed in a single order, Clupeiformes.

Order CLUPEIFORMES

Characters as under Clupeomorpha. Four families are currently recognised (Nelson, 1984); Denticipitidae (one species only) is known from freshwaters of Nigeria.

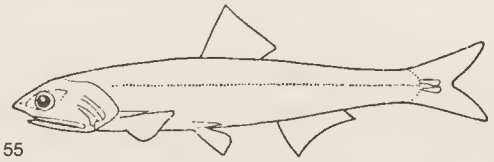
KEY TO FAMILIES

1a Jaws with distinct canines; dorsal fin origin over anal fin origin, well behind midpoint of body + head ..... CHIROCENTRIDAE (No. 56)

56

1b Teeth in jaws usually minute or absent; dorsal fin origin usually well in front of anal fin, and in front of or over midpoint of body + head 2

2a Snout projecting in front of lower jaw; maxilla reaching well past eye ..... ENGRAULIDAE (No. 55)



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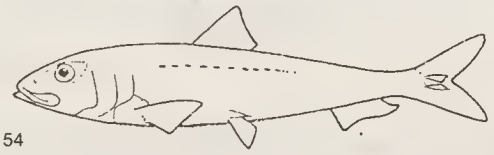
2b Snout usually not projecting in front of lower jaw; maxilla not reaching past eye ..... CLUPEIDAE (No. 54)



54

Family No. 54: CLUPEIDAE

by P.J.P. Whitehead & T. Wongratana

Herrings, sardines, pilchards — **Harings, sardiens, pelsers**

Small to moderate-sized silvery fishes (6-25 cm); body fusiform, subcylindrical or strongly compressed, usually with a keel of scutes along belly. Mouth more or less terminal; snout rarely projecting in front of mouth; maxilla not reaching past eye; teeth minute or absent. Gill-rakers often numerous, long and slender in most species. Fins without spines. Scales cycloid, usually deciduous; no lateral line.

Pelagic, mainly inshore fishes, often forming large and densely packed shoals which are heavily preyed upon by fishes, birds and man. The clupeoid fishes (i.e. including the anchovies) are the most important single group exploited by world fisheries and in some areas they account for a third or even a half of the total catch. The South African pilchard fishery has declined markedly in the past 20 years; the pilchard catch has gone from 318 000 tons in 1960 to 35 000 tons in 1982. Juveniles of some species enter estuaries, and the estuarine round-herring (*Gilchristella*) can tolerate freshwater.

Ten genera with 13 species in our area, but stray individuals of additional species could be expected down our eastern coasts. Identification is often difficult and may require a microscope. In the fin formulae, lower case Roman numerals are used for unbranched soft-rays and Arabic numerals for the branched rays. All warm-water species of the Indo-Pacific have recently been revised by Wongratana (1981). Of the 13 new species of clupeid fishes described by Wongratana (1983), only *Etrumeus whiteheadi* occurs in our area.

KEY TO GENERA

1a Belly rounded; scutes absent or hidden, never present behind V base 2
1b Scutes present along whole belly, often making a sharp keel 4

2a V base below D or behind it; (marine) 3
2b V base in front of D base; (freshwater & estuaries) ..... *Gilchristella*

3a V base under or behind last 2 D rays; upper jaw slender ..... *Etrumeus*

3a

3b V base under last half of D; upper jaw deep ..... *Spratelloides*

3b

4a Strong radiating bony striae on lower part of operculum; dark spots along flanks ..... *Sardinops*

4a

4b Lower part of operculum smooth, at most with fleshy canals 5

5a A long, with 34-42 rays; lower jaw projecting ..... *Pellona*
5b A short, with fewer than 30 rays 6

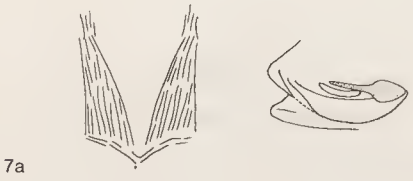
6a Upper jaw rounded in front; rear edge of gill-opening with 2 fleshy projections 7

6a

6b Upper jaw with distinct median notch; rear edge of gill-opening evenly rounded 8

6b

7a Numerous striations on top of head; 2nd supramaxilla symmetrically paddle-shaped ..... *Sardinella*



7a

7b Few striations on top of head; 2nd supramaxilla asymmetrical ..... *Herklotsichthys*

7b

8a Mouth terminal; maxilla straight ..... *Hilsa*
8b Mouth inferior; maxilla curved downward 9

9a Last D ray greatly elongated; predorsal scales paired ... *Nematalosa*
9b Last D ray not elongate; predorsal scales forming a single median row ..... *Anodontostoma*

(A juvenile of *A. chacunda* (Hamilton-Buchanan, 1822) in the J.L.B Smith Institute of Ichthyology is labelled "Natal (South coast?) 1952, RUSI 1008" and was included in a revision by Nelson & Rothman (1973: 145). However, this gizzard shad genus is unknown in our area and the locality must be suspect.)

Genus ***Etrumeus*** Bleeker, 1853

Body subcylindrical; A base very short, well behind D. Formerly placed with *Dussumieria* (and other genera) in a distinct family Dussumieriidae (Whitehead, 1963), which is now considered merely a subfamily of herrings (the other genera, e.g. *Spratelloides* and *Gilchristella* of our area, removed to other subfamilies). Nevertheless, the absence of keeled scutes along the belly justifies the common name roundherrings for all of the Dussumieriinae. Two species; both in our area, one widespread, the other endemic and much more common but only recently recognised as distinct.

KEY TO SPECIES

1a Lower GR 31-35; V base at least ½ eye diameter behind last D ray in adults ..... *E. teres*
1b Lower GR 35-40; V base under or just behind last D ray in adults ..... *E. whiteheadi*

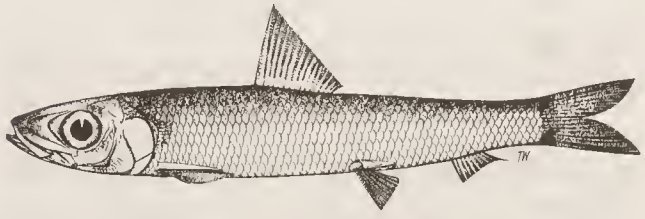
54.1 *Etrumeus teres*
(De Kay, 1842)
PLATE 9

East coast roundherring — Ooskus-rondeharing

Alosa teres De Kay, 1842: 262, Pl. 40, Fig. 128 (New York). *Etrumeus micropus:* Smith, **SFSA No. 106***. *Etrumeus teres:* Wongratana, 1981: 83*; Whitehead & Wongratana, 1984: Etru 1*.

D iii-v,15-18; A iii-iv,7-8; P i,13-16; V i,7; LS 52-58; GR (12-15)+(31-35). Premaxillae rectangular.

Back blue-green, flanks silvery. Attains 25 cm. From Mozambique border to Durban, possibly further south; probably replaced by *E. whiteheadi* on southern west coasts. Elsewhere, western North Atlantic, eastern Pacific, Japan, Australia, off Cape Gardefui and in Red Sea (with immigrants into Mediterranean).



54.1 *Etrumeus teres:* 6.5 cm SL.

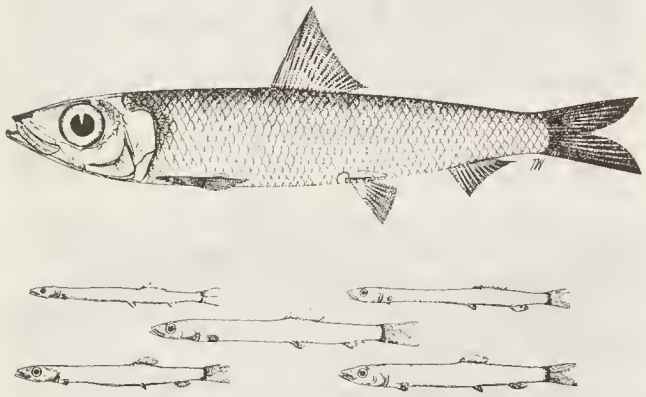
54.2 *Etrumeus whiteheadi*
Wongratana, 1983

Redeye roundherring — Rooi-oog-rondeharing

Etrumeus whiteheadi Wongratana, 1983: 387, Fig. 1 (Algoa Bay). *Etrumeus teres* (*non* De Kay): Whitehead, 1963: 321*.

D iv-v,14-16; A iii-iv,8-10; P i,13-16; V i,7; LS 48-51; GR (16-18)+(35-40). Premaxillae rectangular.

Back blue-green, flanks silvery. Attains 20 cm. An endemic species, from Walvis Bay to Durban (where it overlaps *E. teres*).



54.2 *Etrumeus whiteheadi:* top. 16.5 cm SL; bottom: developing young.

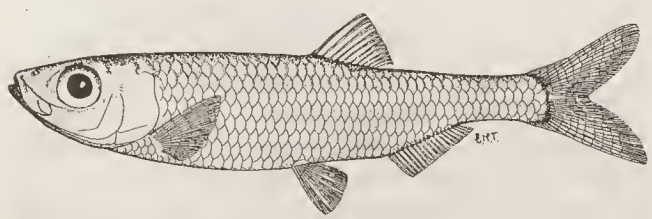
Genus ***Gilchristella*** Fowler, 1935

Body fairly compressed, but belly rounded. Formerly placed in the family Dussumieriidae (now a subfamily), but now included in the subfamily Pellonulinae together with the west African freshwater herrings (*Pellonula,* etc.) and others from India and southeast Asia (*Ehirava, Dayella, Corica,* etc.). A single species, endemic to our area.

54.3 *Gilchristella aestuaria*
(Gilchrist, 1914)
PLATE 9

Estuarine roundherring — Rivier-rondeharing

Spratelloides aestuarius Gilchrist, 1914: 55 (Swartkops River). *Gilchristella aestuarius:* Smith, **SFSA No. 108*;** Whitehead, 1963: 334*; 1973: 194*; Blaber et al., 1981*. *Pellonulops madagascariensis:* Smith, **SFSA No. 110*.** *Ehirava madagascariensis:* Whitehead, 1963: 333 (the 11 Buffalo River specimens).



54.3 *Gilchristella aestuaria:* 4 cm (Algoa Bay).

D iii,11-12; A iii,17; P i,10-11; V i,7; lower GR apparently highly variable, 42-76 (at 40-63 mm SL). (It may be that we have two species with different, but overlapping, numbers of GR.) Belly with 6-9 thin scutes before V (only visible when belly scales removed and surface dried); V reaching more than halfway to anus.

Top and sides of head and body thickly sprinkled with black dots; silver stripe on hind part of side. Attains 65 mm. Common in estuaries and lower parts of rivers (also lakes), from the Kosi system and Lake Sibaya south to at least Knysna; also Saldanha Bay and possibly north to the Orange River mouth.

Genus ***Herklotsichthys*** Whitley, 1951

Body fairly compressed, belly sharp with row of keeled scutes. Fifteen species, all Indo-Pacific; probably only 1 in our area. "*Harengula vittata*" of Smith (**SFSA No. 112***) is not identifiable.

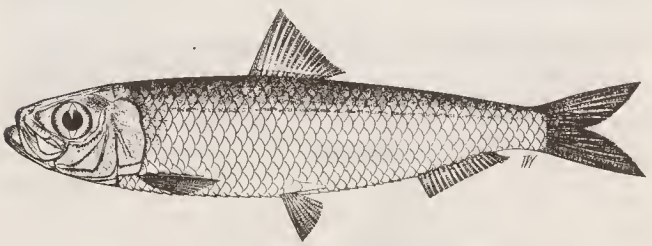
54.4 *Herklotsichthys quadrimaculatus*
(Rüppell, 1837)

Blueline herring — Bloulintharing

Clupea quadrimaculata Rüppell, 1837: 78, Pl. 21, Fig. 3 (Bay of Massawa, Red Sea). *Harengula ovalis:* Smith, **SFSA No. 111.** *Herklotsichthys punctatus:* Whitehead, 1973: 174*. *Herklotsichthys quadrimaculatus:* Wongratana, 1981: 139*; Whitehead & Wongratana, 1984: Herk 2*.

D iii-v,14-16; A ii-iv,13-17; P i,13-16; V i,7; LS 38-45; lower GR 29-37; scutes (16-19)+(12-14). Top of head with about 4-7 striae on each side.

Back blue-green; flanks silvery with two orange spots behind gill opening in life and a blue midlateral band. Attains 14 cm. Widespread in Indo-Pacific, reaching south to Algoa Bay.



54.4 *Herklotsichthys quadrimaculatus:* 11 cm.

Genus ***Hilsa*** Regan, 1917

Body deep, compressed; belly sharply keeled. Now recognised with only one Indo-Pacific species. Fowler (1941) wrongly used the name *Macrura.*

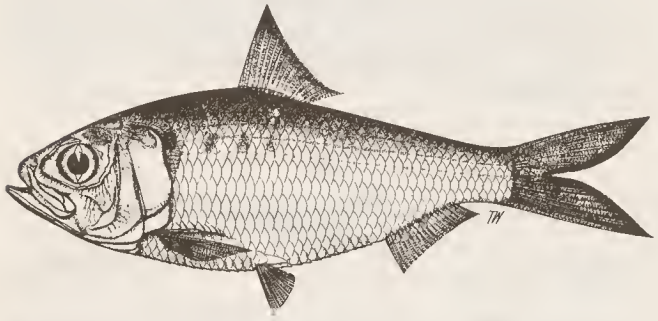
54.5 *Hilsa kelee*
(Cuvier, 1829)

Kelee shad — Kelee-haring

Clupea kelee Cuvier, 1829: 320 (Vizagapatnam, India). *Clupea durbanensis* Regan, 1906: 4, Pl. 4 (Durban). *Macrura kelee:* Smith, **SFSA No. 109***. *Hilsa kelee:* Whitehead, 1965: 129*; 1973: 197*; Wongratana, 1981: 156*; Whitehead & Wongratana, 1984: Hils 1*.

D iii-iv,13-15; A ii-iv,15-19; P i,12-15; V i,7; LS 39-44; lower GR 75-175 (number increasing with growth); scutes (15-17)+(12-14). Body depth 2.4-3.0 in SL. Distinct median notch in upper jaw. GR on 2nd arch curled outward.

A black blotch behind gill opening with a series of oval blotches down flank. Attains 24 cm. Widespread in Indo-Pacific, reaching south to Durban.



54.5 *Hilsa kelee:* 14 cm SL.

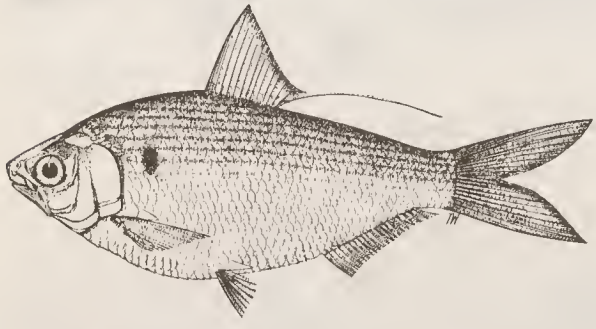
Genus ***Nematalosa*** Regan, 1917

Body deep, somewhat compressed; belly rounded, with scutes. Mouth small, subterminal; snout slightly projecting. Nine species, all Indo-Pacific; 1 in our area (based solely on a single juvenile from Durban).

54.6 *Nematalosus nasus*
(Bloch, 1795)
PLATE 9

Gizzard shad — Kropharing

Clupea nasus Bloch, 1795: 116, Pl. 429 (Malabar). *Nematalosa nasus:* Smith, **SFSA No. 117*** (single Durban juvenile); Nelson & Rothman, 1973: 161* (same specimen); Wongratana, 1981: 179*; Whitehead & Wongratana, 1984: Nem 1*.



54.6 *Nematolosa nasus:* 9.5 cm SL.

D iii-v,12-14; A ii-iii,19-22; P i,12-16; V i,7; LS 46-49; GR very numerous, the number increasing with growth; belly scutes (17-19)+(11-13). Lower jaw flared outward. Hind edge of scales toothed in adults.

Body and head dark bluish dorsally, silvery below; dusky blotch on shoulder. Attains 22 cm. A single juvenile of 6 cm from Durban Bay; otherwise known from Gulf of Aden and Oman eastward to India, Malaysia and Hong Kong. More specimens needed.

Genus ***Pellona*** Valenciennes, 1847

Body compressed; belly sharply keeled. Five species, western Atlantic and Indo-Pacific; 1 in our area.

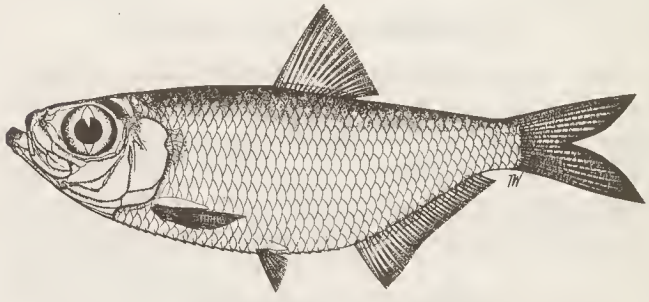
54.7 *Pellona ditchela*
Valenciennes, 1847

Indian pellona — Indiese pellona

Pellona ditchela Valenciennes, *in* Cuv. & Val., 1847: 314 (Vizagapatnam, India); Smith, **SFSA No. 116***; Wongratana, 1981: 195*; Whitehead, 1973: 209*; Whitehead & Wongratana, 1984: Pell 1*.

D iii-iv,13-15; A iii-iv,31-38; P i,13-17; V i,6; LS 37-42; lower GR 22-27; belly scutes (17-20)+(8-9). Body depth 2.6-2.9 in SL.

Back brown, flanks silvery. Attains 16 cm. Widespread in Indo-Pacific, reaching south to Durban.



54.7 *Pellona ditchela:* 13.5 cm SL.

Genus ***Sardinella*** Valenciennes, 1847

A base well behind D. Eighteen species, mostly Indo-Pacific but a few Atlantic; 4 in our area, 2 from the west coast and 2 from the east (but strays of other Indian Ocean species may occur).

KEY TO SPECIES

1a V 9; body depth 4.0-4.9 in SL; (west coast only) ..... *S. aurita*
1b V 8 2

2a Lower GR more than 70; (west coast only) ..... *S. maderensis*
2b Lower GR 41-68; (east coast only) 3

3a Total scutes 32-34, usually 33 ..... *S. gibbosa*
3b Total scutes 29-33, usually 30-32 ..... *S. albella*

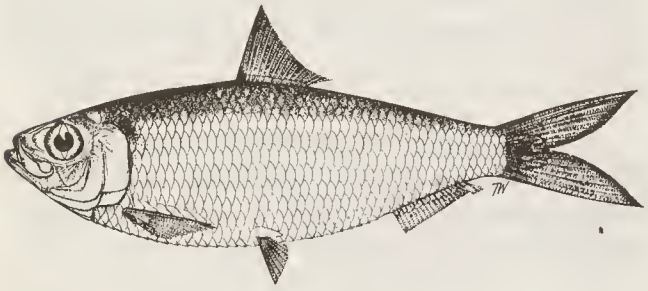
54.8 *Sardinella albella*
(Valenciennes, 1847)

White sardinelle — Wit sardinelle

Kowala albella Valenciennes, *in* Cuv. & Val., 1847: 362 (Pondicherry). *Sardinella melanura* (*non* Cuvier): Smith, **SFSA No. 113***. *Sardinella albella:* Whitehead, 1973: 183*; Wongratana, 1981: 121*; Whitehead & Wongratana, 1984: Sardl 6*.

D iv,14-16; A iii,16-20; P i,13-16; V i,7; LS 40-45; lower GR 41-68; scutes (17-19)+(11-15), total 29-33. Body fusiform, compressed; body depth 2.5-4.1 in SL; belly with sharp keel of scutes.

Back blue-green; flanks silver; hind margin of C dusky. Attains 14 cm. East coast as far south as Durban, perhaps to East London. Elsewhere, widespread throughout Indo-Pacific to Taiwan and Papua/New Guinea. Easily confused with *S. gibbosa*, but slightly fewer scutes.



54.8 *Sardinella albella:* 10.5 cm SL.

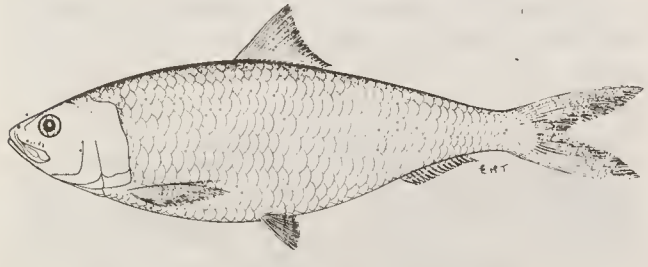
54.9 *Sardinella aurita*
Valenciennes, 1847

Round sardinelle — Goue sardinelle

Sardinella aurita Valenciennes, *in* Cuv. & Val., 1847: 263, Pl. 594 (Messina, Mediterranean); Smith, **SFSA No. 114a***; Whitehead, 1981: Sardl 1*.

D iii-iv,14-16; A iii,13-15; P i,14-16; V i,8; LS 45-50; lower GR increasing to over 200 with growth; scutes (17-20)+(14-16). Body round in cross-section; belly with a low keel of scutes.

Dark spot on hind border of operculum with a gold spot behind it, but no spots along flanks. Attains 31 cm. A "cold water" species (18-25 °C), approaching the coast and shoaling near the surface in periods of upwelling, but retreating below the thermocline in hot seasons, down to depths of 200 - 300 m. At times common at Walvis Bay, occasionally reaching Saldanha Bay. Elsewhere, eastern and western Atlantic, also Mediterranean and perhaps the same species in Japan. Of considerable fishery importance off the west coast of Africa south to Angola.



54.9 *Sardinella aurita:* 30 cm SL.

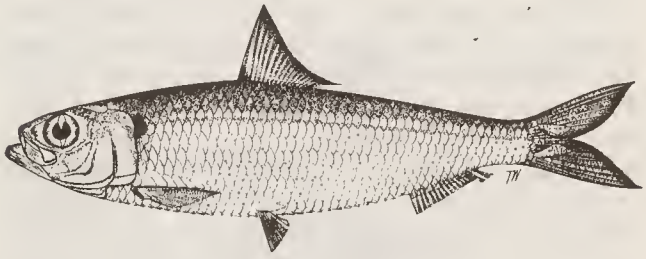
54.10 *Sardinella gibbosa*
(Bleeker, 1849)

Goldstripe sardinelle — Gouestreep-sardinelle

Clupea gibbosa Bleeker, 1849: 72 (Makassar). *Sardinella jussieu:* Smith, **SFSA No. 114***. *Sardinella gibbosa:* Whitehead, 1973: 185*; Wongratana, 1981: 117*; Whitehead & Wongratana, 1984: Sardl 8.

D iv,13-16; A iii,14-18; P i,13-16; V i,7; LS 42-47; lower GR 45-60; scutes (17-19)+(14-16), total 32-34. Body depth 3.2-4.5 in SL; belly with sharp keel of scutes. Extremely similar to *S. albella,* but the slightly higher scute count usually separates it.

Back blue-green; a thin yellow-gold line along flank, silvery below; hind margin of C dusky. Attains 17 cm. East coast as far south as Durban, perhaps to East London. Elsewhere, widespread throughout Indo-Pacific to Philippines, Taiwan and Western Australia.



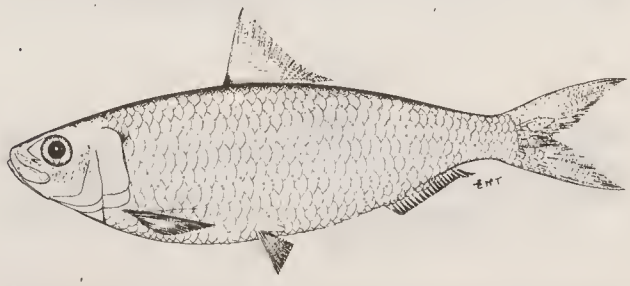
54.10 *Sardinella gibbosa:* 10 cm SL.

54.11 *Sardinella maderensis*
(Lowe, 1839)

Madeiran sardinelle — Madeira-sardinelle

Clupea maderensis Lowe, 1839: 189 (Madeira). *Sardinella maderensis:* Whitehead, 1981: Sardl 2*.

D iii-iv,14-19; A iii,14-19; P i,13-16; V i,7; LS 40-50; lower GR more than 70, increasing with growth; scutes (18-20)+(13-15). Body depth variable, belly compressed, with sharp keel of scutes, becoming more rounded in large adults.



54.11 *Sardinella maderensis:* 12.5 cm SL.

Black spot at base of anterior D rays, a gold, green or faint dark spot behind gill opening; upper part of P black, with pale rays. Attains 30 cm. Atlantic and Mediterranean, reaching south to Walvis Bay (one specimen, probably uncommon). Of considerable fishery importance off west coast of Africa south to Congo.

Genus ***Sardinops*** Hubbs, 1929

Body fusiform, not much compressed; belly rounded, the scutes feeble; 2 enlarged scales at base of caudal. Four species (subspecies by some authors); 1 in our area.

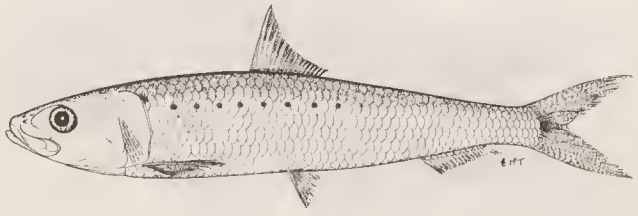
54.12 *Sardinops ocellatus*
(Pappe, 1853)
PLATE 9

South African pilchard — Suid-Afrikaanse pelser

Clupea ocellata Pappe, 1853: 20. *Sardinops ocellata:* Smith, **SFSA No. 115***; Crawford, 1981:1; Whitehead & Wongratana, 1984: Sardop 2*.

D iii-iv,14-16; A iii-iv,15-18; P i,8; V i,7; LS 50-57; lower GR to about 120 with growth; scutes (16-19)+(13-16). Strong radiating bony striae on lower part of operculum (easily visible even in juveniles). Lower GR decreasing in length at angle of gill arch and overlapped by upper rakers.

A series of dark spots along flanks, sometimes with a second or third series below. Attains 28 cm. Atlantic coast from southern Angola (Baia dos Tigres) south to Cape Town and northeast to Delagoa Bay. A shoaling cool-water species, formerly the basis of a large canning industry on the west coast. Considerable research has been carried out on this species by the Division of Sea Fisheries. It was thought that all breeding took place in the cold water off the west coast, but larvae found near East London indicate a breeding area to the east of that port. The densely packed shoals, heavily preyed upon by birds and fishes, are sometimes driven inshore and numbers may be washed up on the beach. (Note by M.M. Smith: This is the species responsible for the famous "Sardine Run" of Natal. Large shoals travel up the coast and reach the Natal south coast at the beginning of June. They are probably following the planktonic food supply that drifts in that direction during the winter months. The shoals are preyed upon by birds, fishes and sea mammals, and most of the shark nets are removed to avoid damage by the hordes of large predators. Anglers have a field day catching the big fish that follow the shoals. The pilchards are often driven ashore by their predators, and many frantic people wade into the sea with whatever net or container they can find to catch all they can. The shoals migrate up the coast, ultimately to disappear off northern Natal.)



54.12 *Sardinops ocellatus*. 15 cm SL.

Genus ***Spratelloides*** Bleeker, 1851

Body fusiform, not much compressed; belly rounded, without scutes. Wrongly called *Stolephorus* by Fowler (1941) and others. Four species, all Indo-Pacific; probably only 1 in our area.

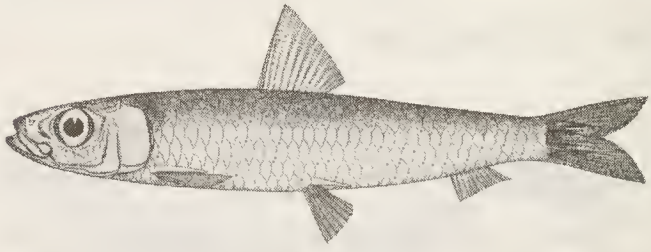
54.13 *Spratelloides delicatulus*
(Bennett, 1831)

Delicate roundherring — Delikate rondeharing

Clupea delicatula Bennett, 1831: 168 (Mauritius). *Stolephorus delicatulus:* Smith, **SFSA No. 107***. *Spratelloides delicatulus:* Whitehead, 1973: 172*; Wongratana, 1981: 105*; Whitehead & Wongratana, 1984: Spratel 1*.

D ii,9-11; A ii,8-9; P i,10-12; V i,7; LS 36-40; GR (9-12)+(14-21).

Back blue, lower flanks silver. Attains 7 cm. Widespread in Indo-Pacific, reaching south to Zululand. The related *S. gracilis* (Schlegel), with a distinct silver stripe along flanks, probably does not reach south to Beira.



54.13 *Spratelloides delicatulus:* 5 cm SL.

Family No. 55: ENGRAULIDAE

by P.J.P. Whitehead & T. Wongratana

Anchovies — **Ansjovisse**

Small fishes (8-20 cm); pale brown or flesh-coloured with silvery bellies when fresh; some species with silver mid-lateral band along flanks. Body subcylindrical or compressed. Snout prominent, projecting in front of lower jaw; mouth inferior; maxilla reaching well past eye; teeth usually minute. Gill-rakers long and slender. Fins without spines. Scales cycloid, deciduous; no lateral line.

Pelagic, mainly inshore fishes, but sometimes down to 200 m *(Engraulis)*; often forming dense shoals. An extremely important group in world fisheries, but only *Engraulis* of commercial interest in our area. Juveniles often found in estuaries, but all our species are essentially marine.

Several genera and numerous species; represented in all warm seas. Six species in 3 genera found in our area; stray individuals of extralimital species can perhaps be expected on our east coast. The flesh of some forms is dark and much used for savoury pastes. In South Africa the huge catches of anchovies are generally turned into fishmeal. As with the Clupeidae, identification often requires a microscope. The warm-water Indo-Pacific species have recently been revised by Wongratana (1981), which supersedes the synopsis by Whitehead (1973). Of the eleven new species proposed by Wongratana (1983), none is recorded from our area.

KEY TO GENERA

1a No scutes along belly; body subcylindrical; maxilla tip bluntly rounded, barely reaching edge of preopercle *Engraulis*
1b At least some scutes along belly 2

2a Sharp needle-like scutes in front of V, none behind; silver band along flanks . . . . . *Stolephorus*
2b Complete keel of sharp scutes from gill opening to anus; no silver band along flanks . . . . . *Thryssa*

Genus ***Engraulis*** Cuvier, 1816

Our species seems identical to the Japanese anchovy. Differences from the European anchovy, which reaches south to at least Angola, are slight and all may in the future be united as a single widespread species, *E. encrasicolus* (Linnaeus, 1758).

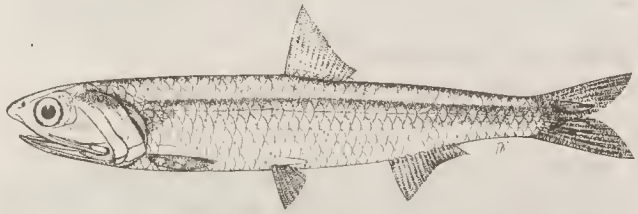
55.1 *Engraulis japonicus*
Schlegel, 1846
PLATE 9

Cape anchovy — Kaapse ansjovis

Engraulis japonicus Schlegel, 1846: 238, Pl. 108, Fig. 3 (Japan); Smith, **SFSA No. 123*;** Whitehead, 1973: 218*; Wongratana, 1981: 219*. *Engraulis capensis* Gilchrist, 1913: 62 (vicinity of Cape Peninsula); Smith & Smith, 1966: 84*; Crawford, 1981: 51.

D ii-iii,12-14; A ii-iii,13-18; P i,14-17; V i,6; LS 40- 45; lower GR 26-39. Body almost cylindrical, belly rounded, without scutes. Snout acute; maxilla tip blunt, ending far short of gill opening. Origin of A well behind last D ray.

Silvery stripe along flanks in fishes over about 6 cm. Attains 13 cm. A very important commercial species, the Cape anchovy is the major component of the present South African purse-seine fishery. Known from the cooler waters of the Indo-Pacific, it extends round the Cape to Walvis Bay; recorded down to 200 m. (When catches of the pilchard, *Sardinops ocellata,* waned, increasing numbers of this anchovy were caught. The high oil content of the flesh required considerable technical adaptation for turning these fishes into fishmeal. As the anchovy shoals in turn became scarce, their place was taken by shoals of the smaller and commercially less attractive myctophid fish called "onderbaadjies" *(Lampanyctodes hectori),* a pattern similar to that which occurred in Peru. – M.M. Smith.)



55.1 *Engraulis japonicus:* 5.5 cm SL.

Genus ***Stolephorus*** Lacepède, 1803

This name was misused by Fowler (1941) and others for the clupeid (roundherring) genus *Spratelloides;* Fowler called the present genus *Anchoviella,* causing much confusion in the literature. Seventeen species, all Indo-Pacific; 3 in our area.

KEY TO SPECIES

1a Maxilla short, not reaching gill opening, its tip blunt, or bluntly pointed 2
1b Maxilla long, reaching or almost reaching to gill opening, its tip sharply pointed . . . . . *S. holodon*

2a Isthmus reaching hind border of branchiostegal membrane; attains 15 cm . . . . . *S. indicus*

2a

2b Isthmus shorter and preceded by diamond-shaped bony plate; attains only 8.5 cm . . . . . *S. punctifer*

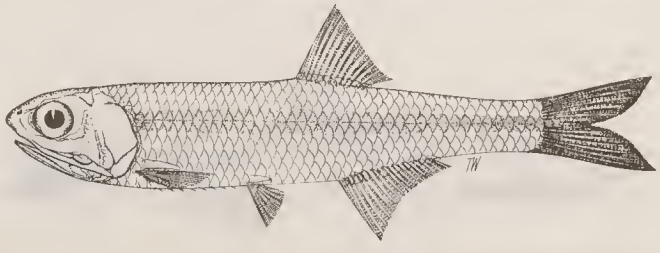
2b

55.2 *Stolephorus holodon*
(Boulenger, 1900)

Thorny anchovy — Doring-ansjovis

Engraulis holodon Boulenger, 1900: 12, Fig. 3 (Swartkops R.). *Anchoviella holodon:* Smith, **SFSA No. 120** (probably also **No. 119*,** *A. commersonii*). *Stolephorus holodon:* Wongratana, 1981: 245*.

D iii,12-14; A iii,17-20; P i,11-13; V i,6; LS 38-40; lower GR 24-29; prepelvic scutes 6-8. Body somewhat compressed. Tip of maxilla sharply pointed, reaching about to gill opening.



55.2 *Stolephorus holodon:* 6.5 cm SL.

Silver stripe along flanks. Attains 8 cm. Endemic to east coast, from northern Mozambique, south at least to Swartkops estuary; common along shore and in estuaries.

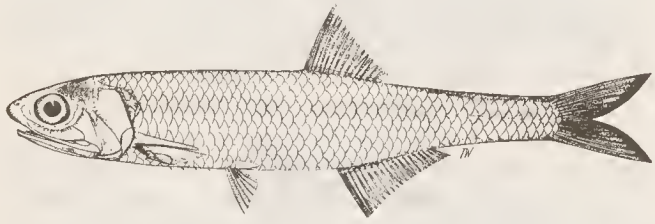
55.3 *Stolephorus indicus*
(van Hasselt, 1823)

Indian anchovy — Indiese ansjovis

Engraulis indica van Hasselt, 1823: 329 (on Russell's Nattoo of Vizagapatnam). *Anchoviella indica:* Smith, **SFSA No. 118*.** *Stolephorus indicus:* Whitehead, 1973: 225*; Wongratana, 1981: 231*; Whitehead & Wongratana, 1984: ENGR Stol 5*.

D iii,12-14; A iii,16-18; P i,12-15; V i,6; LS 38-42; lower GR 21-28; prepelvic scutes 3-6. Body subcylindrical, belly rounded with usually 3-5 needle-like scutes before V. Tip of upper jaw bluntly pointed, reaching only to front margin of preopercle.

A silver stripe down flanks. Attains 15 cm. Rare in Natal and southern Mozambique, but elsewhere common along east African coast and throughout Indo-Pacific.



55.3 *Stolephorus indicus:* 12.5 cm SL.

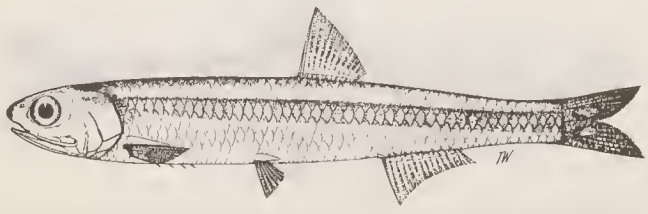
55.4 *Stolephorus punctifer*
(Fowler, 1938)

Buccaneer anchovy — Seerower-ansjovis

Encrasicholina punctifer Fowler, 1938: 157* (Fare Bay, Huaheine, Society Ids.); *Stolephorus buccaneeri:* Whitehead, 1973: 222*; Wongratana, 1981: 224*; Whitehead & Wongratana, 1984: ENGR Stol 2*.

D ii,10-13; A ii,12-15; P i,12-16; V i,6; LS 39-43; lower GR 21-27; prepelvic scutes 2-7. Body subcylindrical; belly rounded, usually with 4-5 needle-like scutes before V. Tip of maxilla bluntly rounded, reaching only to front margin of preopercle.

A silver stripe along flanks. Attains 85 mm. East coast south to St. Lucia, perhaps to Durban, but more samples needed; throughout Indo-Pacific to Hawaii.



55.4 *Stolephorus punctifer:* 8.5 cm SL.

Genus ***Thryssa*** Cuvier, 1829

Body compressed, with a sharp keel of scutes from gill opening to anus. Fowler (1941) and subsequent authors wrongly used the genus *Thrissocles* Jordan & Evermann, 1917. Twenty-two species, all Indo-Pacific; 2 in our area.

KEY TO SPECIES

1a Maxilla reaching base of P; lower GR 18-24 . . . . . *T. vitrirostris*
1b Maxilla filamentous at tip, reaching to V or beyond; lower GR 10-12 . . . . . *T. setirostris*

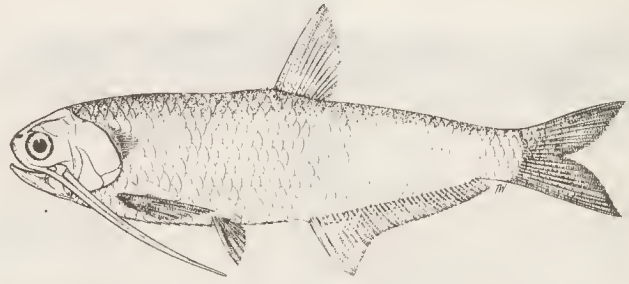
55.5 *Thryssa setirostris*
(Broussonet, 1782)
PLATE 9

Longjaw glassnose — Snor-glasneus

Clupea setirostris Broussonet, 1782: text and Pl. 2, no pagination (Society Ids.). *Thrissocles setirostris:* Smith, **SFSA No. 122*.** *Thryssa setirostris:* Whitehead, 1973: 230*; Wongratana, 1981: 293*; Whitehead & Wongratana, 1984: ENGR Thrys 3*.

D iii,11-12; A iii,29-36; P i,11-13; V i,6; LS 41-46; lower GR 10-12; scutes (16-18)+(9-10).

Attains 15 cm. East coast south to Transkei, perhaps to East London; apparently less common than *T. vitrirostris*. Throughout Indian Ocean to Indonesia and China.



55.5 *Thryssa setirostris:* 13 cm SL.

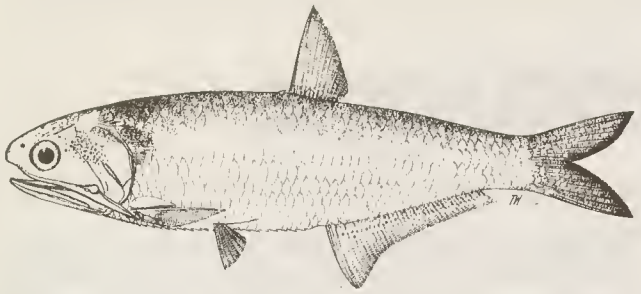
55.6 *Thryssa vitrirostris*
(Gilchrist & Thompson, 1908)
PLATE 9

Orangemouth glassnose — Oranjebek-glasneus

Engraulis vitrirostris Gilchrist & Thompson, 1908: 201 (Durban). *Thrissocles malabaricus (non* Bloch) Smith, **SFSA No. 121*.** *Thryssa vitrirostris:* Whitehead, 1973: 233*; Wongratana, 1981: 269*; Whitehead & Wongratana, 1984: ENGR Thrys 2*.

D iii,10-11; A iii,31-40; P i,11-12; V i,6; LS 40-44; lower GR 18-24; scutes (16-19)+(8-12).

Attains 22 cm. East coast south to Port Alfred; apparently common along shore and in estuaries. East Africa to Persian Gulf and coasts of India.



55.6 *Thryssa vitrirostris:* 11 cm SL.

Family No. 56 : CHIROCENTRIDAE

by P.J.P. Whitehead

Wolfherrings **Wolfharings**

Moderate-sized silvery fishes (30-100 cm) with elongate and highly compressed (almost ribbon-like) bodies; belly without scutes. Two large canines at front of upper jaw, pointing forwards; smaller canines behind them and in lower jaw. Gill-rakers short. Fins without spines; pelvic fins very small and about midway between pectoral base and anal fin origin. Scales minute, cycloid, usually shed; no lateral line along flanks. Vertebrae (42-45)+(27-31).

Pelagic inshore fishes, carnivorous, preying on small fishes; reported to exhibit a feeding frenzy among small herrings and anchovies during night fishing with lights. Should be handled with caution. Reports of specimens reaching 12 feet (Fowler, 1956; Smith, 1961) are probably unfounded. Flesh tasty, but very bony. One genus (Indo-Pacific only) with 2 species.

Genus *Chirocentrus* Cuvier, 1816

The 2 species were frequently muddled in the past or else combined under the name *C. dorab;* they were first convincingly separated by Luther (1966), see also Whitehead (1973). *C. nudus* Swainson, 1839 was recorded by Fowler in 1934 (see Smith, **SFSA No. 103**), but this record was apparently based on *C. dorab*.

KEY TO SPECIES

1a Tip of D and often A black; P length equal to distance from gill opening to about eye centre . . . . . *C. dorab*

1b D and A colourless; P length equal to distance from gill opening to mid-snout . . . . . *C. nudus*
(Not yet recorded from our area)

56.1 *Chirocentrus dorab*

(Forsskål, 1775)

Wolfherring Wolfharing

Clupea dorab Forsskål, 1775: xiii, 7 (Djedda and Mocha, Red Sea). *Chirocentrus dorab:* Smith, **SFSA No. 104*** (perhaps including *C. nudus*); Whitehead, 1973: 167*; Whitehead & Wongratana, 1984: CHIROC Chiroc 1*.

D iv-v, 12-14; A iii-iv, 26-32; P i,13-15; V i,6-7; lower GR 12-16. P length 11-13% SL.

Back with bands of green and blue, shading through brassy gold to bright silver flanks; tip of D and front of A black. Attains 100 cm. East coast, south to Durban. Elsewhere, widespread in Indo-Pacific, usually occurring with *C. nudus*. Flesh delicate but very bony.

56.1 *Chirocentrus dorab:* 33 cm.

Infradivision EUTELEOSTEI

An ill-defined set of "higher teleosts" comprising all those living (recent) teleosts that are left after subtraction of the Osteoglossomorpha, Elopomorpha and Clupeomorpha. Nelson's (1894) survey of the fishes of the world recognises 374 families of euteleosts, comprising some 19 642 species. In addition to representing 90% of all living fish species, the euteleosts far exceed all of the other fishes in their diversity of morphology, ecology and behaviour.

Order GONORHYNCHIFORMES

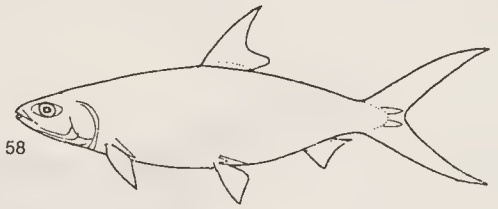
Mouth small, toothless; epibranchial organs (bilateral pouches behind fourth gill arch) present; pelvic fins abdominal; pectoral fin base horizontal; well-developed scaly axillary process at base of pectoral and pelvic fins; no fin spines; eye covered with skin; neural arch of first vertebra enlarged and forms an extensive joint with the cranium.

Gonorhynchiforms are thought to be closely related to the dominant freshwater group known as the ostariophysan fishes (Fink & Fink, 1981). The ostariophysans comprise the Cypriniformes (minnows, etc.), Characiformes (characins) and the Siluriformes (gymnotids and catfishes); altogether they represent about three-quarters of the world's freshwater fishes.

Four families of gonorhynchiforms are recognised (Nelson, 1984); two families occur in our area, and the other two in freshwaters of tropical Africa.

KEY TO FAMILIES

1a Mouth terminal; dorsal fin over middle of body ..... CHANIDAE



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1b Mouth inferior (on underside of head); dorsal fin behind midpoint of body ..... GONORHYNCHIDAE

57

Family No. 57: GONORHYNCHIDAE

by M.M. Smith

Beaked sandfish **Spitsbek-sandvis**

Elongate, tapered body with pointed snout; mouth inferior; jaws toothless; barbel below end of snout; epibranchial organs behind 4th gill arch; gill openings narrow; branchiostegals 4; no gasbladder; fish entirely covered by small ctenoid scales. A single genus, *Gonorhynchus* Scopoli, 1777, with 7 nominal species, which most recent authors consider synonyms of *G. gonorhynchus;* but as this fish is anti-tropical there could be 2 or more species. Fortunately the oldest name was given to the fish described from the Cape of Good Hope.

57.1 *Gonorhynchus gonorhynchus*

(Linnaeus, 1766)

PLATE 9

Beaked sandfish Spitsbek-sandvis

Cyprinus gonorhynchus Linnaeus, 1766: 528 (Cape of Good Hope).
Gonorhynchus gonorhynchus: Smith, **SFSA No. 102*.**

D 11-13; A 9-10; P 12-13; V 9-10; GR 10+13; LL about 140-170; skin covers eyes; lips thick with papillae.

Inside of mouth and gills purplish; attains 60 cm. Caught by trawlers over sand, breeds in deeper water; pelagic transparent young often eaten by seabirds and sometimes thrown ashore in bad weather. Known from Chile and St. Helena in the Atlantic, otherwise Indo-West Pacific including New Zealand, Australia, Japan and Hawaii.

Family No. 58: CHANIDAE

by M.M. Smith

Milkfish **Melkvis**

Compressed, torpedo-shaped body with regular, grooved, cycloid scales. Head naked. Mouth small, maxilla not reaching past centre of eye; no teeth. Eye covered by skin. Gill membranes united, forming a free fold across the chest. Dorsal and anal fins with basal scaly sheath; large axillary scales above pectoral and pelvic fins, no fin spines.

57.1 *Gonorhynchus gonorhynchus:* 7.5 cm juvenile (Natal).

One genus, *Chanos* Lacepède, 1803 with one species.

58.1 *Chanos chanos*
(Forsskål, 1775)

Milkfish — Melkvis

Mugil chanos Forsskål, 1775: 74 (Red Sea). *Chanos chanos:* Smith, **SFSA No. 105***; Blaber, 1978: 31; van der Elst, 1981: 152*.

D 13-17; A 8-10; P 15-17; V 10-12; LL 78-90; GR (147-160)+(107-165)(Fowler, 1941). Depth 3.1-4.7. Eye greater than snout and interorbital.

Brilliant silvery, darker dorsally, C and A margins dusky. Spawns at sea and passes through a ribbon larval stage that metamorphoses in estuaries. Tropical Indo-West Pacific, reaches as far south as the Krom River. In the East the young are reared in ponds as food. A vigorous fighter, taken on prawn or fish fillet; flesh esteemed. Attains 1.8 m. Feeds on shallow banks and swims in shoals; when swimming with D and upper C lobe cutting the surface, milkfish are often mistaken for sharks.

58.1 *Chanos chanos:* 90 cm (Cosmoledo Id.).

Order SILURIFORMES

Catfishes — Babers

Skin naked; first dorsal and pectoral fins with a long serrated spine; no pelvic fin spine; 3 or 4 pairs of barbels around the mouth. Anterior five vertebrae and their ribs modified to form a bony connection between the swimbladder and the ear; this specialised structure (called the "Weberian apparatus") is a unique characteristic of all ostariophysan fishes and substantially improves the hearing of these fishes.

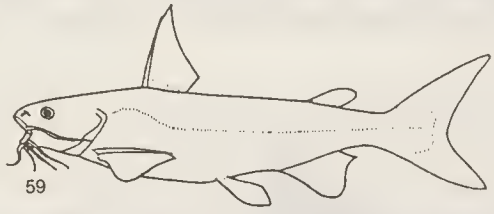
The siluriforms are the only ostariophysans to have adapted to life in the sea, but most siluriforms occur in freshwaters of South America.

KEY TO FAMILIES

1a Caudal fin continuous with the long soft-rayed second dorsal and anal fins ..... PLOTOSIDAE

60

1b Caudal fin forked, separate from dorsal adipose fin and anal fins ..... ARIIDAE



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Family No. 59: ARIIDAE

by W.R. Taylor

Sea catfishes — Seebabers

Medium to large fishes. Body elongate; snout and head rounded to depressed; mouth terminal to inferior. Gill membranes fused with each other and attached to isthmus. Teeth in jaws fine or granular; those on palate when present, fine, granular or molariform, arranged in bands or patches. One pair of maxillary and two pairs of mental (mandibular) barbels. Head with dorsal rugose bony shield covered with thin skin in some species or by thick skin and muscles in others; the supraoccipital process or posterior portion of this shield extends backward to the predorsal plate at the base of the dorsal fin. Front and rear nostrils close together; rear nostrils partly covered by a flap of skin. Gill-rakers 10-20 on first arch, present on anterior faces of all arches and on posterior faces of third and fourth arches, but present or absent from rear faces of first and second arches. Five to 7 vertebrae fused into a "complex vertebra" that is rigidly fused to skull. Dorsal fin with a very short spine followed by a long serrated spine and 7 soft-rays; pectoral fins with a serrated spine, 9-13 soft-rays; an adipose fin opposite anal fin; anal fin with 16-22 soft-rays; pelvic fins with 6 soft-rays, variously modified in the female at maturity; caudal fin forked, with 13 branched rays (6 in upper and 7 in lower lobe). Scales absent. Lateral line complete, branching posteriorly onto upper and lower lobes of caudal fin. Swimbladder present.

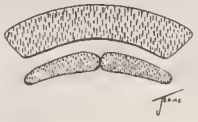
The South African species of Ariidae were previously known under the generic names *Tachysurus* Lacepède and *Arius* Valenciennes. *Tachysurus* is not an ariid catfish as it was illustrated and described as having a rayed adipose fin. The genus *Arius* differs from our species as follows: epiotic lamina broadly fused with transverse processes of 4th fused vertebra but epiotic not entering skull roof; 7 anterior fused vertebrae, 2 of which bear ribs; moderate size gill-rakers along rear (inner) margin of first 2 gill arches.

Found in marine, brackish and freshwater of warm-temperate and tropical continental coasts. Many genera and species.

Dangerous fishes, as the hard fin spines that are covered by a venomous mucus inflict painful lacerated wounds. The venom is destroyed at 50°C so immersion of the wound in water between 50 and 55°C relieves the pain immediately. The flesh is wholesome and tasty. The eggs are about as big as peas or small marbles, and carried in the mouth of the male until they hatch; for some time after that, the young occupy this shelter. Two genera and 3 species in our area.

KEY TO GENERA

1a Teeth on palate villiform; 2 transverse patches of teeth meeting at midline behind premaxillary tooth band; GR 11-18 on rear or inner surface of 1st and 2nd gill arches; top of head smooth, covered with thick muscle layers; posterior process of cleithrum broadly fan-shaped ..... *Galeichthys*



Galeichthys tooth pattern.

1b Teeth on palate various, fine to enlarged and blunt; 2 well-separated, rounded patches of teeth behind premaxillary tooth band, followed by 2 large, oblong patches of often molariform teeth; no GR on rear or inner surfaces of 1st 2 gill arches; surface of head rugose posteriorly; posterior process of cleithrum a small sharp triangle . . . . . *Ariodes*

Ariodes tooth pattern: anterior to the left.

Genus ***Ariodes*** Müller & Troschel, 1849

Seven anterior complex vertebrae, 2 of which bear ribs. Epiotic an acute triangular wedge in skull surface between supraoccipital process and "supratemporal". Epiotic lamina broadly fused with transverse processes of fourth fused vertebra. Lateral ethmoids greatly enlarged laterally. Fin spines chambered.

59.1 *Ariodes dussumieri*
(Valenciennes, 1840)

Tropical seacatfish — Tropiese seebaber

Arius dussumieri Valenciennes, *in* Cuv. & Val., 1840: 84 (Malabar, India). *Tachysurus dussumieri* Smith, **SFSA No. 164.** *Arius kirkii* Günther, 1864: 163 (Zambezi River).

A 16-18; P I,12; anterior 7 vertebrae fused, 2 with ribs + 13-14 unfused with ribs + 4-6 precaudal lacking ribs + 23-25 caudal; total vertebrae 48-50; branchiostegals 6; total GR 14-16 on first arch, 13-14 on second arch, 14-15 on third arch, all anteriorly. Supraoccipital process more or less evident, subtriangular, rugose striated. Short serrae along front and rear edges of P spine.

Body dark brown, lower surfaces completely covered with fine brown pigment specks. Attains 50 cm SL. Western Indian Ocean southward to Madagascar and Maputo.

59.1 *Ariodes dussumieri:* 19 cm SL.

Genus ***Galeichthys*** Valenciennes, 1840

Anterior complex vertebrae 5, none of which bear ribs. Epiotic not forming part of skull roof, its lamina barely developed, very short, remote from complex vertebrae. Lateral ethmoids narrow distally. Supraoccipital process narrow, separated by a free interneural from the predorsal ring or plate. Branchiostegals 6; total vertebrae 50-53.

Three species; 2 in our area. *Galeichthys peruvianus* Lütken, 1874 is known definitely only from Peru. *Pimelodes fossor* Lichtenstein, 1823: 112 is a *nomen dubium*. Although the description is of a *Galeichthys*, it does not distinguish between the 2 South African species. The type-specimen is lost.

KEY TO SPECIES

1a Dark brown to blackish above, slightly lighter below but all undersurfaces completely and densely covered with dark brown pigment specks; C lobes short; distance from C notch to tip of longest ray 2.7-4.1 in head length . . . . . *G. ater*

1b Greyish to greenish brown above, lighter on sides, sometimes with a faint lateral silvery stripe, generally devoid of dark pigment on undersurfaces; C lobes longer; distance from C notch to tip of longest ray 1.4-2.2 in head length . . . . . *G. feliceps*

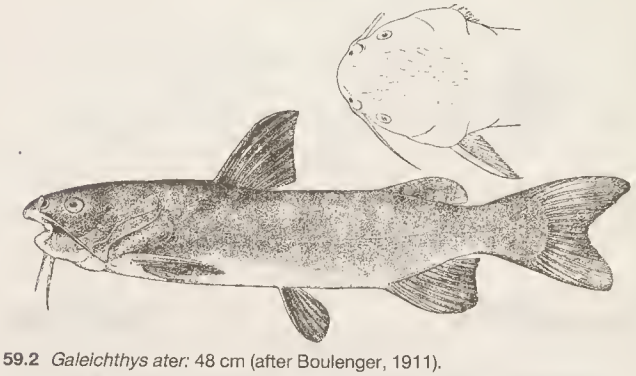
59.2 *Galeichthys ater*
Castelnau, 1861

Black seacatfish — Swart seebaber

Galeichthys ater Castelnau, 1861: 62 (Cape Seas); Boulenger, 1911: 382*.

A 19-22; P I,10-12; total GR 10-13 1st arch anteriorly + 12-16 posteriorly, 11-14 2nd arch anteriorly + 11-15 posteriorly, 11-15 3rd arch anteriorly. Short serrae along rear edge of P spine.

Dark brown to blackish, only slightly lighter below, but whole undersurface always covered with brown specks. Attains 45 cm. South coast to Port Alfred; not in rivers.



59.2 *Galeichthys ater:* 48 cm (after Boulenger, 1911).

59.3 *Galeichthys feliceps*
Valenciennes, 1840
PLATE 10

White seacatfish — Wit seebaber

Galeichthys feliceps Valenciennes, *in* Cuv. & Val., 1840: 29, Pl. 424 (Cape of Good Hope). *Bagrus capensis* Smith, 1840: Pl. 8 (South Africa). *Ariodes polystaphylodon* Fermor, 1913: 196-199* (skull). *Galeichthys ocellatus* Gilchrist & Thompson, 1916: 60, Fig. (Zwartkops River, Algoa Bay). *Tachysurus feliceps:* Smith, **SFSA No. 165*** (part?); Smith, 1975: 20. *Tachysurus fossor:* Smith, 1962: 40 (part?); Smith & Smith, 1966: 36*.

A 17-21; P I,9-11; total GR 11-14 1st arch anteriorly + 12-19 posteriorly, 12-16 2nd arch anteriorly + 14-17 posteriorly; 12-15 3rd arch anteriorly. Short rugose projections or serrae along rear edge of P spine.

Generally brown to greyish or greenish brown above, lighter to whitish on sides and below, midline of abdomen whitish, never pigmented. Attains 55 cm. Sea, estuaries and rivers from Walvis Bay to Natal.

59.3 *Galeichthys feliceps:* 30 cm male (Walvis Bay).

Family No. 60: PLOTOSIDAE

by J.R. Gomon

Eel catfishes **Baberpalings**

Body elongate, tapering to a point posteriorly. No scales or bony plates. Second dorsal, caudal and anal fins confluent. First dorsal and pectoral fins each with a leading spine, usually serrate. Four pairs of barbels. One species has an additional pair of barbel-like extensions of the upper lip. In all marine species and 3 freshwater species, an arborescent organ (that may have a salt-excreting function) in a pit behind the vent; the remaining freshwater species lack this structure.

Found in tropical and subtropical waters of the Indo-West Pacific; freshwater species limited to Australia and New Guinea. Plotosids should be handled with care, as their spines are venomous and can produce very painful (even fatal) wounds. Immersion of wound in water as hot as can be borne (55°C) destroys the venom.

Genus *Plotosus* Lacepède, 1803

Dendritic organ present behind vent; gill membranes separate and free from isthmus except anteriorly; 4 pairs of barbels: 1 pair nasal, 1 maxillary, 2 mental; lips without mental lobes or barbel-like extensions; anterior nostril a small tube at or above edge of upper lip; teeth present on upper jaw.

Five species, 1 of which is in freshwater; 2 marine or estuarine species in our area, 1 endemic to southern Africa. Both species feed on benthic invertebrates and fishes.

KEY TO SPECIES

1a Body usually with 2 or 3 prominent pale stripes, 2 extending onto head (stripes often indistinct in large specimens); total GR 22-32; total rays in confluent median fins 139-200 . . . . . *P. lineatus*

1b Body without stripes or with 2 faint stripes not extending onto head; total GR 16-21; total rays in confluent median fins 202-237 . . . . . *P. nkunga*

60.1 *Plotosus lineatus*

(Thunberg, 1787)

PLATE 10

Striped eel-catfish Streep-baberpaling

Silurus lineatus Thunberg, 1787: 31 (no locality); Thunberg, 1791: 191, Pl. 6 (East Indian Seas). *Plotosus anguillaris:* Smith, **SFSA No. 163*** (in part, Pl. 6). *Plotosus lineatus:* Smith, 1980: 174; van der Elst, 1981: 238*; Gomon & Taylor, 1982: 2.

D I,4 (last ray split to base); dorsal procurrent C 69-115; C 9-11; A 58-82; total rays in confluent fins 139-200; P I,9-13; V 10-13; vertebrae posterior to Weberian complex (9-14)+(37-46) = 49-58; total GR 22-32. Nasal barbels reach hind border of eye or slightly beyond. Eye 12-26% of head length.

Brown or black above, whitish below, with 2-3 horizontal white or yellow stripes, sometimes obscured in larger individuals. Attains 32 cm. Throughout Indo-West Pacific, possibly as far south as Algoa Bay. More common farther east. In tropical waters large tight shoals of these fishes can be found in shallow water and tide pools.

60.2 *Plotosus nkunga*

Gomon & Taylor, 1982

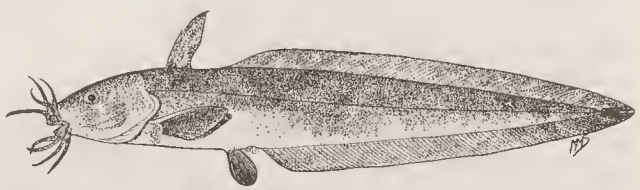
PLATE 10

Eel-catfish Baberpaling

Plotosus anguillaris (non Bloch): Gilchrist & Thompson, 1917: 563; Barnard, 1925: 163 (in part); Fowler, 1934: 417 (in part); Fowler, 1935: 369 (Natal); Smith, **SFSA No. 163*** (in part, not Pl. 6 which is *P. lineatus*); Smith & Smith, 1966: 36*. *Plotosus limbatus (non* Valenciennes): Smith, 1975: 20; Wallace, 1975: 43; ?van der Elst, 1981: 237*. *Plotosus nkunga:* Gomon & Taylor, 1982: 3, Pl. 1 (Bashee River, Transkei).

D I,4 (last ray split to base); dorsal procurrent C 104-120; C 9-10; A 88-109; total rays in confluent fins 202-237; P I,11-15; V 13-14; vertebrae posterior to Weberian complex (13-15)+(55-58) = 68-73; total GR 16-21. Nasal barbels reach hind border of eye or slightly beyond. Eye 11-18% of head length.

In preservative, brown or grey above, lighter brown or whitish below; 2 faint, pale, longitudinal stripes sometimes present on body, but not extending onto head. Attains 54 cm. Knysna to Kosi Bay, possibly further north to Zanzibar.



60.2 *Plotosus nkunga:* 47 cm SL.

Order SALMONIFORMES

Suborder ARGENTINOIDEI

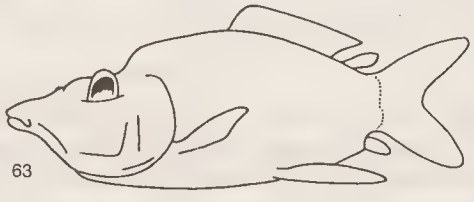
Pelvic fins abdominal; no fin spines; caudal fin shallowly forked; dorsal adipose fin present in most families; usually no teeth on basibranchials; crumenal organ (bilateral pouches incorporating fifth ceratobranchial bone and its accessory cartilage) present.

The argentinoids are salmoniform fishes that have become adapted to a deep-sea habitat. The distinction and relationships of the Order Salmoniformes are not yet clear (Fink & Weitzman, 1982), but the argentinoid fishes are generally accepted as a natural (monophyletic) group. The Suborder Salmonoidei (including the salmonids, trout, smelt, etc.) are mainly freshwater fishes, although some species spend much of their life in the sea.

The family classification of the Argentinoidei is still unsettled, with various groups shifting from subfamily to family rank according to the latest findings and opinions of the authors working on this group. Six families are here recognised. The following key will not work for some genera that are not yet known from our area (e.g. *Bathylychnops*, an opisthoproctid with non-tubular eyes, and *Xenophthalmichthys*, variously classified in the Argentinidae, Bathylagidae or Microstomatidae, with anteriorly directed, tubular eyes).

KEY TO FAMILIES

1a Eyes tubular, directed anteriorly or dorsally; interorbital width less than half caudal peduncle depth; premaxillae much reduced or absent; maxillae thin, scale-like bones which are easily lost ..... OPISTHOPROCTIDAE (No. 63)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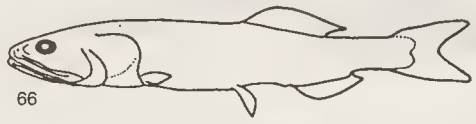
1b Eyes normal, directed laterally; interorbital width not less than half caudal peduncle depth; premaxillae and maxillae distinct (not easily lost) 2

2a No teeth in upper jaw (some species with minute papillae that may be mistaken for teeth); anal fin origin at or behind a vertical through last dorsal fin ray (below rear half of dorsal fin base in *Leptochilichthys*) 3

2b Teeth present on upper jaw bones; anal fin origin not behind dorsal fin base 5

3a Anal fin origin anterior to last dorsal fin ray; branchiostegal rays 12 or 13; no adipose fin; maxilla reaches past eye ..... LEPTOCHILICHTHYIDAE (No. 66)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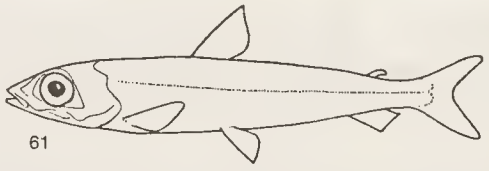
3b Anal fin origin below or behind last dorsal fin ray; branchiostegal rays 2-8; adipose fin present or absent; maxilla not reaching past eye 4

4a Anal fin rays 7-15; swimbladder and postcleithra present ..... ARGENTINIDAE (No. 61)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4b Anal fin rays 17-25; swimbladder and postcleithra absent ..... BATHYLAGIDAE (No. 62)

62

5a Large sac extending forward under the skin (medial to shoulder girdle) containing a luminous fluid and opening posteriorly through a small tube between the lateral line and the pectoral fin base ..... PLATYTROCTIDAE (No. 65)

65

5b No sac under shoulder girdle ..... ALEPOCEPHALIDAE (No. 64)

64

Family No. 61: ARGENTINIDAE

by D. M. Cohen

Argentines **Argentyne**

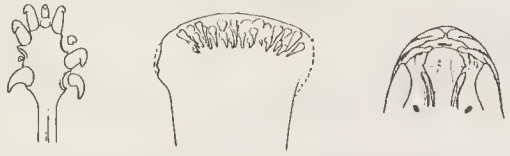
Body elongate, generally silvery. Dorsal fin single; anal fin on rear fourth of body. No spines in fins. Mouth small; snout short and blunt. Teeth absent on upper jaw bones. Scales cycloid, deciduous. Branchiostegal rays 2-6. Swimbladder present. No photophores or other luminous tissue.

Species in the Subfamily Argentininae are benthopelagic on the outer shelf and upper slope; species in the Subfamily Microstomatinae are mesopelagic. Found around the world, with commercially important species in the North Atlantic and at Japan. Five genera and at least 50 species. Partial review by Cohen & Atsaides (1969).

KEY TO SUBFAMILIES AND GENERA

1a P on ventrolateral edge of body; LL not extending onto C; (Subfamily Argentininae) 2
1b P nearly midlateral; LL extending onto C; (Subfamily Microstomatinae) 3

2a Tongue with strong teeth on front and sides; a continuous band of closely spaced, posteriorly directed teeth along front end of vomer and on palatines; maxillaries separated by at least one half width of broad, underlying mesethmoid . . . . . *Argentina*



2a

2b Tongue teeth absent or small, if present, on front end only; vomerine and palatine teeth few and scattered, well behind front edge of vomer; maxillaries touching in midline or very close . . . . . *Glossanodon*

2b

3a Adipose D present; V inserted behind a vertical from D origin . . . . . *Nansenia*
3b Adipose fin absent; V inserted ahead of D . . . . . *Microstoma*

Genus *Argentina* Linnaeus, 1758

Twelve species; 1 in our area.

61.1 *Argentina euchus*
Cohen, 1961

Argentina euchus Cohen, 1961: 19, Fig. 1 (Indian Ocean, 25°20'S, 35°17'E; 590 m); Cohen & Atsaides, 1969: 33. *Argentina sphyraena (non* Linnaeus): Smith, **SFSA No. 127** (Figure is *Argentina silus*).

D 11-12; A 12-15; P 16-18; V 10-11; LL 47-50; lower GR 6; vertebrae 47-48. Depth 6.5-8.4; head 3.2-3.6.

Preserved specimens with a dark brown band along flanks, paler below. Reaches 15 cm. Taken in bottom trawls, apparently rare. Kenya to Natal at depths to 590 m.

61.1 *Argentina euchus:* 14.5 cm paratype (S. Mozambique).

Genus *Glossanodon* Guichenot, 1867

Eight described species; in our area a single specimen (in poor condition) that cannot be identified to species, deposited in the J.L.B. Smith Institute of Ichthyology.

Genus *Microstoma* Cuvier, 1816

A single species.

61.2 *Microstoma microstoma*
(Risso, 1810)

Gasteropelecus microstoma Risso, 1810: 356 (Nice). *Microstoma microstoma:* Cohen, 1964: 28*; Krefft, 1974: 231 (probably to 25°S in the eastern Atlantic).

D 10-12; A 7-9; P 7-8; V 9-11; LL 50-53 (including scales on base of C); vertebrae 44-45. Depth 13-13.6; head 4.9-5.3. Eye notably large.

Body silvery, darker near tail. Reaches 21 cm or larger. Mesopelagic. Probably circumtropical; occasionally taken in temperate seas as well.

61.2 *Microstoma microstoma:* 21 cm (after Bini, 1970).

Genus *Nansenia* Jordan & Evermann, 1896

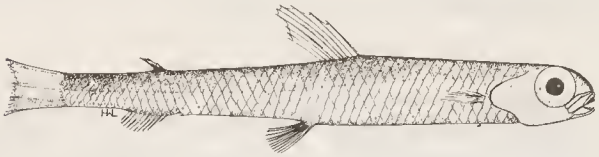
Ten described species; probably 2 species in our area, one of which is unrecorded in the literature and may be undescribed.

61.3 *Nansenia macrolepis*
(Gilchrist, 1922)

Bathymacrops macrolepis Gilchrist, 1922: 53, Pl. 9, Fig. 2 (Natal); Smith, **SFSA No. 129***. *Nansenia macrolepis:* Cohen, 1958: 56.

D 10-11; A 11; P 13-16; V 11; LL 46-50 (including scales on base of C); GR 11-21. Depth 8.1-9.2; head 4.7-4.8.

May reach 20 cm. Mesopelagic. Described from off Natal; recorded also from west of Cape Peninsula. The taxonomy of *Nansenia* is confused and the precise ranges of species cannot be given.



61.3 *Nansenia macrolepis:* 11 cm (off South Africa).

Family No. 62 BATHYLAGIDAE

by D. M. Cohen

Deepsea smelts **Diepsee-spierings**

Body elongate to robust, silvery to dark. Single dorsal fin near mid-length of body; anal fin on posterior third or fourth of body. No spines in fins. Pectoral fins close to ventral surface of body; ventral fins beneath or near level of dorsal fin. Scales large, deciduous; no photophores. Two branchiostegal rays on each side. Mouth small; snout usually short and blunt, especially in larger examples. No teeth on upper jaw bones. No swimbladder.

Mesopelagic to bathypelagic in seas around the world; most abundant in temperate to boreal waters, where they can sometimes be important forage items for commercial species. One or 2 genera, 1 in our area.

Genus ***Bathylagus*** Günther, 1878

About a dozen species; 2 species from our area, perhaps another unrecorded. Taxonomy of this genus is not clear, hence species ranges are not easily defined.

KEY TO SPECIES

1a Scale pockets generally in regular rows; LL about 35-45; eye large, usually entering dorsal outline of head; GR on lower limb 19-24 . . . . . *B. antarcticus*

1b Scale pockets ragged, in irregular rows; LL about 50; eye smaller, not entering dorsal outline of head; GR on lower limb 16-18 . . . . . *B. bericoides*

62.1 *Bathylagus antarcticus* Günther, 1878

Bathylagus antarcticus Günther, 1878: 248 (Antarctic Ocean, "Challenger" sta. 157); Smith, **SFSA No. 130*;** Hulley, 1972: 216. ?*Bathylagus glacialis:* Karrer, 1973: 204.

D 9-12; A 17-25; P 9-11; V 7-9; LL scale pockets about 35-45; GR (9-11)+(19-24). Depth variable, small specimens generally slender, larger ones may be notably deep-bodied anteriorly; A base longer than C peduncle. Gill opening extends less than half distance up side of head (delicate gill membranes sometimes torn).

Scale pockets generally darkly pigmented. Reaches 15 cm or larger. Probably all around Antarctica, both south and north of Antarctic Convergence; possibly anti-tropical in Pacific and Atlantic oceans.

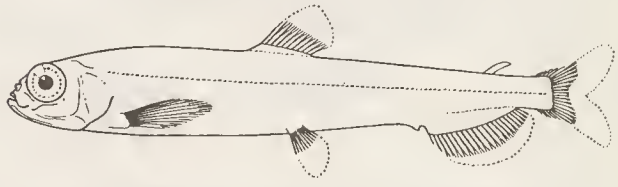
62.1 *Bathylagus antarcticus:* 11 cm.

62.2 *Bathylagus bericoides* (Borodin, 1929)

Scopelus bericoides Borodin, 1929: 110 (41°30′N, 45°57′W). *Bathylagus microcephalus* Norman, 1930: 275* (off Cape Town). *Bathylagus bericoides:* Hulley, 1972: 216.

D 10-12; A 18-23; P 9-12; V 9-11; LL scale pockets about 50; GR (5-9)+(16-18). Head 5.5-5.9 in SL. Body not greatly tapered to C peduncle; A base longer than C peduncle. Gill opening extends less than half distance up side of head.

Scale pockets darkly pigmented. Reaches at least 20 cm. Throughout tropical and subtropical seas.



62.2 *Bathylagus bericoides:* 17 cm holotype of *B. microcephalus* (after Norman, 1930).

Family No. 63: OPISTHOPROCTIDAE

by P.C. Heemstra

Barreleyes **Vaatjieoë**

Body oblong, compressed or cylindrical (elongate and subcylindrical in the extralimital genera *Dolichopteryx* and *Bathylychnops*). Pelvic fins abdominal, with 7-12 soft-rays; no fin spines; pectoral fins lateral; dorsal adipose fin usually present. Scales large, cycloid, deciduous; lateral line running straight along lateral midline. Eyes tubular (except in *Bathylychnops*), directed anteriorly, dorsally or dorsolaterally; interorbital very narrow. Mouth small; premaxillae rudimentary or absent; maxillae thin, scale-like bones which are easily lost; teeth minute or absent. Snout more or less produced.

Small, bizarre, bathypelagic fishes, the largest specimens no more than 16 cm SL. Six genera with about 11 described species. This account is based entirely on the literature,

mainly on the revision of the western North Atlantic species by Cohen (1964). Two genera are known from our area; *Winteria*, with one species known from the Atlantic and Indo-Pacific, may be found in our area and is thus included.

KEY TO GENERA

1a Belly with a broad, flattened, scaly, ventral sole extending from the head to the anus, which is located well behind V bases ..... *Opisthoproctus*
1b Belly without a flattened scaly sole; anus between V bases 2

2a Eyes directed dorsally to dorsolaterally; V longer than head ..... *Rhynchohyalus*
2b Eyes directed anteriorly; V shorter than head ..... *Winteria*

Genus ***Opisthoproctus*** Vaillant, 1888

Luminescent bacteria are contained in a diverticulum of the rectum. The light produced by the bacteria is spread over the flattened sole-like reflecting organ along the ventral edge of the belly (Herring, 1977). Body compressed. Eyes tubular, directed dorsally, covered with transparent gelatinous tissue. No light organ near the eye. At least two species; probably both occur in our area.

KEY TO SPECIES

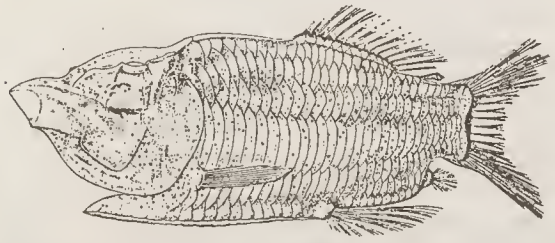
1a Anal fin distinct, with 8 or 9 rays; sole not reaching in front of vertical from nostrils ..... *O. grimaldii*
1b Anal fin rudimentary or absent, often not visible externally; sole reaches in front of vertical from nostrils ..... *O. soleatus*

63.1 *Opisthoproctus grimaldii* Zugmayer, 1911

Opisthoproctus grimaldii Zugmayer, 1911: 2 (off Portugal); 1911: 13, Pl. 1, Fig. 5; Cohen, 1964: 63*; Trunov, 1972: 397*.

D 14-17; A 8-9; P 11-12; V 10-11; GR 20-25. Head 2.2-2.4, body depth 2.2-2.5 in SL. Jaws and palatines toothless; vomer with 6 or 7 small, pointed teeth.

Ventral $^2/_3$ of body and ventral part of head peppered with large melanophores; dorsal part of head transparent; ventral surface of rear part of sole with 4 dark blotches. Attains 70 mm SL. One specimen from 500 - 510 m off northern Namibia. Most specimens have been taken in the North Atlantic, but there are a few records from the Indo-West Pacific. According to Cohen (1964), "the stomach of one specimen was packed with the tentacles and nematocysts of siphonophores".



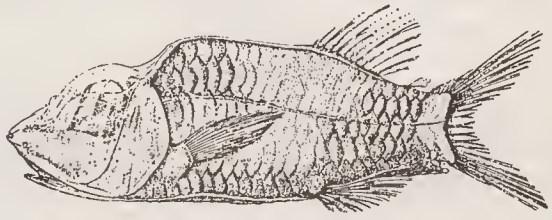
63.1 *Opisthoproctus grimaldii*: 5 cm SL (after Cohen, 1964).

63.2 *Opisthoproctus soleatus* Vaillant, 1888

Opisthoproctus soleatus Vaillant, 1888: 105, Pl. 13, Figs. 1, 1a (off Morocco); Cohen, 1964: 65*.

D 11-13; A not visible externally in some specimens, visible in others as 2 or 3 rudimentary rays between anus and C base; P 14; V 9-10; GR about 12. Head 2.5-2.8, body depth 2.4-2.8 in SL. Jaws toothless; numerous teeth on vomer, and a few on palatines. Anus below C base on a short protuberance.

Sides of body dark; head below and behind eye sprinkled with large melanophores; snout translucent ventrally, transparent dorsally. Ventral aspect of sole uniformly dark posteriorly. Attains 10 cm. Not yet reported from our area but probably occurs here. Known from Atlantic and Indo-West Pacific.



63.2 *Opisthoproctus soleatus:* drawn from 3 specimens 2 cm, 4.5 cm and 5.5 cm SL (after Cohen, 1964).

Genus ***Rhynchohyalus*** Barnard, 1925

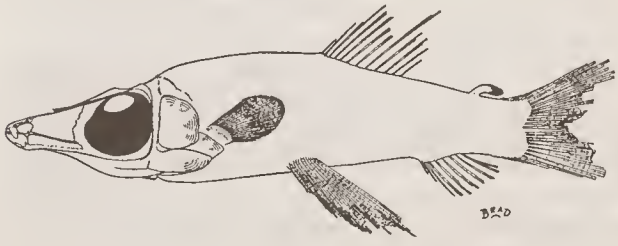
Body compressed, elongate, the depth much less than head length; anus between V. Monotypic.

63.3 *Rhynchohyalus natalensis* (Gilchrist & von Bonde, 1924)

Hyalorhynchus natalensis Gilchrist & von Bonde, 1924: 4, Pl. 1, Fig. 1 (off Table Bay, 135 fms., not Natal). *Rhynchohyalus natalensis:* Smith, **SFSA No. 128**; Cohen, 1964: 51*; Bertelsen *et al.*, 1965: 157.

D 10-12; A 7-10; P 14; V 11-12; LL 41. Head 2.6-3.0, body depth 4.0-4.5 in SL. Mouth very small, toothless; vomer with a band of teeth.

Body (in preservative) brown, with scattered melanophores ventrally; V and area around anus black; head trans-



63.3 *Rhynchohyalus natalensis*: 9.5 cm SL (after Grey, 1952).

lucent; eye black. Attains 16 cm. Atlantic Ocean: Bermuda to off Cape Town.

Genus ***Winteria*** Brauer, 1901

Body plump, cylindrical, somewhat compressed at caudal peduncle, the depth much less than head length. Eyes directed forward; suborbital light organ absent. Anus between V. Haedrich & Craddock (1968) examined 17 specimens from all three major oceans and concluded that they represented a single species.

63.4 *Winteria telescopa*
Brauer, 1901

Winteria telescopa Brauer, 1901: 126 (Gulf of Guinea); 1906: 14, Pl. 1, Figs. 4-6; Haedrich & Craddock, 1969: 1-11*.

D 8-9; A 7-9; P 12-14; V 7-10; LL 34-38; vertebrae 33-36. Head 2.6-3.4, body depth 4.3-5.6 in SL. No teeth in jaws.

Colour in life: dark blue-black with silvery reflections on the head. Attains 16 cm. Circumglobal; not yet recorded from our area, but probably occurs here.

63.4 *Winteria telescopa:* 2.5 cm SL (after Haedrich & Cradock, 1969).

Family No. 64: ALEPOCEPHALIDAE

by D.F. Markle

Slickheads **Glykoppe**

Body moderately deep to elongate and eel-like, but usually somewhat compressed. Body with or without scales. Head naked. Tongue usually without teeth. Dentition variable, from fang-like to completely absent; premaxilla and mandible usually toothed. No premaxillary tusks. No shoulder organ. Dorsal and anal fins usually posterior to middle of body and opposite. No adipose fin. Pectoral fins present or absent; pelvic fins abdominal. Photophores (absent in some species) found underneath scales, as nodules on skin or on stalks and arranged irregularly or in complex patterns.

A diverse (about 75 species) and abundant group of moderate to large deep-sea fishes in all temperate and tropical waters, between about 100 and 5 000 m, usually below 1 000 m. The group is poorly known, but regional reviews have been prepared for the eastern North Atlantic (Markle & Quero, 1984) and the Indian Ocean (Sazonov & Ivanov, 1980).

KEY TO GENERA

1a Body completely scaleless (except for modified LL scales in *Rouleina*) 2
1b Body entirely or partly scaled 7

2a LL in a tube supported by modified ring-like scales on edge; A 18-22 ..... *Rouleina*
2b LL, if present, without modified scales as above 3

3a Photophores present on body 4
3b No photophores on body 5

4a Photophores on raised stalks; ventral outline of upper jaw with obtuse angle at end of premaxilla; A 16-19 ..... *Photostylus*
4b Photophores nodular, not on stalks; ventral outline of upper jaw approximately straight; A 26-33 ..... *Xenodermichthys*

5a D origin distinctly behind A origin; body tapers to a small C ..... *Leptoderma*
5b D origin above or before A origin 6

6a D and A origins approximately opposite; no teeth in jaws or mouth ..... *Mirognathus*
6b D origin before A origin; teeth present in jaws and on vomer ..... *Rinoctes*

7a No teeth on maxilla or vomer 8
7b Teeth present on maxilla and/or vomer 11

8a D origin usually above A origin 9
8b D origin usually behind A origin 10

9a Area from gill cavity to P base scaled; P not fan-like, upper rays longer than lower rays; pyloric caeca 12-28; 2 supramaxillae ..... *Alepocephalus*
9b Area from gill cavity to P base naked; P fan-like; pyloric caeca 3-11; 1 supramaxilla ..... *Asquamiceps*

10a Lower jaw ends under orbit; palatines with teeth; peritoneum darkly pigmented; area from gill cavity to P base with scaleless strip ..... *Conocara*
10b Lower jaw ends behind orbit; no palatine teeth; peritoneum unpigmented or lightly pigmented; area from gill cavity to P base fully scaled ..... *Einara*

11a Lower jaw without teeth ..... *Herwigia*
11b Lower jaw with teeth 12

12a D origin approximately opposite A origin 13
12b D origin in front of A origin 14

13a Body elongate; P and eye reduced; upper jaw with relatively long pointed teeth ..... *Bathyprion*
13b Body moderately deep; P well developed, often with produced rays; upper jaw without long fang-like teeth; a black wart-like spot near base of sixth D ray, often abraded ..... *Talismania*

14a Teeth near front of jaws in more than 1 series ..... *Narcetes*
14b Teeth near front of jaws in a single series 15

15a Lower jaw symphysis with prominent pointed knob directed ventrally ..... *Bajacalifornia*
15b Lower jaw without a prominent knob 16

16a Maxilla ends well behind orbit ..... *Bathylaco*
16b Maxilla ends approximately below rear margin of orbit ..... *Bathytroctes*

Genus ***Alepocephalus*** Risso, 1820

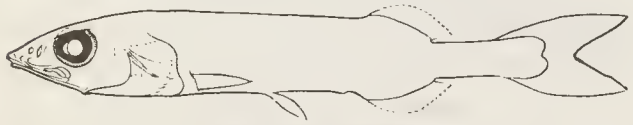
At least 15 species; 3 in our area. This genus needs revision; the following should be considered tentative.

64.1 *Alepocephalus australis* Barnard, 1923

Alepocephalus australis Barnard, 1923: 440 (off Cape Point); Barnard, 1925: 121*; Smith, **SFSA No. 124***; Parr, 1952: 257; Sazonov & Ivanov, 1980: 53*; Markle & Sazonov, in press. *Alepocephalus barnardi* Norman, 1930: 270 (off Cape Point, 700 fms); Smith, **SFSA No. 125.**

D 16-19; A 17-19; P 9-13; V 7-8; LL 55-60; pyloric caeca 11-16; GR (7-10)+(13-18). Maximum body depth of adults approximately at origin of P.

Attains at least 60 cm SL. Common from about 1 000 to 2 600 m; apparently widely distributed in temperate waters of southern hemisphere; a similar Atlantic form north of 15°S may not be conspecific. Benthopelagic.



64.1 *Alepocephalus australis*: adult? (after Sazonov & Ivanov, 1980).

64.2 *Alepocephalus* sp. (cf. *productus/blanfordii)*

Alepocephalus sp. cf. *A. productus:* Sazonov & Ivanov, 1980: 54*. *Alepocephalus productus:* Markle & Quero, 1984: 231*. *Alepocephalus* sp.: Markle & Sazonov, in press.

D 14-19; A 16-19; P 10-11; V 7-8; GR (8-11)+(15-18). Head 2.9-3.0 in SL.

A rare but widespread form found in 1 000 - 2 500 m. From 1 to 3 species may be involved. Benthopelagic.

64.2 *Alepocephalus* sp. cf. *productus/blanfordii*: adult? (drawn after Sazonov & Ivanov, 1980).

64.3 *Alepocephalus* sp. (cf. *rostratus)*

Alepocephalus sp. 4: Sazonov & Ivanov, 1980: 54*. *Alepocephalus rostratus:* Karrer, 1973: 202.

D 17-25; A 19-24; P 9-11; V 7-9; GR (7-9)+(15-18); maximum body depth of adults near D origin.

Maximum size exceeds 50 cm SL. Near bottom from about 300 to 1 600 m and occasionally in midwater over deeper water; in eastern Atlantic found as far south as 27°S and in Indian Ocean from near Seychelles. Confusion exists as to whether there are 1 or 2 species involved. Benthopelagic.

64.3 *Alepocephalus* sp. cf. *rostratus:* adult? (drawn after Sazonov & Ivanov, 1980).

Genus ***Asquamiceps*** Zugmayer, 1911

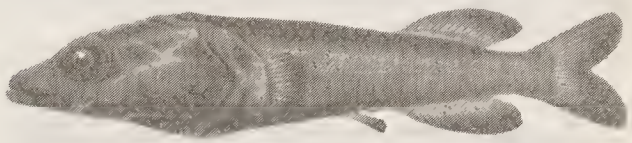
Operculum very large, covering base of P. Five species; 1 known from our area. Genus recently reviewed by Markle (1980).

64.4 *Asquamiceps velaris* Zugmayer, 1911

Asquamiceps velaris Zugmayer, 1911: 2 (36°06′N, 09°W); 1911: 10*; Markle, 1980: 46; Markle & Quero, 1984: 233*.

D 16-17; A 16-17; P 13-15; V 5; GR (5-6)+(9-12). Maxilla ends well before rear margin of orbit; orbit 8.9-12.2% SL; 3-4 pyloric caeca; vertebrae (16-17)+(20-21) = 37.

Attains at least 17 cm SL. One specimen in our area from 33°50′S, 16°04′E. Rare, but widely distributed; North Atlantic and Pacific in midwater collections between 1 300 and 3 660 m. Bathypelagic.



64.4 *Asquamiceps velaris:* 16 cm SL (after Zugmayer, 1911).

Genus ***Bajacalifornia*** Townsend & Nichols, 1925

At least 4 species; 1 in our area.

64.5 *Bajacalifornia megalops* (Lütken, 1898)

Cyclothone (?) *megalops* Lütken, 1898: 10, Fig. 6 (64°38′N, 32°37′W). *Bajacalifornia megalops:* Sazonov & Ivanov, 1980: 27*; Markle & Sazanov, in press; Markle & Quero, 1984: 234*.

D 17-18; A 13-16; P 13-15; V 7-9; GR (6-8)+(17-21). Orbit 7.2-10.8% SL or 90-130% of snout (proportions larger in smaller fish); vertebrae (31-32)+(19-20) = 50-51.

Attains 40 cm SL. Four specimens from Mozambique Ridge; Atlantic, eastern Pacific and Indian oceans.

Mesopelagic to benthopelagic; adults normally found in 820 - 1 425 m.

64.5 *Bajacalifornia megalops:* 19.5 cm SL.

Genus ***Bathylaco*** Goode & Bean, 1896

Two rare species, neither known from our area; *B. nigricans* Goode & Bean, 1896 is found in 1 750 - 2 200 m circumglobally; *B. nielseni* Sazonov & Ivanov, 1980 is known from 1 Atlantic and 2 equatorial Indian Ocean specimens taken in 1 500 - 2 000 m. Bathypelagic. The genus was reviewed by Nielsen & Larsen (1970).

Genus ***Bathyprion*** Marshall, 1966

One species.

64.6 *Bathyprion danae*
Marshall, 1966

Bathyprion danae Marshall, 1966: 4, Figs. 1-3 (33°26′S, 157°02′E); Krefft, 1973: 94; Markle & Quero, 1984: 235*.

D 24-27; A 24-27; P 10-12; V 8-9 plus a splint bone; GR (4-5)+(12-14); pyloric caeca 7-8.

Attains 38 cm SL. Western Pacific, North Atlantic and South Atlantic (21°35′S, 02°00′W) at depths of 1 100 - 2 100 m. Bathypelagic.

64.6 *Bathyprion danae:* 38 cm SL (after Marshall, 1966).

Genus ***Bathytroctes*** Günther, 1878

Four species; 1 in our area. *B. microlepis* Günther, 1878, from North Atlantic, South China Sea and eastern South Pacific, may occur in our area below about 2 000 m; it lacks scales on cheeks and opercles and has orbit 1.2-1.6 times snout length (Markle & Quero, 1984).

64.7 *Bathytroctes squamosus*
Alcock, 1890

Bathytroctes squamosus Alcock, 1890: 303 (15°02′N, 72°34′E); Alcock, 1892*; Sazonov & Ivanov, 1980: 38*.

D 14-17; A 15-17; P 10-13; V 8-9; GR (9-11)+(20-23). Scales present on cheeks and/or opercles; orbit diameter 1.6-1.9 times snout length; scales above LL approximately same size as LL scales.

Attains 30 cm SL. One specimen from south of Madagascar and 4 off Mozambique Ridge; normally between about 1 000 and 2 000 m in western North Atlantic and Indian oceans. Benthopelagic.

64.7 *Bathytroctes squamosus:* 22.5 cm SL (after Alcock, 1892).

Genus ***Conocara*** Goode & Bean, 1896

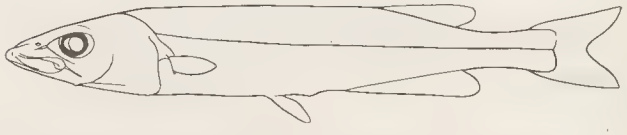
Seven species; 1 from our area.

64.8 *Conocara fiolenti*
Sazonov & Ivanov, 1979

Conocara fiolenti Sazonov & Ivanov, 1979: 1011, Fig. 5 (11°25′S, 88°54′E); Markle & Quero, 1984: 239*.

D 19; A 27; P 9; V 6; GR (1-2)+12. Maxilla reaches vertical at front margin of pupil.

Attains 30 cm SL. Depths of 1 370 - 1 600 m from 31°S, 03°E, Indian and western Pacific oceans. Benthopelagic.



64.8 *Conocara fiolenti:* 30.5 cm SL (after Sazonov & Ivanov, 1979).

Genus ***Einara*** Parr, 1951

Two species, both known from North Atlantic, Indian and eastern Pacific oceans; not yet recorded from our area. *Einara edentula* (Alcock, 1892) has D 23-29, A 30-35 and is normally caught at 700 - 1 200 m; *E. macrolepis* (Koefoed, 1927) has D 21-24, A 25-29 and is normally caught at 1 300-2 000 m (Markle & Quero, 1984). Bathypelagic.

Genus ***Herwigia*** Nielsen, 1972

One species.

64.9 *Herwigia kreffti*
(Nielsen & Larsen, 1970)

Bathylaco kreffti Nielsen & Larsen, 1970: 35, Figs. 5-6 (34°01′S, 47°39′W). *Herwigia kreffti:* Nielsen, 1972: 32*; Sazonov & Ivanov, 1980: 18*; Markle & Quero, 1984: 243*.

D 15-18; A 13-15; P 16-18; V 7-8 plus a splint bone; GR (7-8)+(13-17); pyloric caeca 9-10.

Attains 40 cm SL. Continental slope off southeast Africa and Mozambique in 1 250 - 1 450 m; eastern Atlantic, Indian and mid-Pacific oceans. Bathypelagic.

64.9 *Herwigia kreffti:* adult? (after Markle & Quero, 1984).

Genus ***Leptoderma*** Vaillant, 1886

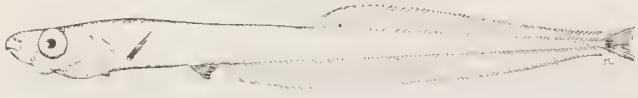
About 5 species; 1 known from our area; several species are poorly known and the genus is in need of revision.

64.10 *Leptoderma macrops*
Vaillant, 1886

Leptoderma macrops Vaillant, 1886: 1239 (off Morocco); Vaillant, 1888: 166*; Karrer, 1973: 203; Markle & Quero, 1984: 244*.

D 57-67; A 78-85; P 7-9; V 5-6; GR (0-1)+(11-14). D and A confluent with C.

Attains 24 cm SL. Known from 66 specimens collected at "Galathea" Station 137, 20°04′S, 11°56′E, in 550 - 585 m; widespread in North and South Atlantic in about 500 - 2 000 m. Benthopelagic.



64.10 *Leptoderma macrops:* 15 cm SL.

Genus ***Mirognathus*** Parr, 1951

One species; *M. normani* Parr, 1951 is known only from 2 eastern North Atlantic localities and 1 western South Atlantic locality at depths of 2 000 - 3 000 m. Bathypelagic.

Genus ***Narcetes*** Alcock, 1890

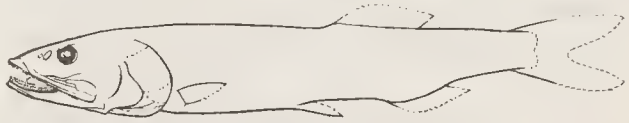
Three to 5 species; 2 in our area.

64.11 *Narcetes lloydi*
Fowler, 1934

Narcetes lloydi Fowler, 1934: 253, Fig. 16 (east coast of Luzon, Philippines in 565 fms); Sazonov & Ivanov, 1980: 22*.

D 18-22; A 15-18; P 8-11; V 6-10; GR (5-6)+(14-17); pyloric caeca 8-17; cephalic lateralis pores prominent; interorbital distance 5.6-8.5% SL.

Attains 50 cm SL. Captured between 24°55′-30°11′S and 31°30′-35°45′E in 920 - 1 050 m; also from South China Sea, Arabian Sea and Indian Ocean ridges. Benthopelagic.



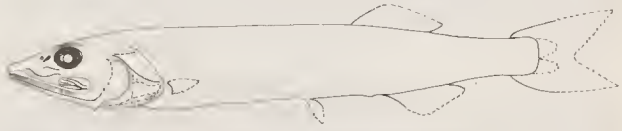
64.11 *Narcetes lloydi:* adult? (after Sazonov & Ivanov, 1980).

64.12 *Narcetes stomias*
(Gilbert, 1890)

Bathytroctes stomias Gilbert, 1890: 53 (ca. 47°N 125°W). *Narcetes stomias:* Sazonov & Ivanov, 1980: 20*; Markle & Quero, 1984: 246*.

D 18-20; A 14-17; P 9-11; V 8-9; GR (4-6)+(10-14); pyloric caeca 6-11; cephalic lateralis pores not prominent; interorbital distance 4.1-5.7% SL.

Attains 53 cm SL. Widely distributed in Atlantic, Indian and eastern Pacific oceans in 1 500 - 2 300 m, usually more narrowly restricted between 1 800 and 2 100 m. Absence from our area most likely due to insufficient sampling. Benthopelagic.



64.12 *Narcetes stomias:* adult? (drawn after Sazonov & Ivanov, 1980).

Genus ***Photostylus*** Beebe, 1933

One species, *P. pycnopterus* Beebe, 1933; relatively rare though circumglobal between about 65°N and 35°S at depths of 1 000 - 2 000 m. Bathypelagic. Presently unknown from our area.

Genus ***Rinoctes*** Parr, 1952

One species, *R. nasutus* (Koefoed, 1927), known only from deep basins in North Atlantic; abyssobenthic.

Genus ***Rouleina*** Jordan, 1923

About 5 species; 3 in our area.

KEY TO SPECIES

1a No photophores; LL 43-48 ..... *R. attrita*
1b Nodular photophores present, most abundant on ventral aspect of body; LL 50-70 2

2a LL 50-56; A 20-22 ..... *R. maderensis*
2b LL about 70; A 16-19 ..... *R. squamilatera*

64.13 *Rouleina attrita*
(Vaillant, 1888)

Bathytroctes attritus Vaillant, 1888: 158, Pl. 12, Fig. 2 (37°35'N, 29°26'W). *Rouleina attrita:* Markle, 1978: 79*; Sazonov & Ivanov, 1980: 66*; Markle & Sazonov, 1984: 249*.

D 18-21; A 18-21; P 6-7; V 6-7; LL 43-48; GR (8-9)+(15-20). No photophores; 43-46 vertebrae.

Attains 42 cm SL. Off Madagascar and Mozambique; widely distributed in Atlantic, Indian and Pacific oceans, primarily between 1 400 and 2 100 m. Benthopelagic.

64.13 *Rouleina attrita:* 31 cm SL.

64.14 *Rouleina maderensis*
Maul, 1948

Rouleina maderensis Maul, 1948: 7, Fig. 1 (Madeira); Markle, 1978: 79*; Sazonov & Ivanov, 1980: 64*; Markle & Quero, 1984: 249*.

D 20-22; A 20-22; P 5-7; V 5-6; LL 50-56; GR (7-9)+(15-21). Photophores present; 47-50 vertebrae.

Attains 32 cm SL. Three specimens from off South Africa; known from North Atlantic, Mascarene Plateau and tropical Pacific at depths of 595 - 1 450 m. Benthopelagic.

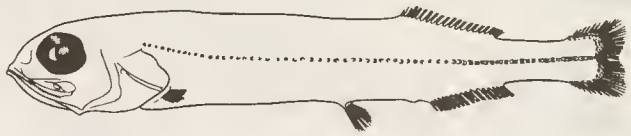
64.14 *Rouleina maderensis:* 22 cm SL.

64.15 *Rouleina squamilatera*
(Alcock, 1898)

Xenodermichthys squamilaterus Alcock, 1898: 148 (off Andaman Ids.). *Rouleina squamilatera:* Sazonov, 1978: 761*; Sazonov & Ivanov, 1980: 57*

D 18-21; A 16-19; P 7-8; V 6-7; LL about 70; GR (7-10)+(18-20). Photophores present; about 50 vertebrae.

Attains 38 cm SL. Twelve specimens from Madagascar Ridge; also known from Okhotsk Sea, Great Australian Bight, southwest Pacific and Indian Ocean in 790 - 1 000 m. Benthopelagic.



64.15 *Rouleina squamilatera:* 75.5 cm SL (after Sazonov, 1978).

Genus ***Talismania*** Goode & Bean, 1896

Seven species; 2 in our area.

64.16 *Talismania kotlyari*
Sazonov & Ivanov, 1980

Talismania kotlyari Sazonov & Ivanov, 1980: 49, Fig. 13 (03°46'N 95°E).

D 22-24; A 23-25; P 10-13; V 7-8; GR (6-7)+(16-17). Head length usually less than 34% SL; 68-80 transverse scale rows above LL.

Attains 23 cm SL. One specimen from 24°55'S, 35°40'E in 980 - 1 050 m; only known from Indian Ocean. Benthopelagic.

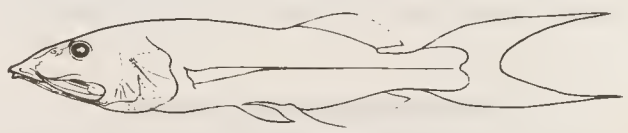
64.16 *Talismania kotlyari:* adult? (after Sazonov & Ivanov, 1980).

64.17 *Talismania longifilis*
(Brauer, 1902)

Bathytroctes longifilis Brauer, 1902: 277 (13°02'08"N, 46°41'06"E). *Talismania longifilis* Parr, 1952: 269; Sazonov & Ivanov, 1980: 46*.

D 20-25; A 19-25; P 11-14; V 7-9; GR (6-9)+(13-17). Head length usually more than 34% SL; 97-137 transverse scale rows above LL.

Attains 46 cm SL. Two specimens from Mozambique Ridge; eastern Atlantic, Indian Ocean and western tropical Pacific. Benthopelagic.



64.17 *Talismania longifilis:* adult? (after Sazonov & Ivanov, 1980).

Genus ***Xenodermichthys*** Günther, 1878

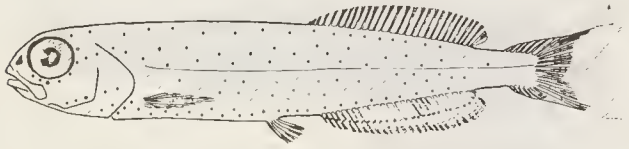
Two species; 1 from our area.

64.18 *Xenodermichthys copei*
(Gill, 1884)

Aleposomus copei Gill, 1884: 433 (37°12'20"N, 69°39'W). *Xenodermichthys socialis* Vaillant, 1888: 162*; Barnard, 1925: 123; Smith, **SFSA No. 126***; Grindley & Penrith, 1965: 282. *Xenodermichthys copei:* Markle, 1978: 79; Sazonov & Ivanov, 1980: 71*.

D 27-31; A 26-30; P 7-8; V 6; GR (7-9)+(16-18); 46-50 vertebrae.

Attains 20 cm SL. Common off South Africa and Madagascar Ridge; widely distributed in Atlantic, tropical Pacific, Tasman Sea, Great Australian Bight and Indian Ocean in depths of 100 - 1 230 m. Mesopelagic to benthopelagic as adults.



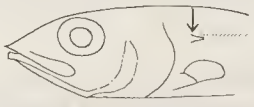
64.18 *Xenodermichthys copei:* 13.5 cm SL (after Holt & Byrne, 1908).

Family No. 65: PLATYTROCTIDAE

by T. Matsui & R.H. Rosenblatt

Tubeshoulders **Pypskouers**

A tube, supported by a modified scale, behind shoulder girdle just below lateral line, leading into a sac containing luminous fluid beneath (medial to) the girdle. Colour black; light organs present or absent. Body scaled; head scaleless. Dorsal and anal fins soft-rayed, some distance behind midlength; no adipose fin. Ventral fins abdominal with 6-10 rays (absent in one species).



Location of exposed tubule leading to sac (not shown) of shoulder organ.

Maximum size ranging from about 12 cm to over 30 cm. Mesopelagic and bathypelagic (generally in the 200 - 2 000 m depth range); usually in eutrophic waters between 60°S and 70°N, with a tendency to be near continents, islands, ocean ridges and sea mounts. Twelve genera with about 31 species; 6 genera represented in our area.

KEY TO GENERA

1a LL with 45-55 enlarged, modified scales; more than ⅓ of D before A origin; cleithral symphysis not produced forward in a spine; body moderately compressed; photophores distinct 2

1b LL absent or represented by papillae (except for *Maulisia microlepis* with about 50 modified scales); less than ⅓ of D before A origin; cleithral symphysis ending in a blunt spine; body strongly compressed (moderately compressed in *Pellisolus perforatus*); photophores absent or weakly developed 4

2a Photophores broadly elliptical or round, 3 across breast and 2 across belly before V; A 13-14; branchiostegal rays 7; GR 38-40 ..... *Persparsia*

2b Photophores narrowly elliptical or as a longitudinal or transverse bar across throat and another across belly before V; A 15- 17; branchiostegal rays 8; GR 21-27 3

3a Scales on nape reverse-imbricated; inner premaxillary teeth about subequal to remainder of premaxillary teeth; a narrow continuous band of white tissue around eye ..... *Sagamichthys*

3b Scales on nape normally imbricated; inner premaxillary teeth as enlarged, forward directed tusks; a patch of white tissue at front of eye and two well-developed patches covering most of rear border of eye ..... *Holtbyrnia*

4a Upper jaw extending to about behind pupil; 1 to several large openings, as large as a scale, in scale pockets behind shoulder girdle ..... *Normichthys*

4b Upper jaw extending well past eye; all pores in scale pockets much smaller than scales 5

5a Body strongly compressed; top of head diamond-shaped, with widest point near mideye ..... *Maulisia*

5b Body moderately compressed; top of head widening posteriorly, widest behind eye ..... *Pellisolus*

Genus ***Holtbyrnia*** Parr, 1937

Holtbyrnia anomala Krefft, 1980 is known from the eastern Atlantic just north of our area (18°S); it differs from other *Holtbyrnia* species in having rudimentary photophores. Six species; 2 in our area.

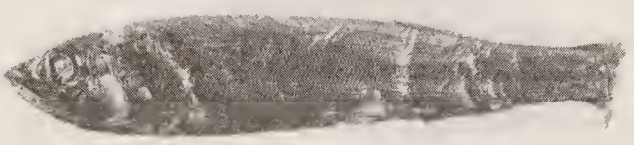
KEY TO SPECIES

1a GR (6-7)+(15-16) = 21-23; body scales in midlateral series 94-104 ..... *H. innesi*

1b GR (7-8)+(17-19) = 24-27; body scales in midlateral series 123-145 ..... *H. laticauda*

65.1 *Holtbyrnia innesi*
(Fowler, 1934)

Bathytroctes innesi Fowler, 1934: 252, Fig. 4 (western North Atlantic); *Holtbyrnia innesi* Parr, 1951: 16; Sazonov & Trunov, 1978: 90*.



65.1 *Holtbyrnia innesi:* 15 cm SL holotype (after Parr, 1951).

D 18-20; A 15-17; P 16-20; V 9. Supraorbitals not rigidly attached to frontals. Two white bodies behind eye separated from each other by a distance greater than length of ventral body.

Attains 21 cm. Also known from northern Atlantic and Pacific oceans. Mesopelagic.

65.2 *Holtbyrnia laticauda*
Sazonov, 1976

Holtbyrnia laticauda Sazonov, 1976: 17 (Tasman Sea); Sazonov & Trunov, 1978: 88*.

D 19-21; A 15-17; P 16-20; V 9-10. Supraorbitals rigidly attached to frontals. Two white bodies behind eye separated from each other by a distance less than length of ventral body.

Attains 30 cm. Distribution from eastern Atlantic to New Zealand between 31° and 46°S. Mesopelagic.

65.2 *Holtbyrnia laticauda:* 12 cm SL.

Genus ***Maulisia*** Parr, 1960

Four species; 2 in our area. Some records of *M. mauli* from the South Atlantic and Indian oceans may be *M. argipalla* Matsui & Rosenblatt, 1979, which has the top of head widest at the supraorbital and a round thoracic photophore. *M. argipalla* is known only from the North Atlantic and eastern Pacific.

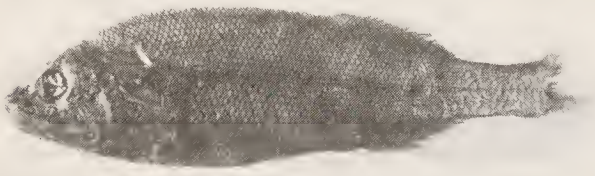
KEY TO SPECIES

1a LL with papillae or unmarked; a large opening several scale rows wide behind shoulder girdle; photophores present ..... *M. mauli*

1b About 50 enlarged modified scales in LL; no opening several scale rows wide behind shoulder girdle; photophores absent ..... *M. microlepis*

65.3 *Maulisia mauli*
Parr, 1960

Maulisia mauli Parr, 1960: 82, Figs. 56-58 (Madeira); Sazonov & Trunov, 1978: 95.



65.3 *Maulisia mauli:* 18 cm SL.

D 17-22; A 15-19; P 17-20; V 7-9; 79-95 midlateral scale series; GR (7-8)+(15-18) = 23-26. Thoracic photophore a short bar; top of head widest at frontals.

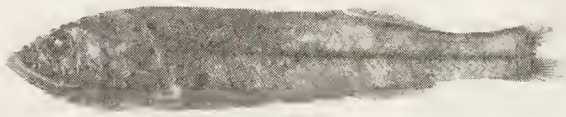
Attains 20 cm. Atlantic and Indian oceans; mesopelagic and bathypelagic.

65.4 *Maulisia microlepis*
Sazonov & Golovan, 1976

Maulisia microlepis Sazonov & Golovan, 1976: 10, Fig. 3 (off Namibia); Sazonov & Trunov, 1978: 95; Pakhorukov, 1980: 23.

D 17-21; A 15-18; P 13-18; V 8-9; 112-125 midlateral scale series; GR (8-9)+(20-23) = 29-31.

Attains 25 cm. Off Namibia; also in North Atlantic. Bathypelagic.



65.4 *Maulisia microlepis:* 22.5 cm SL.

Genus ***Normichthys*** Parr, 1951

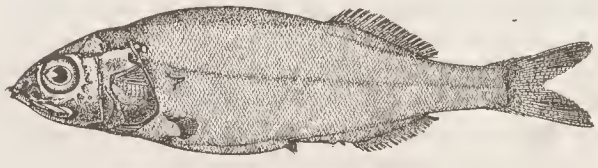
Two species, 1 in our area. *N. operosus* Parr, 1951 has been recorded from the eastern Atlantic at 18°S; it has larger scales (80-100 midlateral scale series) than *N. yahganorum.*

65.5 *Normichthys yahganorum*
Lavenberg, 1965

Normichthys yahganorum Lavenberg, 1965: 3 Figs. 1-2 (off Chile); Sazonov & Trunov, 1978: 96*.

D 17-20; A 16-19; P 14-19; V 6-8; 100-125 midlateral scale series; GR (6-8)+(17-21) = 24-28. Depth 3.4-4.0. Rudimentary photophores usually present at V base and near anus.

Attains 16 cm. Circumglobal; distributed mostly between 30°S and 50°S, southernmost record 59°S. Bathypelagic.



65.5 *Normichthys yahganorum:* 16.5 cm (after Sazonov & Trunov, 1978).

Genus ***Pellisolus*** Parr, 1951

Five species, 1 in our area. Sazonov & Trunov apparently included *M. perforatus* in *Mentodus* because of its

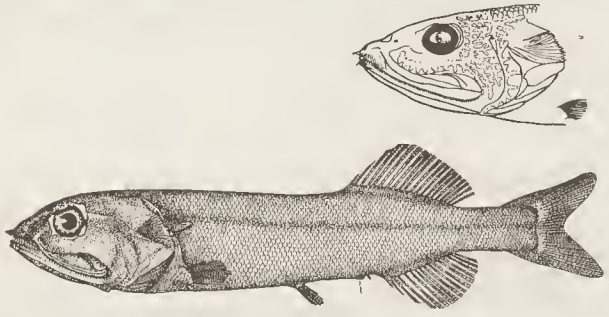
similarities to specimens they identified as *M. crassus*. Both *perforatus* and their *crassus* however are widely different from the type-species, *Bathytroctes rostratus* Günther, 1878, which is most like species of *Holtbyrnia* and should be included in that genus. Work in progress indicates that *M. perforatus* is properly referred to the genus *Pellisolus* Parr, 1951.

65.6 *Pellisolus perforatus*
(Sazonov & Trunov, 1978)

Mentodus perforatus Sazonov & Trunov, 1978: 93, Fig. 4 (off west coast of South Africa).

D 18-21; A 16-18; P 13-18; V 8-9; GR (7-8)+(19-21) = 27- 28. Depth 4.3-4.6, head 2.7-3.0. Body moderately compressed; snout longer than eye; white tissue around eye.

Attains 23 cm. Tropical/subtropical eastern Atlantic; southern hemisphere (5°-33°S) with 1 record in North Atlantic. Bathypelagic.



65.6 *Pellisolus "Mentodus" perforatus*: 23 cm SL.

Genus ***Persparsia*** Parr, 1951

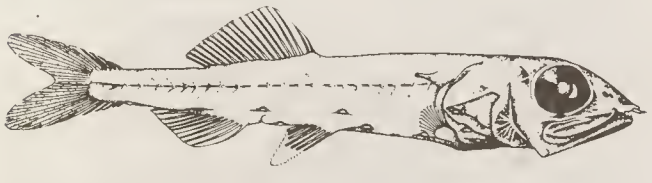
Monotypic.

65.7 *Persparsia kopua*
(Phillips, 1942)

Bathytroctes kopua Phillips, 1942: 49, Fig. 1 (Cook Strait, New Zealand). *Persparsia kopua:* Parr, 1960: 48*; Hulley, 1972: 203*; 1972: 237; Sazonov & Trunov, 1978: 87.

D 19-22; A 13-14; P 19-21; V 8-9; GR (10-12)+(26-30) = 38-40.

Attains 14 cm. Eastern Atlantic to New Zealand, mostly between 30° and 50°S. Mesopelagic.



65.7 *Persparsia kopua*: 7 cm (after Hulley, 1972).

Genus ***Sagamichthys*** Parr, 1953

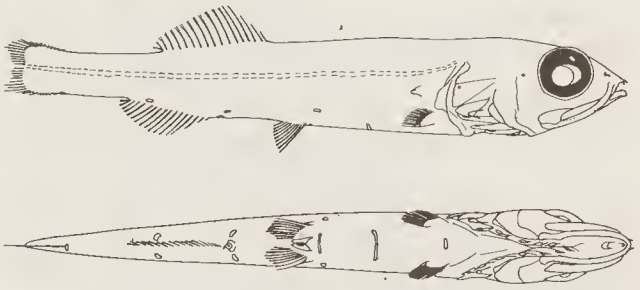
Three species, 1? in our area.

65.8 ?*Sagamichthys schnakenbecki*
(Krefft, 1953)

Searsia schnakenbecki Krefft, 1953: 259, Fig. 1 (Iceland – Faroe Ridge). (?) *Sagamichthys schnakenbecki:* Karrer, 1975: 67; Sazonov & Trunov, 1978: 87.

D 16; A 15; P 18; V 9; GR 5+17 (from Sazonov & Trunov, 1978).

Except for reverse-imbricated scales, Sazonov and Trunov (1978) failed to mention any other diagnostic character identifying *Sagamichthys*. The low GR and V ray counts indicate that their specimen (from 23°S, 13°E) is not *schnakenbecki;* GR 27-32 and V rays usually 10 in *S. schnakenbecki* from North Atlantic. Karrer (1975) reported *S. schnakenbecki* from 18°45'S, 11°25'E, at 380 m but gave no description.



65.8 *Sagamichthys schnakenbecki*: 9.5 cm (after Quero, 1970).

Family No. 66: LEPTOCHILICHTHYIDAE

by D.F. Markle

Leptochilichthyids **Leptochilichthiede**

Body compressed, oblong; with moderately large cycloid scales; head naked. Maxilla a deep thin bone without teeth; premaxilla toothless; a conspicuous notch between premaxillae. Vomer and palatines with teeth. Tongue absent. No shoulder organ. Dorsal fin origin posterior to middle of body and in front of anal fin origin. No adipose fin. Pectoral fins low on body; pelvic fins abdominal.

A rare group comprising one genus with two species of moderate-sized fishes found between about 800 and 3 100 m. Leptochilichthyids are close relatives of alepocephalids and platytroctids; they are recognised as a separate family on the basis of a unique complex of feeding-related specialisations.

Genus ***Leptochilichthys*** Garman, 1899

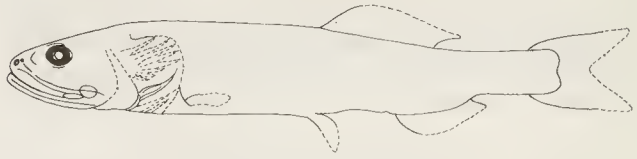
Two species; 1 in our area. *L. agassizii* Garman, 1899, with D 11-15 and A 11-13, is known only from the eastern North Atlantic and eastern Pacific in 2 000 and 3 100 m.

66.1 *Leptochilichthys pinguis*
(Vaillant, 1886)

Anomalopterus pinguis Vaillant, 1886: 1239 (off Morocco); 1888: 160*. *Leptochilichthys pinguis:* Sazonov & Ivanov, 1980: 12*; Markle & Quero, 1984: 255*.

D 16-21; A 14-18; P 9-10; V 9 plus a short splint bone; GR (8-9)+(17-21).

Attains 24 cm. One specimen from off South Africa (36°40′S, 20°10′E) in 930 - 1 000 m; also known from off Morocco, Indian Ocean and the western tropical Pacific.

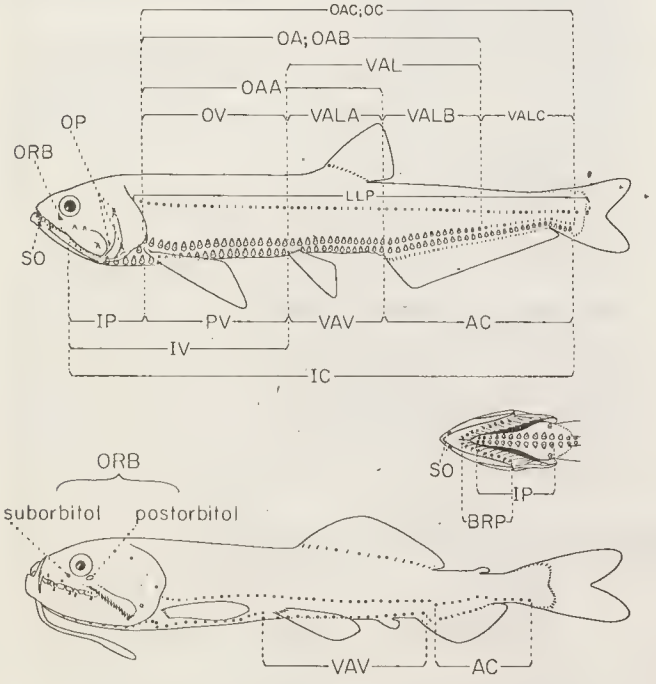


66.1 *Leptochilichthys pinguis:* schematic diagram of adult (after Sazonov & Ivanov, 1980).

Order STOMIIFORMES

Introduction by S.H. Weitzman

Mesopelagic and bathypelagic fishes distributed in all oceans, with 9 families, about 50 genera and 300 species. Adults reach 15 to 500 mm in length. Anatomical diversity extensive from relatively primitive *Diplophos* to highly derived *Sternoptyx* and *Malacosteus*. Neoteleosts, derived from base of that group (Rosen, 1973; Fink & Weitzman, 1982). Stomiiforms are characterised by the structure of their photophores or light organs which they bear in series along body, by type 3 tooth attachment, a special arrangement of jaw muscles and ligaments, and several derived features of branchial arches (Fink & Weitzman, 1982). Family classification last revised by Weitzman (1974). Identification of stomiiform families, genera and species requires use of special terminology for photophores.



PHOTOPHORE TERMINOLOGY

AC = Posterior part of IC series; usually extending between a vertical line at anal fin origin to posterior termination of IC photophore row on caudal peduncle. In barbelled stomiiforms with posterior part of IC (or OAC) row offset from rest of row, offset photophores comprise AC series even when they begin posterior to anal fin origin.

BR = BRP. A series of photophores on branchiostegal membranes.

IC = Entire ventral photophore row extending from anterior end of isthmus to posterior termination of this row on caudal peduncle; consists of IP, PV, VAV and AC.

IP = Anterior part of IC, extending from anterior end of isthmus to a vertical line at origin of pectoral fin.

IV = Part of IC extending from anterior end of isthmus to a vertical line at pelvic fin origin; comprises IP and PV.

LLP = Series of small photophores on midside from opercular margin, or just medial to it, to near base of middle caudal fin rays.

OA = OAB. All large photophores of the OAC series; comprises OV, VALA and VALB.

OAA = Part of OAC extending from opercular border, or just medial to it, to a vertical line at anal fin origin; comprises OV and VALA.

OAC = OC. Entire lateral photophore series on body sides just dorsal to ventral series and extending from opercular border, or just medial to it, to caudal fin base; comprises OV, VALA, VALB and VALC (when last is present).

OP = Three photophores associated with gill cover; one near anterior base of preopercle, one just dorsal to anterior part of subopercle, and one anteriorly adjacent to dorsal region of opercle.

ORB = Photophores associated with eye. In some stomiiforms an organ anterior and ventral to eye is called a preorbital or suborbital organ and one posterior and ventral to eye is called a postorbital organ.

OV = Part of OAC from opercular border, or just medial to it, to a vertical line at pelvic fin origin.

PV = Part of IC series extending between vertical lines at origins of pectoral and pelvic fins; bends dorsal (lateral) to pelvic fin origin in astronesthids; separate from VAV, which may begin anterior to last few PV.

SO = Photophore situated near anterior end or symphysis of lower jaw.

VAL = Part of OAC series extending between a vertical line at origin of pelvic fin and end of large photophores of this series; consists of VALA and VALB.

VALA = Part of OAC extending from a vertical line at origin of anal fin to end of large photophores of this series.

VALC = Small photophores of OAC series extending from just posterior to last large photophore of this series to termination of row on caudal peduncle.

VAV = Part of IC extending between a vertical line at insertion of posterior pelvic fin ray and anal fin origin (when OAC is continuous) or to end of row (when AC is offset). In astronesthids, VAV may begin anterior to pelvic fin insertion, between posterior ends of PV rows.

KEY TO FAMILIES

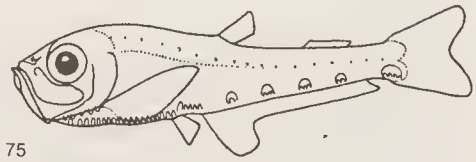
1a Bony pectoral fin radials 4 (reduced or fused to 1 in *Cyclothone*) 2

1b Bony pectoral fin radials 3 (reduced to fewer in some species) 3

2a Branchiostegal rays 12-16, with 4-6 of these attached to posterior ceratohyal (= epihyal); BR photophores 7-16; AC photophores never with single photophores clumped into compound light organs (posteriormost 2 AC photophores in *Diplophos taenia* sometimes so close together as to appear nearly united into a compound organ) ..... GONOSTOMATIDAE (No. 74)

74

2b Branchiostegal rays 6-10, with 3 of these attached to posterior ceratohyal; BR photophores 6 (rarely 7 in *Sonoda*); AC photophore series with 2 or more photophores clumped into specialised light organs surrounded by black or silvery pigment ..... STERNOPTYCHIDAE (No. 75)



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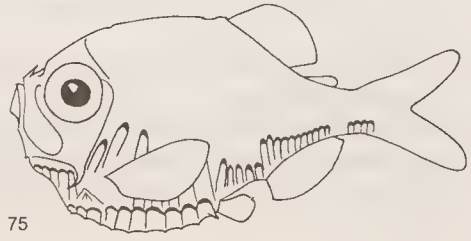


75

3a Gill-rakers well developed in young and adults; maxilla with 2 supramaxillae (these fused with maxilla in *Ichthyococcus*); never with a mental or chin barbel; serial photophores with a lumen and duct . PHOTICHTHYIDAE (No. 73)

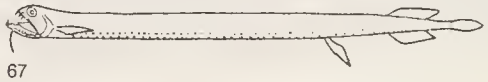
73

3b Gill-rakers present only in larvae; gill arches in metamorphosed specimens with spine-like teeth or bare anteriorly; often with a chin barbel; photophores without ducts or a lumen 4

4a Entire body with hexagonal areas (reputed to be scales) 5

4b Body without hexagonal areas 6

5a Dorsal and anal fins both at rear end of body and ending close to tail ..... STOMIIDAE (No. 67)



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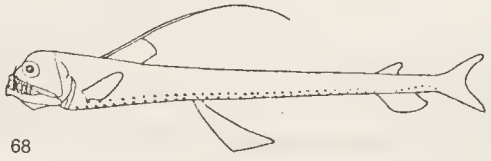
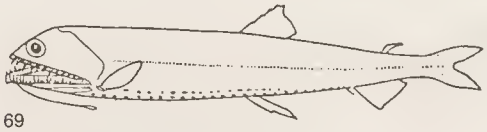
5b Dorsal fin far in advance of anal fin, close to head; anal fin close to tail ..... CHAULIODONTIDAE (No. 68)



68

6a Dorsal and anal fins both ending close to tail; no adipose dorsal fin (except in *Chirostomias*, Melanostomiidae, which is not found in the area) 7

6b Dorsal fin well in advance of anal fin, ending well in advance of tail; dorsal adipose fin present (absent in *Rhadinesthes*, which is not found in the area) ..... ASTRONESTHIDAE (No. 69)



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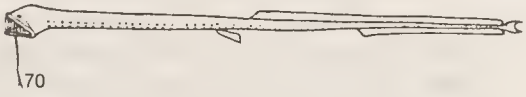
7a Dorsal fin much longer than anal fin, its origin anterior to mid-length of body; paired spines present anterior to each dorsal and anal ray ..... IDIACANTHIDAE (No. 70)



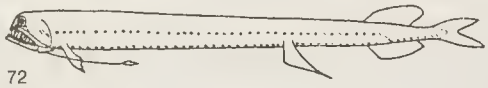
70

7b Dorsal and anal fins about equal in length, or anal fin longer than dorsal; no paired spines anterior to dorsal or anal rays 8

8a No floor of mouth, lower jaws not connected by membrane; either or both preorbital or suborbital luminous organ present, in addition to postorbital organ ..... MALACOSTEIDAE (No. 71)

71

8b Floor of mouth formed by membrane connecting lower jaws; only postorbital organ present ..... MELANOSTOMIIDAE (No. 72)



72

Family No 67: STOMIIDAE

by R.H. Gibbs, Jr.

Scaly dragonfishes **Skubbige draakvisse**

Body long, slender, with hexagonal areas ("scales") on sides, covered by a gelatinous membrane in life; 2 rows of prominent photophores on ventral part of body on each side; hexagonal areas each with 1 or more smaller photophores; jaws somewhat curved upward, with moderately long fangs; dorsal and anal fins both far posterior, close to tail; no dorsal adipose fin; a prominent slender barbel arising under chin with a bulb and filaments at its end.

Occurring in mid-depths of the open oceans around the world, often migrating to near-surface waters at night. Two genera with a total of 11 species. Recently revised by Shcherbachev and Novikova (1976) and Gibbs (1969, *Stomias* only); also see Gibbs, 1984.

KEY TO GENERA

1a Chin barbel shorter to slightly longer than head, its terminal bulb with 3 or 4 short, simple filaments at end; body length 10 to 20 times its depth; fewer than 100 photophores in ventral series ..... *Stomias*

1b Chin barbel much longer than head, up to ¾ of SL, its terminal bulb with several complex filaments on sides and end; body length 20 to 35 times its depth; more than 170 photophores in ventral series ..... *Macrostomias*

Genus ***Macrostomias*** Brauer, 1902

Two species, 1 in our area.

67.1 *Macrostomias longibarbatus* Brauer, 1902

Macrostomias longibarbatus Brauer, 1902: 52, Pl. 3, Fig. 2 (Gulf of Guinea); Shcherbachev & Novikova, 1976: 108.

D 13-14; A 15-17; P 6-7; V 4-5.

Body iridescent silver. Attains 40 cm. Taken once west of Cape of Good Hope. Widespread in subtropical and tropical Atlantic and tropical Indian and Pacific oceans.

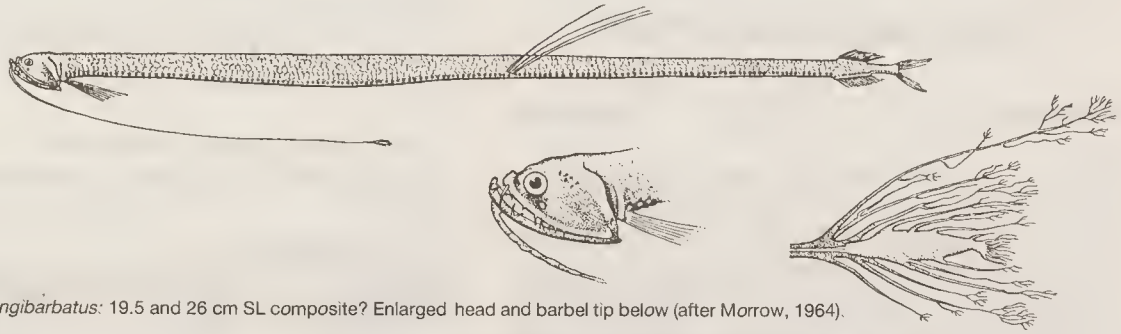
Genus ***Stomias*** Cuvier, 1816

Nine species; 2 in our area.

KEY TO SPECIES

1a Most mandibular teeth longer than longest premaxillary teeth; premaxillary teeth 16-25, more than mandibular teeth (9-16); fewer than 75 photophores in ventral row (IC); fewer than 10 VAV or VAL photophores .... *S. nebulosus*

1b Longest mandibular tooth shorter than longest premaxillary tooth; premaxillary teeth 5-6, fewer than mandibular teeth (7-11); more than 75 IC photophores; more than 10 VAV or VAL photophores . *S. boa boa*



67.1 *Microstomias longibarbatus:* 19.5 and 26 cm SL composite? Enlarged head and barbel tip below (after Morrow, 1964).

67.2 *Stomias boa boa:* 12.5 cm (after Goode & Bean, 1896).

67.2 *Stomias boa boa*
(Risso, 1810)

Esox boa Risso, 1810: 330, Pl. 10, Fig. 34 (Mediterranean Sea). *Stomias boa:* Cuvier, 1816: 184; Smith, **SFSA No. 131*.** *Stomias boa boa:* Ege, 1934: 14*; Gibbs, 1969: 4; Hulley, 1972: 210; Shcherbachev & Novikova, 1976: 104*.

D 17-22; A 18-22; P 6; V 5; PV 44-50, OV 44-49; vertebrae 74-82.

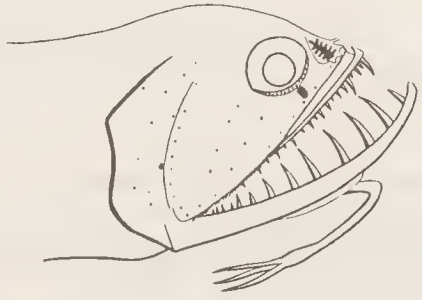
Body iridescent silver. Attains more than 30 cm. Taken offshore throughout the area. Circumglobal between about 20° and 45°S; a separate population in Mediterranean Sea and off northwest Africa.

67.3 *Stomias nebulosus*
Alcock, 1889

Stomias nebulosus Alcock, 1889: 451 (off Ceylon); Ege, 1934: 39, Gibbs, 1969: 7; Shcherbachev & Novikova, 1976: 99*

D 15-20; A 18-26; P 6-7; V 5; PV 33-38, OV 32-38; vertebrae 59-65.

Body iridescent silver. Attains almost 18 cm. Two specimens taken off Delagoa Bay (25°36′S, 35°21′E) in 730 m. Tropical waters of Indian and Pacific oceans.



67.3 *Stomias nebulosus:* 8.5-12 cm SL composite? (after Brauer, 1906).

Family No. 68: CHAULIODONTIDAE

by R.H. Gibbs, Jr.

Viperfishes **Addervisse**

Body long, slender, with hexagonal areas ("scales") on sides, covered by a gelatinous membrane in life; 2 rows of prominent photophores on ventral part of body on each side; hexagonal areas with 1 or more smaller photophores; jaws with enormous fangs; dorsal fin close to head, the first ray prolonged; anal fin close to tail; dorsal and ventral adipose fins present; chin barbel short and simple, becoming smaller or disappearing as fish grows.

Occurring in mid-depths of open oceans around the world; juveniles often migrating to near-surface waters at night. One genus, *Chauliodus* Schneider, 1801, with 8 species. Recently revised by Parin & Novikova (1974).

KEY TO SPECIES

1a Predorsal length 19-26% SL in specimens 3-9 cm SL, 20-23% SL in specimens over 9 cm; D origin over 4th to 8th OV photophore (specimens from Atlantic and south of 34°S) or 6th to 10th OV photophore (specimens from tropical Indian Ocean); barbel lost at 10-14 cm SL; maximum SL greater than 30 cm ..... *C. sloani*

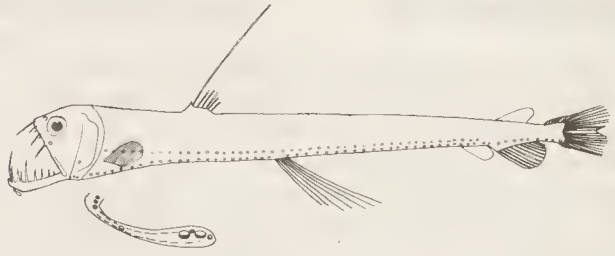
1b Predorsal length 26-32% SL in specimens 3-9 cm SL, 23-30% SL in specimens over 9 cm; D origin over 8th to 11th OV photophore; barbel lost at 4-9 cm SL; maximum SL 145 mm ..... *C. minimus*

68.1 *Chauliodus minimus*
Parin & Novikova, 1974

Chauliodus danae (*non* Regan & Trewavas): Norman, 1930: 308; Ege, 1948: 54. *Chauliodus minimus* Parin & Novikova, 1974: 295, Fig. 17 (South Atlantic).

D 6-7; A 11-13; P 11-14; V 7; IC 63-67; OA 42-45; vertebrae 56-57 (includes unossified anterior centra).

Body iridescent silver. Attains 14.5 cm. Taken offshore in the Atlantic; South Atlantic between 7° and 40°S.



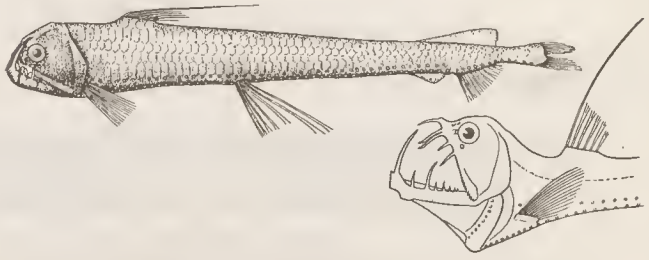
68.1 *Chauliodus minimus:* 6 cm SL holotype and mental barbel (drawn after Parin & Novikova, 1974).

68.2 *Chauliodus sloani*
Schneider, 1801

Chauliodus sloani Schneider, in Bloch & Schneider, 1801; 430; Smith, **SFSA No. 145;** Morrow, 1964: 281; Grindley & Penrith, 1965: 282; Hulley, 1972: 210; Parin & Novikova, 1974: 275; Gibbs, 1984: 337*.

D 5-8; A 10-13; P 9-14; V 7; IC 62-72; OA 41-49; vertebrae 53-62 (includes unossified anterior centra).

Body iridescent silver. Attains more than 30 cm. Taken offshore throughout the area. Circumglobal between 50°N and 50°S.



68.2 *Chauliodus sloani:* ca. 16 cm SL composite (after Morrow, 1964); head (after Regan & Trewavas, 1929).

Family No. 69: ASTRONESTHIDAE

by R.H. Gibbs, Jr.

Snaggletooths **Lostandvisse**

Body without scales or hexagonal areas; skin usually black, sometimes iridescent silver on sides; 2 rows of prominent photophores on ventral part of body on each side, anterior section of ventral row (PV) curving upward to pelvic fin inscrtion, not continuous with posterior part of row (VAL); numerous small photophores on most of body and head, most dense ventrally; dorsal fin mostly or entirely in advance of anal fin, usually near middle of body length; dorsal adipose fin present (absent in *Rhadinesthes,* which is not found in the area); a prominent barbel arising under chin, ranging from half to 3 times head length (rudimentary in species of *Astronesthes* not found in the area), with or without terminal bulb or swelling.

Snaggletooths occur in mid-depths of the open oceans around the world, often migrating to near-surface or surface waters at night; some apparently benthopelagic as adults. Five genera with a total of about 35 species; 3 genera with 10 species described here. The revisions by Regan & Trewavas (1929) and Gibbs (1964), are out of date in many respects. Revisionary studies are being conducted by Gibbs.

KEY TO GENERA

1a A rays 21-28; snout appearing upturned at tip; gill bars with closely spaced needle-like spines anteriorly along their length ..... *Neonesthes*
1b A rays 12-21; snout not upturned; gill bars with separated groups of short teeth anteriorly along their length 2

2a Teeth on maxilla comb-like, closely spaced, slanting rearward ..... *Astronesthes*
2b Teeth on maxilla distinctly separated, not slanting rearward ..... *Borostomias*

Genus ***Astronesthes*** Richardson, 1844

About 25 species; 6 probably in our area.

KEY TO SPECIES

1a Serial photophores few and relatively widely spaced; OV 5-6; VAL 6-8; IP 4-6; PV 5-7; VAV 7-9; AC 6-10 ..... *A. indicus*
1b Serial photophores numerous and closely spaced, minimum numbers as follows: OV 11, VAL 17, IP 8, PV 12, VAV 18, AC 11 2

2a Ventral row of photophores forming a pronounced U-shaped bend at level of P ..... *A. niger*
2b Ventral row of photophores forming a straight or only slightly curved line between P 3

3a Middle photophores of AC row (above A) raised above those at beginning and end of row; sides of body silvery ..... *A. martensii*
3b AC photophores forming a continuous line; body entirely black 4

4a Distal end of barbel with long, slender swelling, without filaments; P rays 7-9 (usually 8); D rays 13-17 (usually 13-15); OA photophores 39 or fewer 5
4b Distal end of barbel with bulbous swelling with 2 side filaments and, usually, a terminal filament or projection; P 6-7 (usually 6); D 11-12 (occasionally 13 or 14); OA photophores 40 or more ..... *A. trifibulatus*

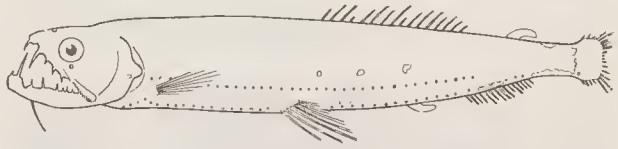
5a Pale patches of luminous material present on dorsal and ventral C peduncle and other parts of body in medium to large specimens (not visible in many small specimens); PV photophores 12-16; VAV usually 20 or more; OA usually 37 or fewer ..... *A. boulengeri*
5b No pale patches on C peduncle or rest of body; PV photophores 17-19; VAV usually 18 or 19; OA usually 38 or more ..... *A. caulophorus*

69.1 *Astronesthes boulengeri*
Gilchrist, 1902

Astronesthes boulengeri Gilchrist, 1902: 103, Pl. 6 (southeast of Cape Point); Parr, 1927: 37; Regan & Trewavas, 1929: 21*; Smith, **SFSA No. 141;** Gibbs, 1964: 316*.

D 13-17; A 12-18; P 7-9. Ventral row of serial photophores: IP 10-12, PV 12-16, VAV 19-25, AC 11-15, total 53-62; lateral row of serial photophores: OV 13-17, VAL 19-25, total 34-38. Vertebrae 49-55. Barbel slightly longer than, to less than, ⅓ head length, its tip barely widened in some, forming a long, slender swelling in others.

Body black; pale luminous patches develop with growth on dorsal and ventral C peduncle and other parts of body. Attains 21 cm. Circumpolar between 30° and 40°S.



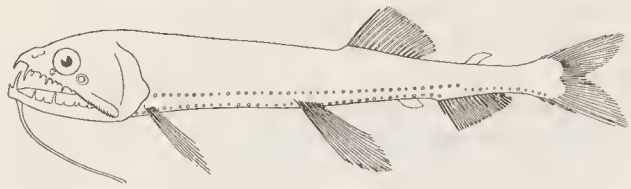
69.1 *Astronesthes boulengeri:* 21 cm holotype (after Gilchrist, 1902).

69.2 *Astronesthes caulophorus*
Regan & Trewavas, 1929

Astronesthes caulophorus Regan & Trewavas, 1929: 15, Fig. 3 (13°35′S, 30°11′W); Gibbs, 1964: 317. *Astronesthes blanci* Blache & Rossignol, 1961: 282, Fig. (03°36′S, 09°12′E); Karrer, 1973: 207*; 1975: 68.

D 13-15; A 16-19; P 7-8. Ventral row of serial photophores: IP 10-11, PV 17-19, VAV 18-20, AC 11-14, total 59-62; lateral row of serial photophores: OV 17-18, VAL 20-22, total 37-39. Vertebrae 53-56. Barbel slightly longer than, to about ⅔ of head length, its tip forming a long, slender swelling.

Body black, without pale luminous patches; head with many small, pale dots developing with growth behind eye and on gill cover. Attains 26 cm. Occurs only in tropical Atlantic to about 20°S.



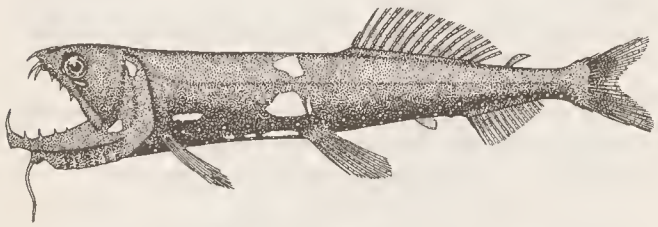
69.2 *Astronesthes caulophorus:* 4 cm holotype (after Regan & Trewavas, 1929).

69.3 *Astronesthes indicus*
Brauer, 1902

Astronesthes indicus Brauer, 1902: 287 (east of Zanzibar); Regan & Trewavas, 1929: 23* Gibbs, 1964: 322*; Hulley, 1972: 211: Gibbs, 1984: 328*.

D 11-17; A 12-16; P 6-9. Ventral row of serial photophores: IP 4-6, PV 5-7, VAV 7-9, AC 6-10, total 25-29; lateral row of serial photophores: OV 5-6, VAL 6-8, total 11-14. Vertebrae 42-46. Barbel from half to 1.5 times head length, its tip either with small flattened wings or with a long, grooved swelling.

Body black; larger specimens with pale, luminous patches on sides of body and gill cover. Attains 18 cm. Circumglobal in tropical waters, taken between 33° and 35°S on Atlantic side but not yet south of 20°S on our east coast.



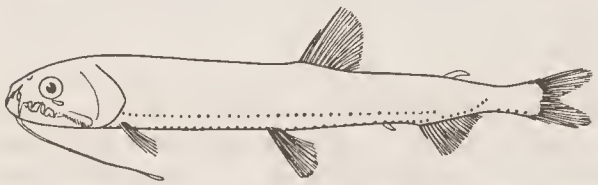
69.3 *Astronesthes indicus:* 12 cm (after Regan & Trewavas, 1929).

69.4 *Astronesthes martensii*
Klunzinger, 1871

Astronesthes martensii Klunzinger, 1871: 594 (Red Sea); Lutken, 1892: 276*; Regan & Trewavas, 1929: 17*.

D 10-13; A 17-21; P 6. Ventral row of serial photophores: IP 10-11, PV 16-19, VAV 19-21, AC 11-13, total 59-65; lateral row of serial photophores: OV 16-18, VAL 18-21, total 36-38. Vertebrae 50-53. Barbel usually equal to 1.5 times head length; a very small swelling at tip, usually longer than wide.

Body with silvery sides; a prominent black patch on ventral caudal peduncle. Attains 14 cm. Indonesia to Red Sea and south to Durban. Many specimens taken in midwater trawls, but most larger ones in bottom trawls, suggesting that adults live close to the bottom.



69.4 *Astronesthes martensii:* (after Lütken, 1892).

69.5 *Astronesthes niger*
Richardson, 1844

Astronesthes nigra Richardson, 1844: 97, Pl. 50 Figs. 1-3 ("Habitat unknown, presumed to be S. China Sea"). *Astronesthes niger:* Regan & Trewavas, 1929: 20*; Gibbs, 1964: 327*; Gibbs, 1984: 330*.

D 14-17; A 12-16; P 7-9. Ventral row of serial photophores: IP 8-10, PV 12-15, VAV 18-22, AC 11-13, total 50-56; lateral row of serial photophores: OV 11-16, VAL 17-23, total 30-37. Vertebrae 46-51. Barbel 1.5 times to less than ½ head length, its tip forming a long, slender swelling.

Body black, pale luminous patches present on middle of snout and along front of upper jaw at most sizes, developing with growth on shoulder and on lower sides between P and V and below D. Attains 16 cm. Not yet reported from our area, but taken in adjacent Atlantic and north of 20°S in Indian Ocean.

69.5 *Astronesthes niger:* 6 cm (after Weitzman, 1967).

69.6 *Astronesthes trifibulatus*
Gibbs, Amaoka & Haruta, 1984

Astronesthes trifibulatus Gibbs, Amaoka & Haruta, 1984: 1, Fig. 1 (off Oahu, Hawaii).

D 11-14; A 18-21; P 6-7. Ventral row of serial photophores: IP 9-12, PV 15-17, VAV 23-25, AC 11-12, total 60-64; lateral row of serial photophores: OV 15-17, VAL 24-27, total 40-43. Vertebrae 54-56. Barbel shorter to slightly longer than head, its tip forming a short, broad swelling, usually with a slender terminal projection and a pair of filaments arising from its sides.

Body black; pale luminous patches present around postorbital organ in some larger specimens. Attains more than 13 cm. Tropical and subtropical Indo-Pacific; taken in Mozambique Channel.

69.6 *Astronesthes trifibulatus:* 9.5 cm SL paratype (after Gibbs et al., 1984).

Genus ***Borostomias*** Regan, 1908

Five species; 2 in our area, possibly variants of a single species, as no characters have been found that distinguish them completely.

KEY TO SPECIES

1a Anterior part of jaws with fangs much longer than other teeth; longer teeth straight; photophores in lateral series (OA) usually 44 or fewer, in ventral series to tail (IC) usually 68 or fewer ..... *B. antarcticus*

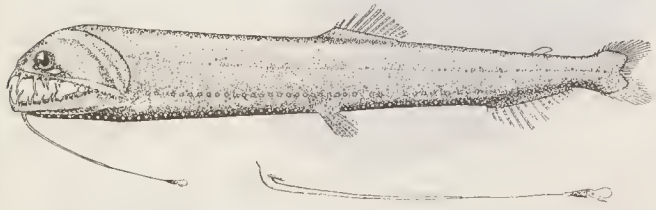
1b Anterior part of jaws with fangs not much larger than other teeth; longer teeth curved; OA usually 46 or more, IC usually 70 or more ..... *B. mononema*

69.7 *Borostomias antarcticus*
(Lonnberg, 1905)

Astronesthes antarcticus Lonnberg, 1905: 762 (48°27'S, 42°36'W). *Borostomias antarcticus:* Regan & Trewavas, 1929: 25; Gibbs, 1964: 334*; Gibbs, 1984: 331*. ?*Borostomias richardsoni* (*non* Poey): Barnard, 1925: 135. *Astronesthes richardsoni:* Smith, **SFSA No. 139** (not figure).

D 9-13; A 12-17; P 7-9. Ventral row of serial photophores: IP 10-11, PV 22-26, VAV 19-25, AC 9-13, total 66-69 (73); lateral row of serial photophores: OV 22-25, VAL 19-24, total 43-47. Vertebrae 56-60. Barbel from 1.3 times to ½ head length, its tip with a bulbous black swelling and a smaller, pale distal portion with 1 filament, sometimes 2.

Body black, without well-developed pale patches. Attains about 30 cm. Boreal and temperate North Atlantic and circumglobally south of about 40°S. In our area, known only from Atlantic, where it is reported up to 18°S.



69.7 *Borostomias antarcticus:* 18 cm; enlarged mental barbel below (after Norman, 1930).

69.8 *Borostomias mononema*
(Regan & Trewavas, 1929)

Diplolychnus mononema Regan & Trewavas, 1929: 27, Fig. 19, Pl. 5, Fig. 2 (off Virgin Ids.); Gibbs, 1964: 341*. *Borostomias mononema:* Weitzman, 1967: 5; ? Karrer, 1973: 208 (could be *B. antarcticus*); Gibbs, 1984: 333*.

D 12-14; A 15-19; P 6-8. Ventral row of serial photophores: IP 10-11, PV 23-26, VAV 19-25, AC 11-13, total 65-72; lateral row of serial photophores: OV 19-25, VAL 21-25, total (43) 46-49. Vertebrae 60-63. Barbel from 1.25 times to ½ head length, its tip with a bulbous, black swelling and a smaller, pale distal portion with 1 filament, sometimes 2.

Body black, without well-developed pale patches. Attains 31 cm. Reported from Atlantic side at 28°S and from Indian Ocean to about 25°S. Mainly in tropical waters of Atlantic and Indian oceans.

69.8 *Borostomias mononema:* 27 cm type (after Regan & Trewavas, 1929).

Genus ***Neonesthes*** Regan & Trewavas, 1929

Two species, both probably in our area.

KEY TO SPECIES

1a Head length about 16% SL (6.0 or more in SL); A rays 21-24 but usually 23 or fewer; branchiostegal photophores 11-15 or fewer ..... *N. microcephalus*

1b Head length greater than 16% SL (less than 6.0 in SL); A 22- 28 but usually 24 or more; branchiostegal photophores 16-19 ..... *N. capensis*

69.9 *Neonesthes capensis*
(Gilchrist & von Bonde, 1924)

Astronesthes capensis Gilchrist & von Bonde, 1924: 5 (off South Africa); Smith, **SFSA No. 140.** *Neonesthes capensis:* Gibbs, 1964: 346*; Hulley, 1972: 211; Gibbs, 1984: 333*.

D 8-12; A 22-28; P 6-9. Ventral row of serial photophores: IP 10-12, PV 14-17, VAV 18-22, AC 11-18, total 56-65; lateral row of serial photophores: OV 13-16, VAL 16-21, total 30-36. Palatine teeth 2-4. Gill teeth 39-53. Vertebrae 51-55. Barbel from 3 times to less than ½ head length, its tip with a short, spherical or ovoid bulb that may bear a slender filament.

Body black, often iridescent. Attains 17 cm. Eastern and southern parts of our area and should occur on Indian Ocean side. Subtropical/temperate waters of all oceans, but appears to be rare or absent in tropical waters.

69.9 *Neonesthes capensis:* 15 cm type of *N. macrolychnus* (after Regan & Trewavas, 1929).

69.10 *Neonesthes microcephalus*
Norman, 1930

Neonesthes microcephalus Norman, 1930: 307, Fig. 16 (15°55'S, 10°35'E).

69.10 *Neonesthes microcephalus:* 15 cm holotype (after Norman, 1930).

D 8-9; A 21-24; P 8-9. Ventral row of serial photophores: IP 9-10, PV 15-17, VAV 20-21, AC 11-13, total 57-59; lateral row of serial photophores: OV 15-17, VAL 18-20, total 33-37. Palatine teeth 0-2. Gill teeth 37-39. Vertebrae 50-52. Barbel 2.5 times to less than ½ head length, its tip with a short, slender swelling, from which 1 or more filaments may arise.

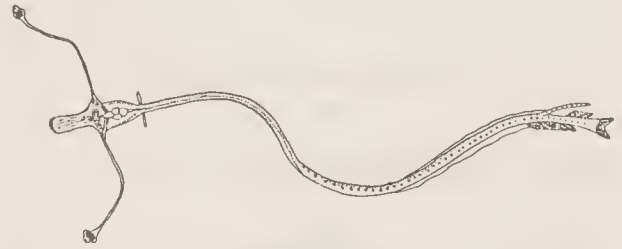
Body black, often iridescent. Attains 17 cm. Not yet recorded from our area, but known to occur in adjacent subtropical/temperate waters of South Atlantic and Indian oceans, as well as Pacific.

Family No. 70: IDIACANTHIDAE

by P.A. Hulley

Sawtail-fishes **Saagstertvisse**

Body markedly elongate, without scales or hexagonal areas, colour black in females, dark brown in males. Sexual dimorphism marked, adult males retaining semilarval appearance, with anterior anal rays modified and fused with sperm duct and serving as an intromittent organ. Head relatively large; mouth in adult females with numerous, depressible, barbed, fang-like teeth of variable size; vomer with 1-2 and palatines with 2-3 sharp teeth; jaws without teeth in males. Gill arches without rakers or teeth. Chin barbel about twice head length only in females. Dorsal fin long, its origin much nearer tip of snout than base of caudal rays; anal fin about half length of dorsal, its origin under middle dorsal rays; base of each dorsal (except first) and anal ray flanked anterolaterally by a small sharp spur. Pectoral fins absent in adults, present in larvae; pelvic fins with 6 rays in females, absent in males. Postorbital luminous organ present, larger in males than in females, and another organ embedded in skin immediately below eye; small luminous organs scattered over head and body, arranged in patterns on each serial segment. Two rows of larger photophores, situated low down on body, one from gill opening to about middle of anal fin, the other from anterior end of isthmus to near caudal base. Stylophthalmid larvae with eyes on long transverse stalks, shortening with age.



Idiacanthus larva: 3.5 cm ("*Stylophthalmus paradoxus*", redrawn from Brauer, 1906).

Fairly common at midwater depths in all tropical and temperate oceanic waters of the world. One genus, *Idiacanthus* Peters, 1877 with about 3 species; *I. antrostomus* Gilbert, 1890 known from the Pacific.

KEY TO SPECIES
(females only)

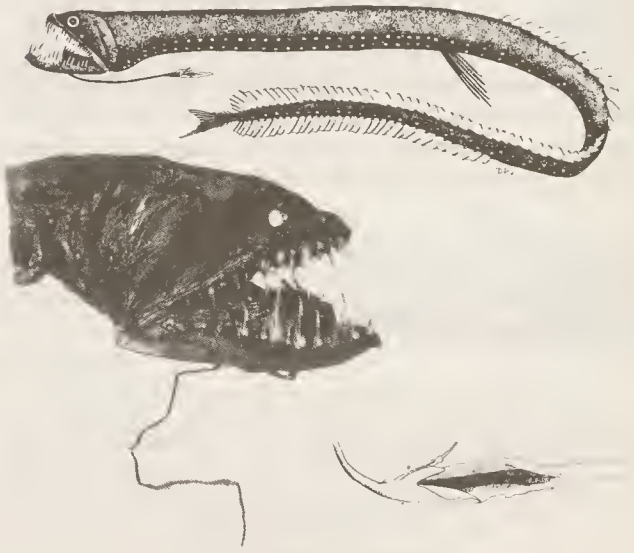
1a D origin behind V origin; 19-23 VAV photophores (from V origin to A origin) ..... *I. atlanticus*
1b D origin in advance of V origin; 14-16 VAV photophores (from V origin to A origin) ..... *I. fasciola*

70.1 *Idiacanthus atlanticus*
Brauer, 1906

Idiacanthus atlanticus Brauer, 1906: 62, Fig. 21 (25°25′3″S, 6°12′4″E); Barnard, 1925: 136; Smith, **SFSA No. 144;** Hulley, 1972: 214. *Stylophthalmus paradoxus* Brauer, 1902: 298 (Atlantic, Southern and Indian oceans) (in part); 1906: 67*; Barnard, 1925: 140; Smith, **SFSA No. 138.** *Idiacanthus niger:* Smith, **SFSA No. 142*;** Grindley & Penrith, 1965: 282; Novikova, 1967: 185*.

D 55-63; A 37-42. Depth 20.6-26.3; head 14.8-15.9 in SL. IV 36-38; VAV 19-23; OV 24-27; VAL 32-36.

Attains more than 43 cm. Off west (24°-37°S) and east (30°-41°S) coasts; in 300 - 500 m. Circumglobal between about 26°S and Subtropical Convergence, with northern extensions in eastern boundary currents.



70.1 *Idiacanthus atlanticus:* 38 cm SL; photo: head of 22 cm specimen (off Algoa Bay); bottom: mental barbel.

70.2 *Idiacanthus fasciola*
Peters, 1877

Idiacanthus fasciola Peters, 1877: 847 (western South Pacific); Brauer, 1906: 60*; Smith, **SFSA No. 143;** Gibbs, 1964: 514*; Grindley & Penrith, 1965: 282; Novikova, 1967: 164*; Hulley, 1972: 215; Gibbs, 1984: 372*. *Idiacanthus ferox:* Barnard, 1925: 136. *Stylophthalmus paradoxus* Brauer, 1902: 298 (in part; Atlantic, Southern and Indian oceans).

D 62-68; A 42-46. Depth 22.7-28.0; head 13.2-15.5 in SL. IV 33-35; VAV 14-16; OV 23-24; VAL 31-33.

Attains more than 27 cm. Off east coast and in Agulhas

water pockets in eastern South Atlantic (34°-36°S). Tropical/subtropical waters of North Atlantic, Indian and Pacific oceans.

70.2 *Idiacanthus fasciola:* 17.5 cm SL.

Family No. 71: MALACOSTEIDAE

by R.H. Goodyear & R.H. Gibbs, Jr.

Loosejaws **Losbekke**

Body elongate, compressed. Dorsal opposite anal fin, located well posteriorly on the body. Pectoral fins absent or consisting of free, filament-like rays. Pelvic fins of 6 rays, located about mid-length of body. Caudal fin small, forked. Head and mouth large. No membrane connecting the rami of the lower jaw. Jaw teeth large, barbed. Light organs: IP, PV, VAV, OV, VAL and AC serial photophores present; postorbital organ present; preorbital and suborbital organs present or absent. Hyoid barbel present or absent.

Black to dark brown, mesopelagic or bathypelagic fishes occurring in all oceans. Known to reach 24 cm SL. Not abundant and of no commercial value. Three genera with perhaps 17 species; *Photostomias* Collett, 1889 does not occur in our area. Recently revised by Goodyear (1980, unpublished Ph.D. dissertation).

KEY TO GENERA

1a P present; suborbital organ present 2
1b P absent; suborbital organ absent ..... [*Photostomias*]

2a Hyoid barbel present; serial photophores well developed, conspicuous; 2 pairs of nostrils ..... *Aristostomias*
2b Hyoid barbel absent; serial photophores poorly developed, inconspicuous, 1 pair of nostrils ..... *Malacosteus*

Genus ***Aristostomias*** Zugmayer, 1913

Eight species; 2 in our area.

KEY TO SPECIES

1a PV with 3-5 linear groups of photophores separated by gaps shorter than the lengths of the adjacent groups of photophores; no solid streak of luminous tissue between eye and postorbital organ ..... *A. lunifer*
1b PV with 5-9 groups of photophores, some groups oblique or triangular and not linear, separated by gaps longer than the adjacent photophore groups; solid streak of luminous tissue between eye and postorbital organ ..... *A. polydactylus*

71.1 *Aristostomias lunifer*
Regan & Trewavas, 1930

Aristostomias lunifer Regan & Trewavas, 1930: 138, Fig. 132, Pl. 13, Fig. 2 (Caribbean Sea); Morrow, 1964: 534*; Gibbs, 1984: 368*. *Aristostomias photodactylus* Beebe, 1933: 171, Fig. 7 (off Bermuda).

D 21-26; A 25-30; P 6-10; IC 49-53; OA 32-35; vertebrae 50-53. Depth 5-8; head 2.8-3.6. OV photophore row linear, with 1 short gap or none; solid or broken crescent of luminous tissue from anterior margin of eye to below suborbital organ.

Attains 17 cm. Taken west of our area. Occurs in all 3 major oceans.

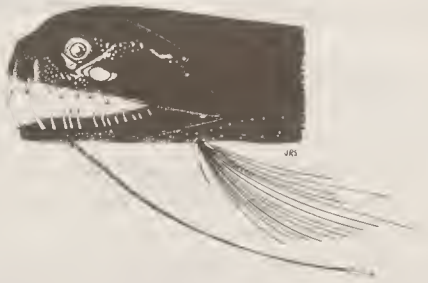
71.1 *Aristostomias lunifer:* 8 cm SL (drawn by Jack R. Schroeder).

71.2 *Aristostomias polydactylus*
Regan & Trewavas, 1930

Aristostomias polydactylus Regan & Trewavas, 1930: 141, Fig. 137, Pl. 14, Fig. 3 (mid North Atlantic); Morrow, 1964: 538*.

D 22-25; A 26-30; P 10-17; IC 48-54; OA 32-36; vertebrae 50-53. Depth 6-12; head 3.4-4.4. OV mostly linear, but with 4-8 groups of photophores separated by long gaps; scattered luminous tissue in front of eye not forming a crescent.

Attains 22 cm. Taken once on the Atlantic side, once on the Indian Ocean side of our area. Occurs in all 3 major oceans.



71.2 *Aristostomias polydactylus:* head of 8 cm SL specimen (drawn by Jack R. Schroeder).

Genus ***Malacosteus*** Ayres, 1848

Two species; both occur in our area.

KEY TO SPECIES

1a Postorbital light organ of males relatively large, length of organ 1.4-3.0% SL ..... *M. niger*
1b Postorbital light organ of males relatively small, organ length 0.7-1.5% SL ..... *M.* sp.

71.3 *Malacosteus sp.*

Malacosteus niger (*non* Ayres): Hulley, 1972: 214.

D 16-20; A 17-22; P 3-5; IC 16-22; OA 9-15; vertebrae 48-51. Depth 6.1-8.1; head 3.1-3.8.

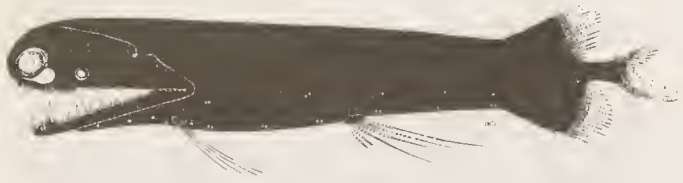
Attains 19 cm. Bathypelagic. Southern Subtropical Convergence waters of all 3 major oceans.

71.4 *Malacosteus niger*
Ayres, 1848

Malacosteus niger Ayres, 1848: 69 (mid North Atlantic); Morrow, 1964: 545*; Gibbs, 1984: 369*. *Malacosteus indicus:* Smith, **SFSA No. 137;** Hulley, 1972: 214.

D 17-21; A 18-23; P 2-4; IC 12-22; OA 7-14; vertebrae 45-51. Depth 5.6-11.4; head 3.1-4.1.

Attains 24 cm. Bathypelagic. Tropical and subtropical waters of all 3 major oceans and Atlantic north to subarctic waters.



71.4 *Malacosteus niger:* 12 cm SL (drawn by Jack R. Schroeder).

Family No. 72: MELANOSTOMIIDAE

by R.H. Gibbs, Jr.

Scaleless dragonfishes **Kaal draakvisse**

Body without scales or hexagonal areas; skin usually black, sometimes iridescent silver, bronze, or metallic green; 2 continuous rows of prominent photophores on ventral part of body on each side; numerous small photophores on most of body and head, most dense ventrally. Dorsal and anal fins close to tail; no dorsal adipose fin (present in *Chirostomias*, which is not found in the area); floor of mouth formed by membrane connecting dentary bones; barbel under chin, ranging from tiny to longer than body, with or without branches or terminal elaborations; no preorbital or suborbital luminous organ, only postorbital organ present.

Occurring in mid-depths of open oceans around the world, often migrating to near-surface waters at night; a few apparently benthopelagic as adults. Fifteen genera with a total of about 200 species; 10 genera and 25 species described here. The family revisions by Regan & Trewavas (1929) and Morrow & Gibbs (1964) are out of date in many respects. Barnett & Gibbs (1968) reviewed *Bathophilus*. Parin & Pokhilska (1974, 1978) partially reviewed *Eustomias* and *Melanostomias*, but followed the lumping of Regan & Trewavas species by Morrow & Gibbs (1964) for these 2 genera; Regan & Trewavas (1929) are mainly correct in most of their descriptions. Revisionary studies are being conducted by Gibbs, Clarke, Parin and their associates. A number of species in several genera occur in southeastern Atlantic or southwestern Indian oceans but are not recorded in our area. Some of these may be taken in the future.

KEY TO GENERA

1a D base much shorter than A base; A origin well anterior to that of D 2
1b D & A bases similar in length; A origin approximately below D origin 3

2a First P ray separate, much longer than subsequent rays; snout blunt, upper jaw protrusible ..... *Flagellostomias*
2b P rays either absent, single or none separate and much longer than others; snout (upper jaw) tapering, slender, protrusible ..... *Eustomias*

3a V origins far apart, near midlateral body ..... *Bathophilus*
3b V origins close together, near midventral line 4

4a A large, sausage-shaped luminous organ (suborbital) below eye, with smaller ones anterior (preorbital) and posterior (postorbital) to eye ..... *Pachystomias*
4b No suborbital or preorbital light organs; postorbital light organ present 5

5a Lower jaw longer than upper and strongly curved upwards; P rays 0-2 ..... *Photonectes*
5b Lower jaw not longer than upper, not strongly curved upward; P with 3-12 rays 6

6a P with 1 long ray separated from 3-5 smaller rays 7
6b P with 3-12 rays of approximately equal length, none separated from the others 8

7a First long mandibular tooth piercing premaxilla; no teeth on palatines ..... *Opostomias*
7b No mandibular tooth piercing premaxilla; teeth present on palatines ..... *Echiostoma*

8a Body (very long, slender) depth 10% of SL or less; photophores between P & V insertions (PV) 39 or more; barbel long, increasing with growth from ⅓ SL to longer than SL in some species; P rays 10-12 ..... *Leptostomias*
8b Body (moderately long) depth greater than 10% of SL; PV photophores 30 or fewer; barbel only slightly longer than head (except *Melanostomias niger,* in which the barbel may be up to 50% of SL); P rays 3-7 9

9a Area of head around and behind postorbital luminous organ with a large patch of luminous tissue and lines radiating posteriorly onto gill cover; 1 or 2 horizontal lines present or absent on side of body; barbel with a small, round terminal bulb; 21 or more VAV and VAL photophores ..... *Trigonolampa*
9b Head behind eye without a large patch of luminous material; no horizontal lines on side of body; terminal end of barbel variously complex, not just a small, round bulb; 11-16 VAV and VAL photophores ..... *Melanostomias*

Genus ***Bathophilus*** Giglioli, 1884

About 18 species; 5 in or near our area.

KEY TO SPECIES

1a P rays 31-57 ..... *B. nigerrimus*
1b P rays 4-13 2

2a P rays 11-13 ..... *B. digitatus*
2b P rays 4-9 3

3a V rays 15-18 ..... *B. indicus*
3b V rays 9-13 4

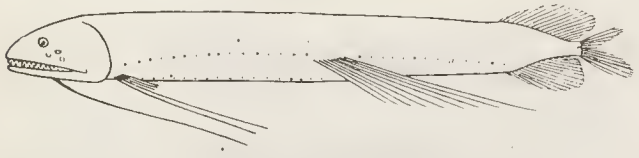
4a Photophores in ventral series (IC) 42-48; in lateral series (OA) 30-32; vertebrae 48-51; P rays 4-7 ..... *B. ater*
4b Photophores in ventral series (IC) 36-39, in lateral series (OA) 23-25; vertebrae 40-44; P rays 6-9 ..... *B. longipinnis*

72.1 *Bathophilus ater*
(Brauer, 1902)

Dactylostomias ater Brauer, 1902: 286 (southeastern Atlantic, ca. 27°S, 06°E); 1906: 57*. *Bathophilus ater:* Regan & Trewavas, 1930: 68*; Barnett & Gibbs, 1968: 831; Hulley, 1972: 214.

D 13-16; A 14-16; P 4-7; V 9-11. Serial photophores in ventral row: IP 5-6, PV 17-18, VAV 13-17, AC 6-7 (9?), total 42-45 (48?); serial photophores in lateral row; OV 16-18, VAL 13-16, total 30-32. Vertebrae 48-51.

Attains 15 cm. Atlantic south of 23°S. Not recorded in Indian Ocean, but probably occurs there, as it is known from the Pacific south of 32°S.

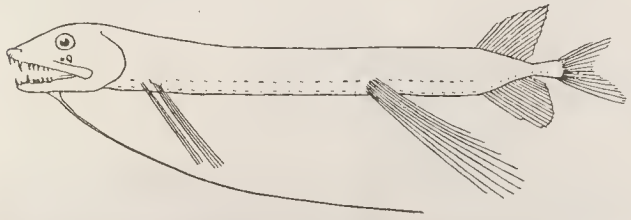


72.1 *Bathophilus ater.* 8.5 cm SL holotype (after Brauer, 1906).

72.2 *Bathophilus digitatus*
(Welsh, 1923)

Dactylostomias digitatus Welsh, 1923: 9, Fig. 9 (west of Bermuda). *Bathophilus digitatus:* Regan & Trewavas, 1930: 67*; Morrow & Gibbs, 1964: 466; Barnett & Gibbs, 1968: 826; Gibbs, 1984: 343*.

D 12-15; A 14; P 11-13; V 9-10 (?7). Photophores in ventral series: IP 5, PV 15-16, VAV 12-13, AC 6, total 38-39; photophores in lateral series: OV 14-16, VAL 10-12, total 25-26. Vertebrae 42-45.



72.2 *Bathophilus digitatus:* 3.5 cm holotype (after Welsh, 1923).

Attains 17 cm. A single specimen taken off Cape Town; North Atlantic, Indian and Pacific oceans.

72.3 *Bathophilus indicus*
(Brauer, 1906)

Dactylostomias indicus Brauer, 1906: 58 (Indian Ocean near southern Maldives). *Bathophilus indicus:* Regan & Trewavas, 1930: 68; Barnett & Gibbs, 1968: 197; 1968: 831.

D 13-14; A 14-15; P 4-5; V 15-18. Photophores in ventral series: IP 5, PV 14-15, VAV 13-14, AC 6, total 38-40; photophores in lateral series: OV 13-14, VAL 11-12, total 25-27. Vertebrae 42-44.

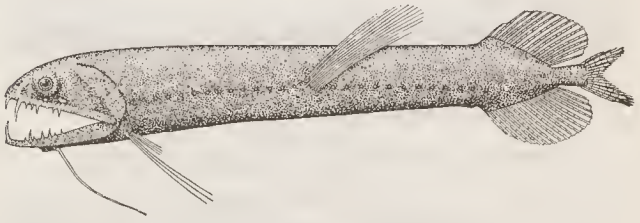
Attains at least 9 cm, probably twice that. Tropical Indian Ocean, extending southward in Mozambique Channel almost to 30°S, off Durban.

72.4 *Bathophilus longipinnis*
(Pappenheim, 1914)

Melanostomias longipinnis Pappenheim, 1914: 170, Fig. 1 (northeastern Atlantic). *Bathophilis longipinnis:* Regan & Trewavas, 1930: 68*; Morrow & Gibbs, 1964: 470; Barnett & Gibbs, 1968: 831.

D 13-14; A 12-14; P 6-9; V 8-13. Photophores in ventral series: IP 5, PV 14-16, VAV 11-13, AC 5-6, total 36-39; photophores in lateral series: OV 14-15, VAL 9-10, total 23-25. Vertebrae 40-44.

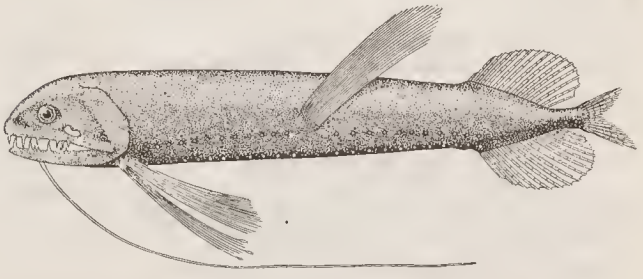
Attains at least 11 cm, probably more. Off Cape Town and from 25°S, 38°E in Indian Ocean. Occurs widely in all 3 major oceans.



72.4 *Bathophilus longipinnis:* 8 cm (after Regan & Trewavas, 1930).

72.5 *Bathophilus nigerrimus*
Giglioli, 1884

Bathophilus nigerrimus Giglioli, 1884: 261, Fig. (Mediterranean Sea); Regan & Trewavas, 1930: 65*; Morrow & Gibbs, 1964: 475; Barnett & Gibbs, 1968: 831, Gibbs, 1984: 343*.



72.5 *Bathophilus nigerrimus.* 6 cm (after Regan & Trewavas, 1930).

D 14-15; A 12-15; P 31-57; V 16-24. Photophores in ventral series: IP 5, PV 12, VAV 11-13, AC 3-6, total 33-35; photophores in lateral series: OV 12, VAL 10-12, total 22-24. Vertebrae 38-42.

Attains at least 12 cm, probably more. Off Cape Town and from Mozambique Channel to off Port Elizabeth. Occurs widely in all 3 major oceans.

Genus ***Echiostoma*** Lowe, 1843

Probably monotypic.

72.6 *Echiostoma barbatum* Lowe, 1843

Echiostoma barbatum Lowe, 1843: 87 (Madeira); Smith, **SFSA No. 135*;** Morrow & Gibbs, 1964: 482*; Krueger & Gibbs, 1966: 43; Hulley, 1972: 211; Gibbs, 1984: 345*. *Echiostoma tanneri:* Barnard, 1937: 48.

D 12-15; A 14-18; P 1+3-4; V 8 (5-9). Photophores in ventral series: IP 7-8+2, PV 25-28, VAV 15-19, AC 9-13, total 62-68; photophores in lateral series: OV 24-27, VAL 14-19, total 39-45. Vertebrae 56-59. Barbel to end of terminal bulb 7-16% of SL, its stem black, with many filaments before the bulbs; 2 contiguous terminal bulbs in small specimens, becoming indistinct in large ones, with a branched filament arising from distal bulb.

Attains 37 cm. Southeast of Algoa Bay and off Cape Town; widespread in tropical/subtropical waters of all oceans.

72.6 *Echiostoma barbatum:* 30 cm (after Regan & Trewavas, 1930).

Genus ***Eustomias*** Vaillant, 1888

About 100 species; 7 in our area.

KEY TO SPECIES

1a No P ..... *E. lipochirus*
1b P present, with one or more rays 2

2a P rays 8-10 ..... *E.* sp.
2b P rays 1-3 3

3a A single P ray (sometimes a tiny 2nd ray) ..... *E. filifer*
3b P rays 2 or 3, well developed 4

4a 2 P rays bound together in black tissue; barbel short (origin to end of terminal bulb 7-17% of SL), with black stem; 3 branches arising together from barbel stem, middle branch bulbous ..... *E. schmidti*
4b 3 separated P rays; barbel longer (origin to end of terminal bulb greater than 20% of SL), with stem mostly unpigmented externally; no branches arising from stem before terminal bulbs 5

5a Barbel with single terminal bulb, from which arise 3 bilaterally symmetrical pairs of ornate filaments ..... *E. bulbornatus*
5b Barbel with 2-4 terminal bulbs, with filaments, when present, not as 3 pairs 6
6a Barbel with 2 terminal bulbs, with a branched filament arising from the distal one ..... *E. grandibulbus*
6b Barbel with 4 terminal bulbs, with filaments, when present, arising in a group from 1 of the 2 proximal bulbs ..... *E. trewavasae*

72.7 *Eustomias bulbornatus* Gibbs, 1960

Eustomias bulbornatus Gibbs, 1960: 200, Fig. 1 (off southern Japan); Parin & Pokhilskaya, 1974: 345*; 1978: 75; Gibbs et al., 1983: 97.

D 22-26; A 32-37; P 3. Photophores in ventral series: IP 7-8, PV 32-35, VAV 16-20, AC 16-19, total 72-79; photophores in lateral series: OV 32-36, VAL 15-20, total 48-54. Anterior vertebral centra not ossified; 65-69 ossified vertebrae. Barbel to end of terminal bulb 21-35% of SL, its stem unpigmented externally.

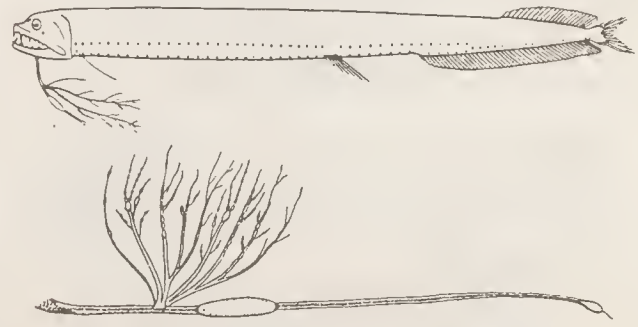
Attains almost 16 cm. Two collections, one south and one west of Cape of Good Hope; tropical Indian and Pacific oceans.

72.7 *Eustomias bulbornatus:* left side of head: black teeth are fixed, white depressible; end of barbel (after Gibbs, 1960).

72.8 *Eustomias filifer* (Gilchrist, 1906)

Neostomias filiferum Gilchrist, 1906: 168, Pl. 50 (off Cape Point). *Eustomias ramulosus* Regan & Trewavas, 1930: 107*. *Eustomias filifer:* Regan & Trewavas, 1930: 108*; Smith, **SFSA No. 134*;** Morrow & Gibbs, 1964: 407*; Gibbs, 1984: 348*.

D 22-27; A 39-45; P 1 (+1 rudimentary). Photophores in ventral series: IP 7, PV 26-31, VAV 13-16, AC 18-24, total 67-73; photophores in lateral



72.8 *Eustomias filifer:* (after Gibbs, 1984); below: enlargement of barbel from 8.4 cm specimen (after Regan & Trewavas, 1930).

series: OV 26-31, VAL 13-17, total 41-46. Anterior vertebral centra not ossified; 61-67 ossified vertebrae. Barbel to tip 15-66% of SL, its stem darkly pigmented internally; 3 simple to elaborate branches arising from stem, followed by a large bulb and a prolonged extension beyond bulb.

Attains 23 cm. Off Cape Point; tropical and subtropical Atlantic.

72.9 *Eustomias grandibulbus*
Gibbs, Clarke & Gomon, 1983

Eustomias grandibulbus Gibbs, Clarke & Gomon, 1983: 47, Fig. 10e (34°25′S, 14°47′E).

D 26; A 40; P 3. Photophores in ventral series: IP 7, PV 31, VAV 18, AC 18, total 74; photophores in lateral series: OV 32, VAL 20, total 52. Vertebral centra not ossified anteriorly; 67 ossified vertebrae. Barbel to end of terminal bulb 68% of SL, its stem unpigmented externally.

The only known specimen is about 16 cm; it was caught west of Cape Town between the surface and 112 m.

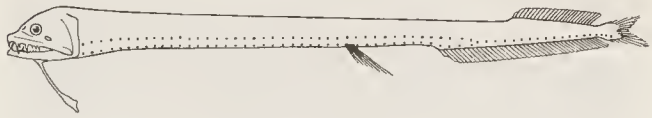
72.9 *Eustomias grandibulbus:* barbel from 16 cm holotype (after Gibbs, Clark, & Gomon, 1983).

72.10 *Eustomias lipochirus*
Regan & Trewavas, 1930

Eustomias lipochirus Regan & Trewavas, 1930: 95, Fig. 80A (off Virgin Ids.); Morrow & Gibbs, 1964: 412*; Parin & Pokhilskaya, 1978: 74*.

D 22-25; A 38-41; P 0. Photophores in ventral series: IP 7, PV 27-29, VAV 12-14, AC 19-22, total 67-70; photophores in lateral series: OV 27-29, VAL 13-15, total 41-43. Anterior vertebral centra not ossified; 60-63 ossified vertebrae. Barbel to end of bulb 9-13% of SL, its stem darkly pigmented internally; a pair of tiny filaments on stem well before bulb; a single terminal bulb, commonly with a finger-like projection; some patchy pigment on one side near base of bulb.

Attains 24 cm. Two specimens from southwest of Cape of Good Hope; tropical/subtropical Atlantic; 1 record from western Indian Ocean.



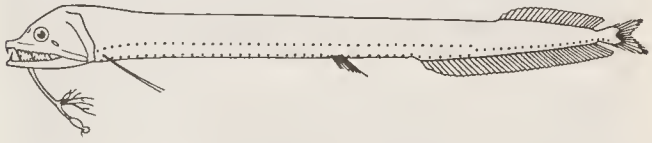
72.10 *Eustomias lipochirus:* 8.5 cm type of *E. dactylobolus* (after Regan & Trewavas, 1930).

72.11 *Eustomias schmidti*
Regan & Trewavas, 1930

Eustomias schmidti Regan & Trewavas, 1930: 100, Figs. 89, 90, Pl. 9, Fig. 3 (North Atlantic); Morrow & Gibbs, 1964: 424*; Gibbs, 1984: 350*.

D 22-28; A 36-43; P 2. Photophores in ventral series: IP 7-8, PV 27-30, VAV 14-17, AC 20-24, total 70-74; photophores in lateral row; OV 25-30, VAL 15-17, total 40-45. Anterior vertebral centra unossified; 63-66 ossified vertebrae.

Attains 21 cm. Off Cape Town; occurs widely in all 3 major oceans.



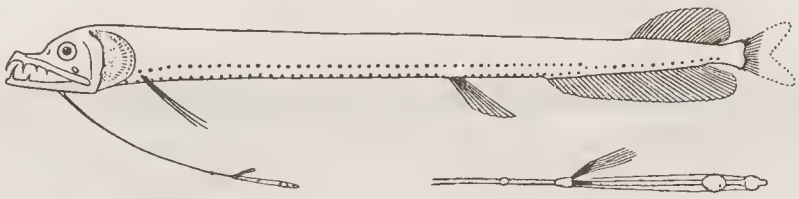
72.11 *Eustomias schmidti:* 7 cm (after Regan & Trewavas, 1930).

72.12 *Eustomias trewavasae*
Norman, 1930

Eustomias trewavasae Norman, 1930: 313, Fig. 23 (west of Cape Town); Gibbs & Craddock, 1973: 156*; Parin & Pokhilskaya, 1978: 73*.

D 20-26; A 31-37; P 3. Photophores in ventral series: IP 7-8, PV 29-32, VAV 14-17, AC 14-17, total 65-72; photophores in lateral series: OV 30-32, VAL 15-17, total 46-49. Anterior vertebral centra not ossified; 59-63 ossified vertebrae. Barbel to end of terminal bulb 44-73% of SL, its stem unpigmented externally.

Attains 26 cm. Circumglobal between about 33° and 40°S.



72.12 *Eustomias trewavasae:* 6 cm holotype (after Norman, 1930).

72.13 *Eustomias* sp.
(To be described by Gibbs & Clarke)

D 27-31; A 43-49; P 8-10. Photophores in ventral series: IP 7-8, PV 28-31, VAV 15-19, AC 22-24, total 73-77; photophores in lateral series: OV 27-31, VAL 15-19, total 43-47. Anterior vertebral centra unossified; 66-69 ossified vertebrae. Barbel to end of terminal bulb 26-36% of SL, its stem unpigmented externally, with 2 tiny branches just before terminal bulb; a single, long-ovoid terminal bulb without filaments.

Attains 20 cm. One specimen from south of Cape Agulhas; mainly in tropical waters of Pacific and Indian oceans.

Genus ***Flagellostomias*** Parr, 1927

Monotypic.

72.14 *Flagellostomias boureei*
(Zugmayer, 1913)

Eustomias boureei Zugmayer, 1913: 1 (North Atlantic, ca. 39°N, 24°W). *Flagellostomias boureei:* Regan & Trewavas, 1930: 57*; Morrow & Gibbs, 1964: 430*; Hulley, 1972: 213; Gibbs, 1984: 352*.

D 14-17; A 21-26; P 1+(8-11). Photophores in ventral series: IP 8-10, PV 31-34, VAV 14-16, AC 15-18; photophores in lateral series: OV 30-32, VAL 12-17. Vertebrae ca. 63-65. Barbel to end of terminal bulb 50-75% of SL, its stem black with white patches; a single terminal bulb with numerous filaments on both bulb and stem proximal to it.

Attains 32 cm. Atlantic part of our area; all 3 major oceans.

Genus ***Leptostomias*** Gilbert, 1905

No recent revision, and there is much confusion concerning the validity of the 14 nominal species. *Leptostomias gladiator* appears to be a valid species that occurs in our area, and at least one other species, tentatively called *L. gracilis*, is included here.

KEY TO SPECIES

1a Barbel stem black, with irregular white patches; 1 or 2 filaments at base of stem; other filaments usually arising from stem along its length, especially distally; terminal bulb without filaments beyond its proximal end, but usually with 1 or more tubercles or projections at its distal end ..... *L. gladiator*

1b Barbel stem black, without white patches, but with small, white photophores appearing as dots; filaments absent at base of stem and along most of its length, sometimes present just proximal to bulb; terminal bulb with or without short filaments, without pronounced tubercles or projections at its distal end ..... *L. gracilis*

72.15 *Leptostomias gladiator*
(Zugmayer, 1911)

Nematostomias gladiator Zugmayer, 1911: 5 (off Portugal). *Leptostomias gladiator:* Morrow & Gibbs, 1964: 441*; Gibbs, 1984: 355*.

D 19-22; A 23-29; P 10-11. Photophores in ventral series: IP 10-11, PV 39-44, VAV 20-22, AC 11-13; photophores in lateral series: OV 39-42, VAL 20-22. Barbel increasing with growth from about 30% to about 75% of SL; terminal bulb longer than wide, with tubercles or projections at its tip.

Attains 37 cm. Tropical, subtropical and temperate Atlantic; also Indian and Pacific oceans.

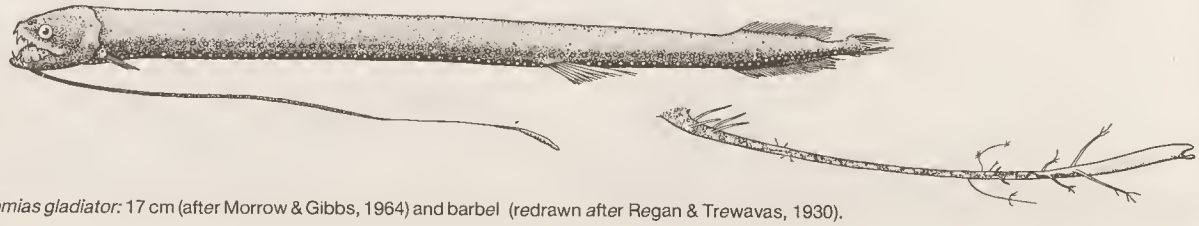
72.16 *Leptostomias gracilis*
Regan & Trewavas, 1930

Leptostomias gracilis Regan & Trewavas, 1930: 59, Fig. 38 (northeastern Atlantic).

D 18-22; A 21-26; P 10-12. Photophores in ventral series: IP 10-11, PV 45-47, VAV 20-23, AC 11-13, total 88-90; photophores in lateral series: OV 43-46, VAV 21-23, total 65-68. Barbel increasing with growth from about 30% of SL to longer than body in some large specimens; terminal bulb swollen or long and slender.

Attains 39 cm. Apparently occurs in much of northern and eastern Atlantic; perhaps in Indian or Pacific oceans.

72.14 *Flagellostomias boureei:* 22.5 cm (after Regan & Trewavas, 1930).



72.15 *Leptostomias gladiator:* 17 cm (after Morrow & Gibbs, 1964) and barbel (redrawn after Regan & Trewavas, 1930).

72.16 *Leptostomias gracilis:* 11.5 cm SL type of *L. longibarba* (after Regan & Trewavas, 1930).

Genus ***Melanostomias*** Brauer, 1902

About 15 species; 4 known from our area.

KEY TO SPECIES

1a Barbel with a terminal ovoid bulb with a slender, finger-like tentacle beside the bulb ..... *M. niger*

1b Barbel with its terminal end flattened, variously modified, but not forming a bulb 2

2a Terminal, flattened end of barbel with at least 2 prominent bulbs on one side of axis, 1 or more on the other side ..... *M. valdiviae*

2b Terminal, flattened end of barbel with no more than 1 prominent bulb on each side 3

3a Terminal end of barbel with masses of opaque material filling much of the membrane on both sides of axis; relatively large, round white spots present on head; 1 at tip of snout, 1 dorsally on rear of head, 1 on mid-snout, 1 or more anterior to eye, and a pair on isthmus between lower-jaw halves ..... *M. bartonbeani*

3b Terminal end of barbel without masses of opaque material along axis, but with a prominent bulb on one side of axis, often a smaller bulb on opposite side, sometimes with tiny, discrete bulblets; no large white spots on head ..... *M. paucilaternatus*

72.17 *Melanostomias bartonbeani*
Parr, 1927

Melanostomias bartonbeani Parr, 1927: 45, Fig. 25 (northwestern Atlantic); Gibbs, 1984: 358*. *Melanostomias spilorhynchus:* Morrow & Gibbs, 1964: 363*; Parin & Pokhilskaya, 1978: 78*.

D 12-16; A 16-20; P 5. Photophores in ventral series: IP 8+2-3, PV 23-26, VAV 12-16, AC 8-11, total 55-60; photophores in lateral series: OV 22-25, VAL 11-14, total 33-37. Vertebrae 48-51. Barbel to tip 17-24% of SL, its stem black; barbel tip unpigmented, about 5 times longer than wide, ending in a tapering filament.

Attains 26 cm. Taken once off Cape Columbine (western Cape coast); widespread in Atlantic and southern Indian Ocean.

72.18 *Melanostomias niger*
Gilchrist & von Bonde, 1924

Melanostomias niger Gilchrist & von Bonde, 1924: 6, Pl. 2 (Fig. 2) (off Table Bay); Smith, **SFSA No. 133*;** Parin & Pokhilskaya, 1978: 66*. *Haplostomias tentaculatus* (*non* Regan & Trewavas): Barnard, 1937: 47; Smith, **SFSA No. 132.** *Melanostomias tentaculatus* (*non* Regan & Trewavas): Karrer, 1973: 209.

D 15-17; A 17-20; P 5. Photophores in ventral series: IP 8+2-3, PV 26-28, VAV 14-16, AC 9-11, total 59-64; photophores in lateral series: OV 26-27, VAL 13-15, total 40-42. Vertebrae 55-57. No prominent white spots on head. Barbel to end of bulb 20-32% of SL, its stem black; a pale terminal bulb with a black tentacle along it; 1 or more filaments may be present on end of bulb.

Attains 26 cm. Widespread in South Atlantic between 20° and 50°S; also Pacific south of about 30°S; not yet reported from Indian Ocean.

72.19 *Melanostomias paucilaternatus*
Parin & Pokhilskaya, 1978

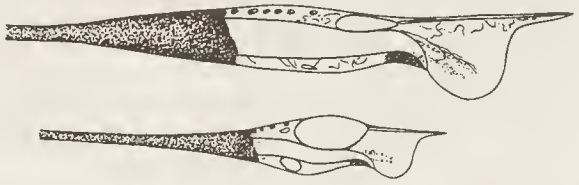
Melanostomias paucilaternatus Parin & Pokhilskaya, 1978: 80, Figs. 9a, b (western Pacific, ca. 5°N,130°E).

72.17 *Melanostomias bartonbeani:* 20.5 cm type of *M. spilorhynchus* (after Regan & Trewavas, 1930).

72.18 *Melanostomias niger:* 24 cm (off Cape Town).

D 13-16; A 16-18; P 5. Photophores in ventral series: IP 8+2-3, PV 24-26, VAV 12-14, total 57-59; photophores in lateral series: OV 24-26, VAL 11-13, total 36-38. Vertebrae 50-52. Barbel to tip 18-25% of SL, its stem black; barbel tip flattened, pale.

Attains at least 20 cm. Off Mozambique at about 25°S; tropical Indo-West Pacific.



72.19 *Melanostomias paucilaternatus:* barbel of holotype (after Parin & Pokhilskaya, 1976).

72.20 *Melanostomias valdiviae*
Brauer, 1902

Melanostomias valdiviae Brauer, 1902: 285 (off west coast of Sumatra); 1906: 56, Pl. 3 (Fig. 6); Morrow & Gibbs, 1964: 365*; Parin & Pokhilskaya, 1978: 82*; Gibbs, 1984: 360*.

D 12-16; A 17-19; P 5. Photophores in ventral series: IP 8+2-3, PV 24-28, VAV 12-14, AC 9-11, total 57-63; photophores in lateral series: OV 23-26, VAL 11-15, total 36-39. Vertebrae 51-53. No prominent white spots on head. Barbel to tip 16-23% of SL, its stem black; barbel tip pale.

Attains 23 cm. Off Cape Town and northeast of Durban; all 3 major oceans.

72.20 *Melanostomias valdiviae:* 16.5 cm (after Brauer, 1906).

Genus ***Opostomias*** Günther, 1887

Two species; 1 in our area.

72.21 *Opostomias micripnus*
(Günther, 1878)

Echiostomias micripnus Günther, 1878: 180 (off southwestern Australia). *Opostomias micripnus:* Günther, 1887: 208*; Regan & Trewavas, 1930: 56*. *Opostomias gibsonpacei* Barnard, 1948: 344, Figs. 1, 2 (northwest of Cape Town); Smith, **SFSA No. 136;** Hulley, 1972: 213.

D 21-23; A 22-24; P 1+5. Photophores in ventral series: IP 8-9 (6-7+2-3), PV 27-28, VAV 24-26, AC 13-15, total 72-76; photophores in lateral row: OV 22-27, VAL 24-26, total 50-53. Anterior vertebral centra unossified; ossified vertebrae 61-63. Barbel 18-22% of SL, its stem black; terminal end pale, slightly wider than stem, often constricted near its middle, with several filaments.

Attains about 50 cm. Occurs across the Atlantic, Pacific and probably the Indian Ocean south of about 33°S.

72.21 *Opostomias micripnus:* 39 cm (after Goode & Bean, 1896).

Genus ***Pachystomias*** Günther, 1887

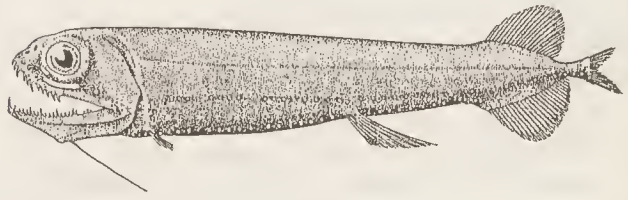
Monotypic.

72.22 *Pachystomias microdon*
(Günther, 1878)

Echiostoma microdon Günther, 1878: 180 (off northwestern Australia). *Pachystomias microdon:* Günther, 1887: 210*; Morrow & Gibbs, 1964: 375*; Hulley, 1972: 214.

D 20-24; A 23-28; P 4-6. Photophores in both ventral and lateral series with longer spaces dividing them into groups; in ventral series: IP 5-6 (3 groups) + 3 (mesial to the rest), PV 15-18 (2-4 groups), VAV 13-16 (2-6), AC 8-11, total 47-50; in lateral series: OV 16-19 (2-7), VAL 12-16 (1-4), total 29-34. Vertebrae 50-53. Barbel 3-50% of SL, generally decreasing with growth, without terminal modification.

Attains 22 cm. Off western Cape coast, widespread in all 3 major oceans.



72.22 *Pachystomias microdon:* 16.5 cm holotype of *P. atlanticus* (after Regan & Trewavas, 1930).

Genus ***Photonectes*** Günther, 1887

Ten or more species; 2 in our area.

KEY TO SPECIES

1a Photophores in ventral row between P and V insertions (PV) 30 or more; terminal bulb of barbel with curved, fringed distal appendage in small specimens, the bulb relatively small with a straight extension with basal fringing in large specimens ..... *P. parvimanus*

1b PV photophores 21-25; terminal bulb of barbel with a small, bulbous appendage in small specimens, the bulb becoming reduced or indiscernible in large specimens .... *P. braueri*

72.23 *Photonectes braueri*
(Zugmayer, 1913)

Melanostomias braueri Zugmayer, 1913: 3 (northwest of Azores). *Photonectes braueri:* Regan & Trewavas, 1930: 12*; Morrow & Gibbs, 1964: 493.

D 15-18; A 17-21; P 2. Photophores in ventral series: IP 8+2, PV 21-25, VAV 14-17, AC 10-12, total 57-61; photophores in lateral series: OV 20-22, VAL 13-15, total 34-37. Vertebrae 51-53. Barbel very short, 8% of SL (half head length) in young, decreasing to 1% of SL or less in adults; stem black; pale terminal bulb spherical, much wider than stem in young, with a tiny bulblet at its tip; bulb reduced and hardly discernible in adults.

Attains 28 cm. Off Cape Town; Atlantic and western Indian Ocean.

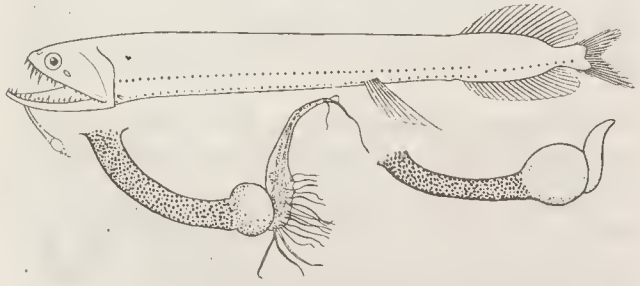
72.23 *Photonectes braueri:* 12 cm (after Regan & Trewavas, 1930).

72.24 *Photonectes parvimanus*
Regan & Trewavas, 1930

Photonectes parvimanus Regan & Trewavas, 1930: 124, Figs. 118, 119a, b (northwestern Atlantic); Morrow & Gibbs, 1964: 506. *Photonectes fimbria* Regan & Trewavas, 1930: 125, Fig. 119c (southwest of Madeira).

D 17-29; A 21-24; P 2. Photophores in ventral series: IP 8+2-3, PV 33-38, VAV 12-14, AC 10-13, total 65-71; photophores in lateral series: OV 30-36, VAL 12-14, total 42-49. Vertebrae 60-65. Small white patches on shoulder area in adults. Barbel to end of terminal bulb about 4-8% of SL (⅓ to ½ head length), its stem black; terminal bulb considerably wider than stem in young, about stem width in adults; bulb with a curved, fringed appendage in young, the appendage straight, fringed at base in adults.

Attains 25 cm. Off west coast; North Atlantic and central Pacific.



72.24 *Photonectes parvimanus:* 3.5 cm type; barbels below: left adult, right young (after Regan & Trewavas, 1930).

Genus *Trigonolampa* Regan & Trewavas, 1930

Monotypic.

72.25 *Trigonolampa miriceps*
Regan & Trewavas, 1930

Trigonolampa miriceps Regan & Trewavas, 1930: 55, Pl. 1, Fig. 2 (northeastern Atlantic); Morrow & Gibbs, 1964: 372*.

D 17-20; A 16-19; P 3-7. Photophores in ventral series: IP 10-12, PV 21-26, VAV 20-24, AC 11-14, total 65-70; photophores in lateral series: OV 22-27, VAL 21-26, total 47-49. Vertebrae 62-64. Body sometimes with 1 or 2 pale stripes on sides. Head with well-developed pale material behind eye, forming patches and stripes. Barbel to end of terminal bulb 10-17% of SL, its stem black; pale terminal bulb slightly wider than stem, with a long filament at its tip.

Attains 32 cm. Off west coast; apparently circumglobal in Southern Ocean south of 30°S; also in North Atlantic.

72.25 *Trigonolampa miriceps:* 11 cm holotype (after Regan & Trewavas, 1930).

Family No. 73: PHOTICHTHYIDAE

by S. Schaefer, R.K. Johnson & J. Badcock

Lightfishes **Ligvissies**

Head and body compressed. Premaxillary teeth uniserial or biserial, dentary teeth usually biserial anteriorly. Gill-rakers well developed. Pseudobranchiae absent (except *Woodsia meyerwaardeni*). Scales deciduous. Dorsal adipose fin present (except *Yarrella*). Three bony pectoral fin radials. Photophores on body discrete, arranged in 2 or more longitudinal rows. Photophores present on isthmus.

Bioluminescent fishes of mesopelagic and bathypelagic habit (*Yarrella* and *Polymetme* are apparently benthic) found in all oceans. Juveniles and adults in 200 - 800 m by day, with postlarvae nearer the surface; photichthyids feed mainly on zooplankton. Seven genera with a total of about 21 species; all genera and 11 species treated here. Grey (1960 and 1964) reviewed species; Krefft (1973) reviewed *Woodsia* and (1983) *Ichthyococcus*. Mukhacheva (1980) reviewed *Ichthyococcus*. Northeastern Atlantic and Mediterranean species reviewed by Badcock (1984).

KEY TO GENERA
(by S.H. Weitzman)

1a Body with more than 2 rows of photophores on sides; adipose fin absent; OA photophores more than 50 ..... *Yarrella*

1b Body with 2 rows of photophores on sides; adipose fin present; OA photophores 16-34 2

2a End of D opposite or behind A origin; branchiostegal rays 9-14; BR photophores 8-12; OA photophores 19-25 3
2b Entire D well in front of A origin; branchiostegal rays 11-21; BR photophores 14-18; OA photophores 29-34 5

3a One ORB photophore, below front margin of eye; premaxillary teeth biserial; AC photophores 22-25 ..... *Polymetme*
3b ORB photophores 2, 1 below or in front of front margin of eye and 1 below rear margin of eye; AC photophores 12-21 4

4a A 22-30; AC photophores 18-21 ..... *Pollichthys*
4b A 12-16; AC photophores 12-16 ..... *Vinciguerria*

5a V origin behind D origin; branchiostegal rays 11-12; BR photophores 11-12; jaws short, maxilla not reaching past eye; adipose fin long, its base longer than horizontal diameter of eye ..... *Ichthyococcus*
5b V origin anterior to D origin; branchiostegal rays 17-21; jaws long, maxilla reaching well past eye; adipose fin short, its base considerably shorter than horizontal eye diameter 6

6a A 23-26; AC photophores 16-18; elongate GR on 1st arch, total 15-16 ..... *Photichthys*
6b A 14-16; AC photophores 12-24; 2-14 GR of short rudimentary spines, others elongate ..... *Woodsia*

Genus ***Ichthyococcus*** Bonaparte, 1841

Eye large, tubular, directed obliquely upward. Teeth on jaws minute, uniserial; vomer (usually), palatines, pterygoids and tongue toothless. Photophores moderate to large: ORB 2 (posterior ORB midventral to eye); OP 3; BR 11-12; SO present or absent, no other photophores on head; body with 2 rows; AC photophores level, 8th IV photophore elevated, OA level, ending at about A origin; no other luminous tissue on head or body. Dorsal adipose fin long and low; small preanal ventral adipose fin present or absent. Anal fin base subequal to or slightly shorter than D base, its origin well behind end of D base. V base behind D origin. Anus close to A origin. Seven species, 3 in our area.

KEY TO SPECIES

1a No ventral adipose fin; last 5-6 AC behind A base ..... *I. australis*
1b Ventral adipose fin present, last 3-4 AC behind A base 2

2a Interorbital width 5-6% HL; body depth 2.6-3.0 in SL; SO absent ..... *I. ovatus*
2b Interorbital width 7.5-10% HL; body depth 3.0-3.5 in SL; SO present in fish > 17 mm SL ..... *I. polli*

73.1 *Ichthyococcus australis*
Mukhacheva, 1980

Ichthyococcus australis Mukhacheva, 1980: 9 (Tasman Sea); Krefft, 1983: 295*.

D 14-15; A 14-17; P 8; V 7; total GR 30-35; vertebrae 48-51. Body depth 23.8-26.1% SL. Photophores conspicuous: ORB 2, OP 3, SO 1, BR 12, IV 27-29, VAV 14-17, AC 13-15, IC 56-59, OA 32-35. Ventral adipose fin absent.

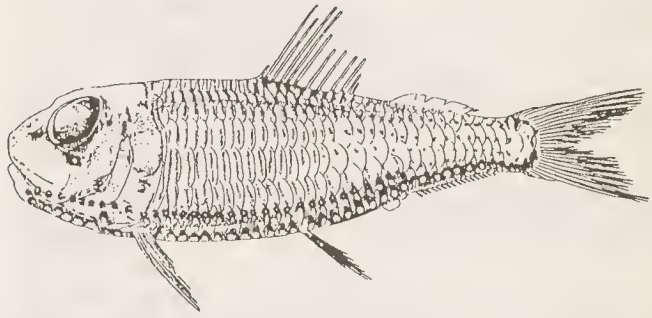
Brown-yellow, flanks silver; bases of fins and edges of scale pockets black. Attains 12 cm. Circumglobal in Subtropical Convergence region of southern hemisphere with records between 30°S and 40°S in Atlantic sector of our region.

73.2 *Ichthyococcus ovatus*
(Cocco, 1838)

Gonostoma ovatus Cocco, 1838: 169, Pl. 5, Fig. 3 (Messina). *Ichthyococcus ovatus:* Grey, 1964: 155*; Mukhacheva, 1980: 4.

D 11-12; A 15-17; P 7-8; V 6-7; total GR 19-25; LL 33- 38; vertebrae 38-42. Supraorbital crests converging, upper parts contacting above midorbit. Body depth 32-36% SL. Photophores conspicuous, closely set: ORB 2, OP 3, BR 11-12, IV 24-26, VAV 9-11, AC 12-14, IC 46-50, OA 23-27. Ventral adipose fin present.

Brown-yellow, flanks silver; bases of fins and edges of scale pockets black. Attains ca. 55 mm. Subtropical waters of all oceans, Mediterranean Sea; likely to occur around South Africa; adults mainly in 200 - 500 m.



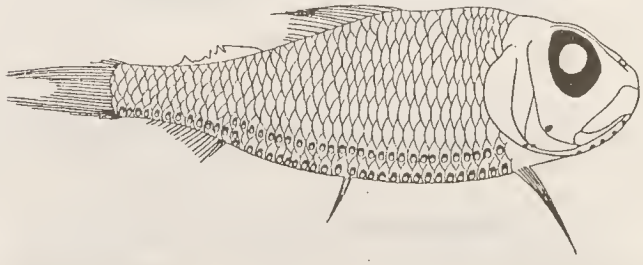
73.2 *Ichthyococcus ovatus:* 3 cm SL (after Grey, 1964).

73.3 *Ichthyococcus polli*
Blache, 1963

Ichthyococcus polli Blache, 1963: 468, Figs. 1-3 (Gulf of Guinea); Mukhacheva, 1980: 8; Krefft, 1983: 303.

D 11-14; A 14-17; P 7-8; total GR 20-26; LL 40-43; vertebrae 43-45. Body depth 26.9-31.9% SL. Photophores: ORB 2, OP 3, SO 1, BR 12-13, IV 25-27, VAV 12-14, AC 12-14, IC 51-53, OA 28-29. Ventral adipose fin present.

Brown-yellow, flanks silver; bases of fins and edges of scale pockets black. Attains ca. 90 mm. Adults mainly in



73.3 *Ichthyococcus polli:* 4 cm SL syntype (after Blache, 1963).

550 - 750 m. Atlantic endemic, essentially restricted to eastern tropical Atlantic, ca. 20°N to 16°S and to 38°W. Likely to reach our area.

Genus ***Photichthys*** Hutton, 1873

Monotypic.

73.4 *Photichthys argenteus* Hutton, 1873

Photichthys argenteus Hutton, 1873: 269 (Cook Strait, New Zealand); Smith, **SFSA No. 153*;** Grey, 1960: 100; Grindley & Penrith, 1965: 282; Hulley, 1972: 205; Karrer, 1973: 205.

D 12-13; A 23-26; P 9; V 6-7; total GR 15-16; vertebrae ca. 51. Eye normal. Mouth large. Premaxillary teeth uniserial; vomer, palatines toothed; pterygoids, tongue with or without minute teeth. Photophores present on isthmus; ORB 2, OP 3, SO 2, BR 17-18, IV 24-25, VAV 15-17, AC 16-18, IC 57-58, OA 33-34; no other luminous tissue on body. AC level, OA ending over anterior part of A. Dorsal adipose fin above front part of A; A origin well behind end of D base. V base slightly in advance of D origin.

Attains 30 cm. All 3 major oceans; southeast Atlantic, southeast of Cape Agulhas, and off Natal coast.

73.4 *Photichthys argenteus:* 13 cm SL (off Cape Point).

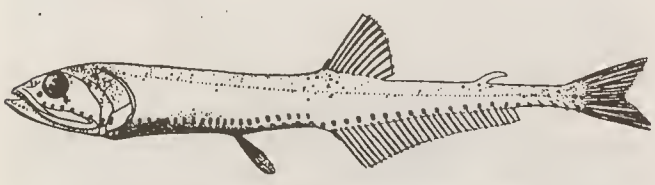
Genus ***Pollichthys*** Grey, 1959

Monotypic, possibly reaching our area.

73.5 *Pollichthys mauli* (Poll, 1953)

Yarella mauli Poll, 1953: 59, Fig. 24 (African coast: 5°15′S, 11°29′′E). *Pollichthys mauli:* Grey, 1959: 169; 1964: 118*; Johnson & Barnett, 1975: 288.

D 10-12; A 22-30; P 8; V 6-7; branchiostegal rays 11-12; total GR 15-19, none in epi-ceratobranchial articulation; vertebrae ca. 43-44. Eyes normal. Premaxillary teeth uniserial; vomer, pterygoids with or without minute teeth; palatine and tongue toothed. Photophores present on isthmus; ORB 2, OP 3, SO present; BR 8, IV 21-23 (the 8th and/or 9th slightly displaced), VAV 7-9, AC 18-21, IC 47-50, OA 18-21. OA ending anterior to A origin; AC level; A base more than twice as long as D base; A origin below or anterior to midpoint of D; V insertion well in advance of D origin.



73.5 *Pollichthys mauli:* 6 cm holotype (after Poll, 1953).

Dark dorsum, flanks silver. Attains ca. 6 cm. Adults mesopelagic, mainly in 300 - 600 m by day, shallower at night. Tropical waters of all 3 major oceans; known to 9°S off west African coast.

Genus ***Polymetme*** McCulloch, 1926

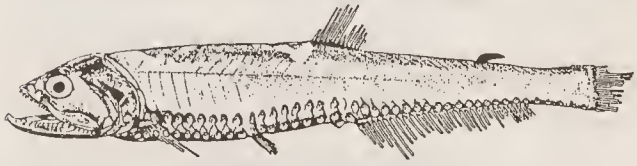
Premaxillary teeth biserial; maxillary teeth uniserial; vomer, palatines and pterygoids toothed; tongue toothless. Photophores: ORB 1, BR 9-10, 9th or 10th IV photophore elevated; 1st 1 or 2 AC elevated; AC ending at A origin; A base more than twice D base; A origin under end of D base; V insertion well in advance of D origin. Dorsal adipose fin short, over rear half of A. One (possibly 3) species, 1 known from our area.

73.6 *Polymetme corythaeola* (Alcock, 1898)

Diplophos corythaeolum Alcock, 1898: 147 (Andaman Sea). *Yarella africana* Gilchrist & von Bonde, 1924: 8, Pl. 1, Fig. 2 (Natal). *Yarella corythaeola:* Smith, **SFSA No. 152*.** *Polymetme corythaeola:* Grey, 1960: 95; 1964: 112*.

D 11-14; A 30-34; P 9-11; V 7; branchiostegal rays 12- 13, total GR 16-17; vertebrae 43-45. Eyes normal. Transparent tissue on belly between V bases and anus. Photophores conspicuous: ORB 1, OP 3, SO 1, BR 9-10; IV 21 (the 10th elevated), VAV 8, AC 24-25, IC 53-54, OA 17. Glandular tissue restricted as dorsal crescent on iris.

Dark dorsum, flanks silver; black pigment on outer C rays. Attains ca. 26 cm. Adults benthopelagic, mainly in 300 - 500 m off continental and island slopes of all 3 major oceans; off Natal below 300 m.



73.6 *Polymetme corythaeola:* 18.5 cm SL (after Grey, 1964).

Genus ***Vinciguerria*** Jordan & Evermann, 1896

Eyes round or slightly tubular. Premaxillary teeth uniserial; teeth of lower jaw biserial in front; vomer and palatines toothed; pterygoids and tongue toothless. Photophores conspicuous. Photophores: ORB 2, posterior 1 posteroventral to eye; OP 3; SO present or absent; BR 7-10; IV and AC series level; last OA ending at about A origin. No glandular luminous tissue. Dorsal adipose fin short, over

rear margin of A; A base subequal to or shorter than D base, its origin below middle or end of D base. V insertion slightly in advance of D origin. Five species, 3 from our area.

KEY TO SPECIES
(for fish >20 mm SL)

1a SO present; premaxilla with 6-10 small subequal teeth ..... *V. nimbaria*
1b SO absent; premaxilla with 3 or 4 long teeth and a few smaller ones 2

2a Total GR 14-16; eyes normal, lateral; dark streak at lower jaw symphysis ..... *V. poweriae*
2b Total GR 19-22; eyes slightly tubular; no dark streak at lower jaw symphysis ..... *V. attenuata*

73.7 *Vinciguerria attenuata*
(Cocco, 1838)

Maurolicus attenuatus Cocco, 1838: 193, Pl. 8, Fig. 3 (Mediterranean Sea). *Vinciguerria attenuata:* Grey, 1964: 143*; Grindley & Penrith, 1965: 282 (in part); Hulley, 1972: 205. *Vinciguerria lucetia* (*non* Garman); Smith, **SFSA No. 157.**

D 13-15; A 13-16; P 8-10; V 6-7; total GR 19-22; vertebrae 40-41; eyes slightly tubular. Interorbital width narrow. Photophores: SO absent, BR 7-10, IV 22-24, VAV 7-10, AC 12-14, IC 44-45, OA 21- 23. Anus under 6th-7th VAV.

Dark dorsum, silvery flanks; lower jaw symphysis, premaxilla and fin rays lacking pigment streaks. Medial caudal melanophore present in juveniles. Attains at least 45 mm. Juveniles and adults mainly in 250 - 600 m by day and 100 - 500 m by night in all 3 major oceans, Mediterranean Sea; off Cape Point, and off Inhaca Id.

73.7 *Vinciguerria attenuata:* 2 cm SL (after Jespersen, 1933).

73.8 *Vinciguerria nimbaria*
(Jordan & Williams, 1896)

Zalarges nimbarius Jordan & Williams, *in* Jordan & Starks, 1896: 793, Pl. 76 (Pacific). *Vinciguerria nimbaria:* Grey, 1964: 130*; Hulley, 1972: 205; Johnson & Barnett, 1975: 288; Johnson & Feltes, 1984: 1. *Vinciguerria sanzoi:* Smith, **SFSA No. 156*;** Grindley & Penrith, 1965: 282 (in part).

D 13-15; A 13-16; P 9-11; V 7; total GR 17-26; vertebrae 39-44; eyes normal, lateral. Interorbital width broad. Photophores: SO present, BR 8, IV 21-24, VAV 8-11, AC 13-14, IC 45-46, OA 23-24. Anus under 7th-9th VAV.

Dorsum dark, flanks silvery; dark pigment streak associated with SO; premaxilla pigmented, pigment patch at anteriormost IV photophore; both upper P and outer C speckled; caudal melanophore in ventral position in juveniles. Attains ca. 48 mm. Adults mainly in 200 - 400 m by day and in upper 100 m by night. Tropical/subtropical waters of all 3 major oceans; East London to Delagoa Bay, thrown up by storms.

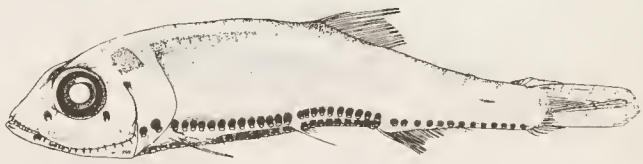
73.8 *Vinciguerria nimbaria:* 2 cm SL (after Jespersen, 1933).

73.9 *Vinciguerria poweriae*
(Cocco, 1838)

Gonostomus poweriae Cocco, 1838: 167, Pl. 5, Fig. 2 (Messina). *Vinciguerria poweriae:* Grey, 1964: 137*; Mukhacheva, 1972: 75.

D 13-15; A 12-14; P 9-11; V 7; total GR 14-16; vertebrae 38-39. Eyes normal, interorbital width broad. Photophores: SO absent, BR 8, IV 22-24, VAV 8-10, AC 12-15, IC 43-47, OA 21-25. Anus under (7th) 8th-9th VAV.

Dorsum dark, silvery flanks; dark pigment streak at lower jaw symphysis and over premaxilla; fins lacking colour; caudal melanophore in median position in juveniles. Attains ca. 40 mm. Adults mainly in 300 - 600 m (day) and 50 - 350 m (night). Circumglobal, subtropical; likely to occur around South Africa.



73.9 *Vinciguerria powerie:* 2 cm SL (after Jespersen, 1933).

Genus ***Woodsia*** Grey, 1959

Eyes normal. Pseudobranchiae present or absent. Mouth large; premaxillary teeth uniserial; vomer at most with rudimentary teeth; palatines toothed; pterygoids, tongue toothless. Photophores: ORB 2, posterior 1 posteroventral to eye, SO present, BR 14-16; 9-11th or 12th IV photophores successively elevated; 1st OA elevated, remainder of series either level or festoon-shaped; OA ending over or near end of A base. AC level. Glandular material absent, head and body. Dorsal adipose fin short, over middle of A; A base slightly longer than D base, its origin well behind end of D base; V base slightly in advance of D origin. Anus near A origin. Two species, one in our area.

73.10 *Woodsia meyerwaardeni*
Krefft, 1973

Woodsia meyerwaardeni Krefft, 1973: 130, Figs. 1-4 (South Atlantic: 38°14′S, 01°15′E).

D 10-11; A 14-16; P 10; V 7; total GR 18-21; vertebrae 43-35; pseudobranchiae present. Photophores: ORB 2, OP 3, SO 1, BR 14-16, VAV 14-15, AC 12-14, IC 51-53; OA 31-33. Preanal part of OA series festoon-shaped.

More or less blackish; operculum coppery. Attains ca. 10 cm; adults in 300 - 1 100 m; probably reaches our area, nearest is 37°08′S, 5°23′E.

73.10 *Woodsia meyerwaardeni:* 10 cm SL (after Krefft, 1973).

Genus *Yarrella* Goode & Bean, 1896

Eyes normal. Premaxillary teeth biserial; vomer and palatines toothed, pterygoid teeth present or absent; tongue toothless. Photophores present on isthmus. Body with several rows of small photophores above the lateral and ventral rows typical of the family; ORB 1, SO present, IV, AC series level, OA always 50 or more and reaching to C base; no glandular luminous tissue; A base much longer than D base; A origin under middle or anterior of D base; V insertion well in advance of D origin. Two species, 1 possibly reaches our area.

73.11 *Yarrella blackfordi*
Goode & Bean, 1896

Yarrella blackfordi Goode & Bean, 1896: 103, Fig. 121 (Gulf of Mexico); Grey, 1960: 86, 1964: 102*; Karrer, 1973: 204; Lloris, 1982: 8.

D 14-17; A 28-31; P 8-10; V 6-7; total GR 18-22; vertebrae 53-54. Premaxilla with an outer row of evenly spaced teeth and a few smaller teeth in interspaces. Photophores small to moderate; ORB 1, OP 3, BR 11-14, IV 24-25, VAV 12, AC 24-28, IC 61-63, OA about 52-53, reaching C base.

Uniformly black; dusky pigmentation on median fins; P and V colourless; photophores reddish or bluish in preservative. Attains 33 cm. Adults in 500 - 700 m. Tropical/subtropical Atlantic, and to 18°32′S, 11°48′E.

73.11 *Yarella blackfordi:* 19.5 cm SL (after Grey, 1964).

Family No. 74: GONOSTOMATIDAE

by S. Schaefer, R.K. Johnson & J. Badcock

Bristlemouths **Borselbekke**

Head and body compressed. Premaxillary teeth uniserial (except in *Triplophos*); dentary teeth biserial anteriorly. Gill-rakers usually well developed. Scales deciduous. Dorsal adipose fin present or absent. Four bony pectoral fin radials (except *Cyclothone*). Photophores discrete, in 1 or more rows on body, present or absent on isthmus; ORB 1.

Elongate bioluminescent fishes of oceanic, mesopelagic and bathypelagic habitats found throughout the world's oceans. Six genera with about 27 species known, 6 genera and 17 species in or near our area. Grey (1960 and 1964) reviewed species of all genera except *Cyclothone;* Mukhacheva reviewed *Gonostoma* in 1972, *Cyclothone* in 1964 and 1974, *Margrethia* and *Bonapartia* in 1976, and *Diplophos* in 1978; Weitzman (1974) considered the generic and family-level classification.

KEY TO GENERA
(by S.H. Weitzman)

1a A 36-69; D origin well in advance of A origin, rear end of D opposite or a little before A origin; photophores present on isthmus; IV photophores 24-50 2
1b A 16-31; D origin not well in advance of A origin; photophores absent from isthmus; IV photophores 13-17 3

2a VAV photophores 12-17; ORB photophore below or slightly before front margin of eye; lower GR 7-10; a row of small photophores present on rear ½ of lower jaw; pseudobranchiae present; IV photophores 30-51 ..... *Diplophos*
2b VAV photophores 5-7; ORB photophore below centre of eye; lower GR 12-16; no photophores on rear ½ of lower jaw; pseudobranchiae absent; IV photophores 24-30 ..... *Triplophos*

3a D origin in advance of A origin; pseudobranchiae well developed ..... *Margrethia*
3b D origin about opposite or behind A origin; pseudobranchiae inconspicuous or absent 4

4a D and A with elongate anterior rays; body with 1 row of photophores; P rays 14-16 ..... *Bonapartia*
4b Anterior rays of D and A not elongate; body with 2 rows of photophores or photophores inconspicuous; P rays 7-13 5

5a OA photophores 11-21; SO photophores present (except in *G. bathyphilum*) 37-40 vertebrae; maxilla with a series of long, slender, subequal teeth interspaced with shorter teeth; palatine teeth in 1 row; A 20-31 ..... *Gonostoma*
5b OA photophores 6-10; SO photophores absent; 29-33 vertebrae; maxillary teeth short and subequal, posteriorly increasing in length where they either remain subequal or form a repeat series of an elongate slender tooth followed by a series of smaller subequal conical teeth; palatine teeth in an anterior patch; A 16-21 ..... *Cyclothone*

Genus ***Bonapartia*** Goode & Bean, 1896

Monotypic.

74.1 *Bonapartia pedaliota*
Goode & Bean, 1896

Bonapartia pedaliota Goode & Bean, 1896: 102 (25°20'N, 79°58'W); Jespersen & Tåning, 1919: 221*; Grey, 1964: 193*; Karrer, 1975: 68; Mukhacheva, 1976: 74.

D 16-20; A 28-31; P 14-16; V 7-9; branchiostegal rays 15-17; GR 16-18; vertebrae 36-38. Pseudobranchiae ill-defined, 4-5. Mouth large, oblique, premaxilla and maxilla with long teeth separated by series of small, subequal teeth; vomer, palatines, pterygoids toothed; tongue toothless. Photophores conspicuous; isthmus and OA series absent, SO present: ORB 1, OP 3, SO 1, BR 11-13, IV 14-15, VAV 5-6, AC 16-18+1-3=18-21, IC 37- 41. Scales present. Last D and A rays not split to base; A origin in advance of D origin; anterior rays of median fins elongate. Anus nearer to A than V origin; V well in advance of D origin. Dorsal adipose fin absent.

Silvery operculum and peritoneum; tail translucent ventrally; D and C rays pigmented. Maximum size ca. 75 mm. Oceanic, mesopelagic, non-migrant, in 100 - 700 m. Subtropical/tropical Atlantic, Gulf of Mexico, Indian Ocean; reported from 19°03'S, 11°27'E by Karrer (1975).

74.1 *Bonapartia pedaliota*: (after Badcock, 1984).

Genus ***Cyclothone*** Goode & Bean, 1883

Pseudobranchiae absent; gill filaments either free or fused basally in broad segment shape along hypobranchial. Scales present or absent. Maxillary teeth close-set, subequal, increasing in size posteriorly. Vomer with or without teeth. Photophores present or absent, SO and isthmus series always absent; when present, OP 2. Precaudal glands and opercular streak (between OP photophores) strongly to weakly developed, or absent. Dorsal adipose fin absent. Last D and A rays not split to base; D and A origins about opposite. Anus nearer to V than A origin, or midway between.

Among the most abundant of all oceanic fishes. Twelve species, 6 in our area; *C. livida* Brauer, 1902 (**SFSA No. 148**), probably occurs within northern Atlantic part of our area and is included in the key. *C. obscura* Brauer, 1902 (**SFSA No. 150**), is limited (in the Atlantic) to tropical waters (Badcock, 1982: 207) and apparently does not enter our area (it is unique among species of *Cyclothone* in lacking photophores).

KEY TO SPECIES
(adapted from Kobayashi, 1973, and Badcock, 1982)

1a One GR in angle of 1st gill arch; snout pigment absent or inconspicuous; total GR 14 ..... *C. alba*
1b Two GR at angle of 1st gill arch; snout pigment conspicuous (around nares only or conspicuous and diffuse over entire snout region); total GR 15-27 2

2a Branchiostegal membrane with pigment conspicuously concentrated over rays and along margins; snout pigment conspicuous around nares only; total GR 15-20 (rarely 20) 3
2b Branchiostegal membrane with pigment uniform or not heavily concentrated over rays and along margins; snout pigment diffuse throughout snout region; total GR 23-27 (except 19-22 in *C. microdon*) 4

3a Lateral photophores fewer than 8; ventral photophores between V and end of A fewer than 16; total GR 15-18; GR of 1st hypobranchial 3 ..... *C. braueri*
3b Lateral photophores 8 or 9; ventral photophores 16 or more (very rarely (1%) 15); total GR 18-20; GR on 1st hypobranchial 4 ..... *C. pseudopallida*

4a Posterior series of maxillary teeth sharply curved forward, enlarging uniformly caudad, without small intermediate teeth; lateral photophores 9 or 10 (rarely (2%) 8) ..... *C. acclinidens*
4b Posterior series of maxillary teeth slightly curved forward, enlarging caudad but with long teeth separated by smaller teeth; lateral photophores fewer than 9 (88% or more of all specimens of the 3 species listed below) 5

5a Total GR 19-22; gill filaments fused basally in broad segment shape along hypobranchial; 3 (rarely 4) VAV photophores anterior to genital pore ..... *C. microdon*
5b Total GR 23-27; gill filaments not fused in broad segment shape along hypobranchial. Two (rarely 3 in *C. pallida*) VAV photophores anterior to genital pore 6

6a Mesopterygoid (= "entopterygoid") teeth not confined to an anterior cluster but extending posteriorly in an irregular row; scale pockets inconspicuous; anus at or posterior to point ⅓ distance from V insertion to A origin ..... *C. pallida*
6b Mesopterygoid teeth confined to an anterior cluster; scale pockets conspicuous; anus less than ⅓ distance from V to A origins ..... *C. livida* Brauer, 1902 (Pseudoceanic; restricted to tropical/subtropical eastern Atlantic, may enter northern waters of our area)

74.2 *Cyclothone acclinidens*
Garman, 1899

Cyclothone acclinidens Garman, 1899: 247; Pl. J, Fig. 4 (mostly NW* Atlantic); Smith, **SFSA No. 147;** Kobayashi, 1973: 167; Mukhacheva, 1964: 117*; 1974: 210; 1980: 134. *Cyclothone pseudoacclinidens* Quero, 1974: 449, Fig. 1 (46°07'N, 4°16'W).

D 13-15; A 18-20; P 8-10; V 5-6; branchiostegal rays 13-15; total GR 20-26, none in epi-ceratobranchial articulation; vertebrae 30-32. Gill filaments free. Pyloric caeca 3. Anus midway between V bases and A origin or nearer V bases. Scales present. Premaxillary teeth even. Posterior maxillary teeth strongly inclined forward and lacking small intermediate

teeth. Vomer toothed. Photophores: ORB 1, OP 2, BR 9-11, IV 12-14, VAV 4-5, AC 14-17, IC 31-34, OA 8-9. Two AC between last A and 1st procurrent C rays. Supracaudal gland massive, distinctly extending to D base. Opercular gland conspicuous.

Variably light to dark brown or grey-brown; branchiostegal membrane diffusely pigmented. Attains ca. 65 mm. Oceanic, juveniles and adults mainly between 500 - 1 000 m. Tropical/subtropical in all 3 major oceans; known from 22°-28°S, 25°-30°W and off Cape Point.

74.2 *Cyclothone acclinidens:* (after Badcock, 1984).

74.3 *Cyclothone alba*
Brauer, 1906

Cyclothone signata var. *alba* Brauer, 1906: 80, Fig. 30 (Atlantic and Indian oceans). *Cyclothone alba* Mukhacheva, 1963: 101; 1964: 95*; 1974: 192; Kobayashi, 1973: 110.

D 12-15; A 17-20; P 9-10; V 6-7; branchiostegal rays 11- 13; total GR 13-14; 1 in epi-ceratobranchial articulation; vertebrae 31-32. Gill filaments fused. Pyloric caeca 4. Anus very close to V bases. Scales lacking. Premaxillary teeth even. Posterior maxillary teeth with longer teeth separated by smaller teeth; vomer toothless. Photophores: ORB 1, OP 2, BR 8-9, IV 13, VAV 3-4, AC 12, IC 27-30, OA 6. Usually 1 AC between last A ray and 1st procurrent C ray. Opercular and precaudal glands inconspicuous.

Off-white with few melanophores: brown pigment conspicuous between A pterygiophores; branchiostegal membrane pigment discrete, as prominent streaks basal to BR, along medial free edge and over branchiostegal rays. Attains ca. 40 mm. Juveniles and adults in 300 - 600 m. All 3 major oceans; off Saldanha, South Africa.

74.3 *Cyclothone alba:* (after Badcock, 1984).

74.4 *Cyclothone braueri*
Jespersen & Tåning, 1926

Cyclothone braueri Jespersen & Tåning, 1926: 7, Figs. 4, 6, 7 (Mediterranean); Mukhacheva, 1964: 101*; 1974: 196; Kobayashi, 1973: 134. *Cyclothone signata:* Smith, **SFSA No. 146.**

D 13-15; A 18-20; P 9-10; V 6-7; branchiostegal rays 12-14; total GR 15-18, none in epi-ceratobranchial articulation; vertebrae 30-32. Gill filaments fused. Pyloric caeca 3. Anus very close to V bases. Scales absent. Premaxillary teeth even; posterior maxillary series with longer teeth separated by smaller teeth; vomer toothed. Photophores: ORB 1, OP 2, BR 8-10, IV 12- 13, VAV 4, AC 13-15, IC 29-31, OA 6-7.

Off-white, with stellate melanophores confined mainly dorsally; brown pigment conspicuous between A pterygiophores; branchiostegal membrane pigment similar to *C. alba,* but often with additional stellate melanophore between posterior branchiostegal rays. Attains ca. 38 mm. Adults mainly in 200 - 900 m; Mediterranean, Atlantic, Indian and southwestern Pacific oceans; known from about 24°45′S along South African coast to 5°14′W.

74.4 *Cyclothone braueri:* (after Badcock, 1984).

74.5 *Cyclothone microdon*
(Günther, 1878)

Cyclothone microdon Günther, 1878: 21, 187 (locality not given); Smith, **SFSA No. 149*;** Mukhacheva, 1964: 111*; 1974: 214; Kobayashi, 1973: 215.

D 13-15; A 17-20; P 9-10; V 5-6; branchiostegal rays 12-15; total GR 19-23, none in epi-ceratobranchial articulation; vertebrae 31-33. Gill filaments fused. Pyloric caeca 3. Anus closer to V bases than to A origin. Scales present. Premaxillary teeth even; posterior maxillary series with longer teeth separated by smaller teeth; vomer toothed. Photophores: ORB 1, OP 2, BR 9-11, IV 12-14, VAV 5, AC 14-15, IC 31-33, OA 8- 9. One AC between last A ray and 1st procurrent C ray. Opercular and precaudal glands moderately developed.

Uniformly brown to brown-black; dense stellate pigment over head, body and fins; branchiostegal membrane, mouth and gill arches uniformly pigmented. Attains ca. 65 mm. Juveniles and adults in 200 - 2 700 m in all 3 major oceans; offshore, 22°-45°S and inshore from Saldanha to Mossel Bay.

74.5 *Cyclothone microdon:* (after Badcock, 1984).

74.6 *Cyclothone pallida*
Brauer, 1902

Cyclothone pallida Brauer, 1902: 281 (Atlantic and Indian oceans); Mukhacheva, 1964: 107*; 1974: 206; Kobayashi, 1973: 203; Badcock, 1982: 197.

D 12-15; A 16-19; P 9-11; V 6-7; branchiostegal rays 13-15; total GR 22-27, none in epi-ceratobranchial articulation; vertebrae 31-33. Gill filaments free. Pyloric caeca 4. Anus closer to V bases than A origin. Scales present. Premaxillary teeth uneven, with at least 1 tooth, usually the 4th, greatly enlarged; posterior maxillary series with longer teeth separated by smaller teeth; vomer toothed. Photophores: ORB 1, OP 2, BR 9- 11, 1V 12-14, VAV 5, AC 14-15, IC 32-34, OA 8-10. Two to 3 AC between last A ray and 1st procurrent C ray; precaudal and opercular glands moderately developed.

Light to dark brown; areas immediately anterior to A and D origins usually transparent or only slightly pigmented; median fin rays and internasal area pigmented; meningeal pigment extending to level of rear margin of eye; branchiostegal membrane pigment diffuse. Attains ca. 75 mm. Juveniles and adults mainly in 400 - 1 000 m. In all 3 major oceans; known from 22°-40°S, 25°-40°W.

74.6 *Cyclothone pallida:* (after Badcock, 1984).

74.7 *Cyclothone pseudopallida*
Mukhacheva, 1964

Cyclothone pseudopallida Mukhacheva, 1964: 104, 110, Fig. 7a (off Japan); Kobayashi, 1973: 146; Mukhacheva, 1974: 273.

D 12-15; A 17-21; P 9-10; V 6-7; branchiostegal rays 13-15; total GR 18-21, none in epi-ceratobranchial articulation; vertebrae 30-33. Gill filaments fused. Pyloric caeca 4. Anus very close to V bases. Scales present. Premaxillary teeth even; posterior maxillary series with longer teeth separated by smaller teeth; vomer toothed. Photophores: ORB 1, OP 2, BR 9-11, IV 13, VAV 5, AC 14-15, IC 31-34, OA 8-9. One (rarely 2) AC between last A ray and 1st procurrent C ray; precaudal glands weakly developed; opercular glands inconspicuous.

Light to dark brown; chromatophores only on upper portion of head and upper ⅔ of body, relatively clear areas anterior to D and A. Brown pigment conspicuous between A pterygiophores; branchiostegal membrane pigment similar to *C. alba,* but with scattering of punctate melanophores between posterior branchiostegal rays. Attains ca. 58 mm. Juveniles and adults in 300 - 900 m in all 3 major oceans; off Cape Agulhas, 40°-45°S.

74.7 *Cyclothone pseudopallida:* (after Badcock, 1984).

Genus ***Diplophos*** Günther, 1873

Pseudobranchiae present. Scales present. Edge of premaxilla straight, about as long as toothed portion of maxilla; vomer, palatines, pterygoids toothed; tongue with or without teeth. Photophores present on isthmus; SO present, somewhat behind dentary symphysis; ORB 1, OP 3; additional head photophores above maxilla and along dentary; OA extending well over A; additional rows of small secondary photophores above OA, of which 3rd row is always along LL leading onto C; 1-2 nonserial pre-P primary photophores. Dorsal adipose fin absent. Anus close to A origin. Four species, 3 known to occur off southern Africa. Osteology and relationships treated by Fink and Weitzman (1982).

KEY TO SPECIES

1a A 36-41; vertebrae 63-66; VAV photophores 12-14 ..... *D. maderensis*
1b A 47 or more; vertebrae 74 or more; VAV photophores 14-17 2

2a A 47-53; vertebrae 77; 1V photophores 31-35 ..... *D. rebainsi*
2b A 57-69; vertebrae 92-98; 1V photophores 40-51 ..... *D. taenia*

74.8 *Diplophos maderensis*
(Johnson, 1890)

Gonostoma maderense Johnson, 1890: 458 (Madeira). *Diplophos maderensis:* Grey, 1960: 75; 1964: 96*; Johnson, 1970: 442; Mukhacheva, 1978: 22.

D 11-13; A 36-41; P 9-11; V 8; branchiostegal rays 13; GR, 1st arch, 12-14; vertebrae 63-66. Tongue toothed anteriorly. Photophores: ORB 1, OP 3, SO 1, BR 8-9, IV 29-33, VAV 12-14, AC 28-30, OA 45-48. Several photophores in series on lateral surface of dentary; 1 non-serial pre-P primary photophore; cluster of minute photophores anterior to SO; interspace between last 2 AC about equal to or slightly less than preceding interspace. D origin nearer C base than snout.

Colour: similar to *D. taenia* except fin rays finely speckled. Maximum size: ca. 22 cm. Mesopelagic, juveniles and adults in 400 - 800 m by day; near surface at night. Tropical Atlantic endemic; known off southern Africa, ca. 19°S, 5°W.

74.8 *Diplophos maderensis:* 11.5 cm (after Fink & Weitzman, 1982).

74.9 *Diplophos rebainsi*
Krefft & Parin, 1972

Diplophos rebainsi Krefft & Parin, 1972: 94, Fig. 1 (43°00′S, 26°37′W); Mukhacheva, 1978: 24.

D 11-13; A 47-53; P 9; V 8-9; branchiostegal rays 10-11; total GR 12-13; vertebrae 74-77. Vomer with 1-2 teeth on each side; 5-9 palatine teeth in single row; 2 small hooked teeth on anterior portion of tongue. Photophores: ORB 1 (below front margin of eye), OP 3, SO 1, BR 7-8, IV 31-35, VAV 15-17, AC 32-34, IC 80-83, OA 60-63. Single photophore on lateral surface of dentary; 1 pre-P nonserial primary photophore. No minute photophores anterior to SO; interspace between last 2 AC about equal to preceding interspace. D origin nearer C base than snout.

Head grey to black-brown; sides of body pale yellow with darker dotted pigmentation; fins colourless except that C has several transverse rows of melanophores, and D has light pigmentation. Attains 25 cm. Postlarvae and juveniles near surface at night; adults from 100 - 2 000 m in southern Atlantic and southeastern Pacific oceans; off southwestern Cape coast, approximately 36°-40°S, 8°E-10°W.

74.9 *Diplophos rebainsi:* 23.5 cm (after Krefft & Parin, 1972).

74.10 *Diplophos taenia*
Günther, 1873

Diplophos taenia Günther, 1873: 104 (22°N, 30°W and 30°S, 24°W); Smith, **SFSA No. 154*;** Grey, 1964: 89*; Grindley & Penrith; 1965: 282; Johnson, 1970: 441; Johnson & Barnett, 1975: 284; Mukhacheva, 1978: 13.

D 9-12; A 57-69; P 8-10; V 7-9; branchiostegal rays 12-15; total GR 10-12; vertebrae 92-98. Palatines with single row of 6-9 small teeth, no teeth on tongue. Photophores: ORB 1, OP 3, SO 1, BR 10-13, IV 40-51, VAV 14-17, AC 42-51, IC 99-113, OA 66-77. Several photophores in series on lateral surface of dentary, 2 pre-P nonserial primary photophores; 2 small photophores anterior to SO; interspace between last 2 AC considerably less than preceding interspace. D origin nearer snout than C base.

Dorsum black-brown, flanks silver; fins colourless; inside of mouth and gill covers dusky, jaws transparent posteriorly. Attains more than 20 cm. Juveniles and adults in 300 - 800 m by day and near surface at night in all 3 major oceans; all around our coast.

Genus ***Gonostoma*** Rafinesque, 1810

Pseudobranchiae weakly developed when present. Dorsal adipose fin present or absent. Maxillary with long teeth separated by series of small teeth; palatines, pterygoids toothed; tongue with or without teeth. Scales deciduous when present. Body with lengthwise rows of serial photophores. Photophores: absent on isthmus; SO and OA present; OP 2-3; minute secondary photophores sometimes present. Supracaudal and infracaudal glands present. A origin opposite or slightly in advance of D. Anus nearer to A than V; V insertion well in advance of D origin. Seven species, 4 from our region.

KEY TO SPECIES

1a Photophores minute, obscure; ORB, OP and SO usually obsolete in adults; OA irregularly arranged, some rather high on sides; a few posterior pterygoid teeth much enlarged; A 21-24; GR (15-17)+(9-11) = 24-28; IV 11-13 ..... *G. bathyphilum*

1b Photophores obvious, if not always conspicuous; ORB and OP relatively well developed, a glandular mass present below OP; OA mostly on a single level low on sides, only the 1st 1 or 2 elevated; pterygoid teeth all small or a few posterior ones slightly enlarged; A 27-31; GR (10-12)+(5-9) = 15-21; IV 14-16 2

2a Body and head with numerous minute photophores (not always evident); each SO and ORB surrounded by mass glandular tissue; GR (10-12)+(7-9) = 18-21; tail about equal to head and trunk; interspace teeth in jaws not close-set ..... *G. elongatum*

2b No minute photophores on body and head; a small silvery reflector behind ORB but SO and ORB without mass glandular tissue; GR (10-11) + (5-7) = 15-18; tail shorter than head and trunk, interspace teeth on maxilla subequal and close-set 3

3a Adipose fin present, vomer edentate, 1st 2 AC above and 2nd 2 AC below remaining AC; GR usually 10+5 = 15 ..... *G. denudatum*

3b Adipose fin absent, vomer with teeth, 1st 1-2 AC slightly elevated, the rest level; GR 11+(5-6) = 16-17 ..... *G. atlanticum*

74.11 *Gonostoma atlanticum*
Norman, 1930

Gonostoma denudatum atlanticum Norman, 1930: 282 (8°12′N, 18°49′W to 0°56′S, 14°08.5′W). *Gonostoma atlanticum:* Grey, 1960: 105; 1964: 166*; Mukhacheva, 1972: 208.

D 16-18; A 27-31; P 9-11; V 6-8; branchiostegal rays 14, 6 with very short spines at bases; total GR 17-18, vertebrae 38-39. Pseudobranchiae with 2-3 filaments. Minute teeth on tongue, confined to posterior part. Photophores of moderate size: ORB, SO and OA lacking associated glandular material. ORB 1, OP 3, SO minute, BR 9, IV 15-16, VAV 4-5, AV 18-20, IC 39-40, OA 13-14. First 2 AC elevated, remainder on level; 2 AC between last A ray and 1st procurrent C ray. First OA elevated, remainder level, low on body. Two supracaudal, 1 infracaudal glands.

74.10 *Diplophos taenia:* 8.5 cm SL (after Fink & Weitzman, 1982).

Dorsum dark; silvery finish on translucent flanks; oral cavity and inner surface of gill covers pale; fin rays colourless; black pigment at base of each D and A ray. Attains 6-7 cm. Juveniles and adults in 300 - 500 m (day) and 50 - 200 m (night) in tropical/subtropical waters of all oceans; 25°26′S, 38°11′E and 39° 01′S, 20°04′E in our region.

74.11 *Gonostoma atlanticum:* 6.5 cm SL (after Grey, 1964).

74.12 *Gonostoma bathyphilum*
(Vaillant, 1886)

Neostoma bathyphilum Vaillant, 1886: 96, Pl. 7, Fig. 1, 1a (Gulf of Gascony). *Gonostoma bathyphilum:* Smith, **SFSA No. 151*;** Grey, 1964: 180*; Mukhacheva, 1972: 233; Hulley, 1972: 206.

D 11-15; A 22-26; P 10-14; V 7-9; branchiostegal rays 12- 13; total GR 24-28; vertebrae 37-40. No pseudobranchiae. Tongue toothless. Photophores extremely small, sometimes obsolete; glandular tissue associated with ORB, SO, OA; ORB 1, OP 3, SO 1; BR 9-11, IV 11-13, VAV 4-5, AC 18-22, IC 35-38, OA 14-16. No AC photophores greatly elevated; 3-5 AC between last A ray and 1st procurrent C ray; OA irregularly arranged, majority close to midline; 1-2 supracaudal, 1 infracaudal glands; white glandular mass in skin fold above upper jaw posteriorly.

Black, faded in alcohol to light brown, head and abdomen black. Attains ca. 20 cm. Juveniles and adults in 700 - 2 700 m in temperate/subtropical Atlantic and Pacific oceans; off Cape Point, and from 33°41′S, 05°54′E.

74.12 *Gonostoma bathyphilum:* 14.5 cm SL (after Goode & Bean, 1896).

74.13 *Gonostoma denudatum*
Rafinesque, 1810

Gonostoma denudata Rafinesque, 1810: 65. *Gonostoma denudatum:* Brauer, 1906: 9; Jespersen & Tåning, 1926: 4; Norman, 1930: 282.

D 14-15; A 28-31; P 11-12; V 8; branchiostegal rays 14; total GR 15-16; vertebrae 39. Pseudobranchiae 6-7. Minute teeth present, in longitudinal serrate series, on tongue (basibranchials 1+2). Photophores large; ORB, SO, OA lacking associated glandular areas: ORB 1, OP 3, SO 1, BR 9 (10), IV 16; VAV 5 (6), AC (19) 20; IC (40) 41, OA 13. First 2 AC above, 3rd and 4th below, remaining AC photophores; 3-4 AC between last A ray and 1st procurrent C ray. First OA elevated, remainder level, low on body. One supracaudal, 2 infracaudal glands. Dorsal adipose fin present.

Flanks silver, dorsum dark; distinctive gular pigment patch. Maximum size ca. 14 cm. Pseudoceanic, mesopelagic, juveniles and adults in 400 - 700 m by day, 100 - 200 m by night. Temperate/subtropical Atlantic (mainly eastern side); Mediterranean; off southern Africa, extending from Atlantic slopes area to ca. 8°W, southern limit ca. 37°S.

74.13 *Gonostoma denudatum:* (after Badcock, 1984).

74.14 *Gonostoma elongatum*
Günther, 1878

Gonostoma elongatum Günther, 1878: 187 (New Guinea); Grey, 1964: 171*; Grindley & Penrith, 1965: 282; Hulley, 1972: 206; Mukhacheva, 1972: 214.

D 12-15; A 28-32; P 10-13; V 7-8; branchiostegal rays 12-14, total GR 18-21; vertebrae 39-41. Pseudobranchiae with 1-5 filaments. Tongue toothless. Photophores: glandular tissue associated with ORB, SO, OA; ORB 1, SO 1, OP 3, BR 8-9, IV 15-16, VAV 4-6, AC 21-23, IC 41-43, OA 13-15; 2nd and 3rd AC greatly elevated, 2nd usually higher; 4th-6th AC lower than 7th, remainder level; 1-2 AC between last A ray and 1st procurrent C ray; 1st 2 OA elevated, remainder level, low on body; 1-2 supracaudal, 1 infracaudal glands. Dorsal adipose fin present.

Black, slightly silver laterally; fins dusky and with minute black spots; distal portion of P and V colourless. Attains 275 mm. Juveniles and adults in 500 - 1 200 m (day), 50 - 400 m (night) in all 3 major oceans; off Saldanha and from 19°13′-40°S, 10°E-13°W.

74.14 *Gonostoma elongatum:* 15 cm (after Grey, 1964).

Genus ***Margrethia*** Jespersen & Tåning, 1919

Mouth large, oblique; premaxillary, maxillary teeth moderate with longer teeth separated by smaller teeth. Vomer, palatines, pterygoids, tongue toothed. Photophores conspicuous, isthmus and OA series plus SO all absent. Anterior rays of D and A elongate; anus close to A origin; V slightly anterior to D origin; dorsal adipose fin present. Two species, both from our area.

KEY TO SPECIES

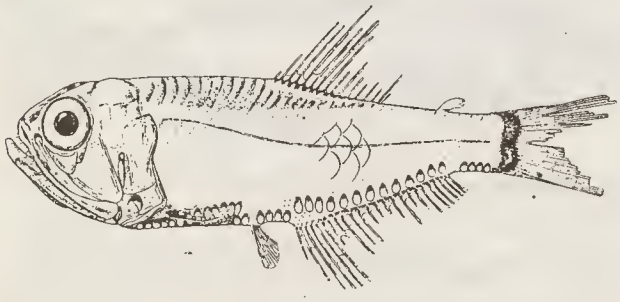
1a All photophores of anterior AC group over A base; last 2 IV displaced ventrally ..... *M. obtusirostra*
1b Ultimate photophores of anterior AC series posterior to base of last A ray; IV series straight ..... *M. valentinae*

74.15 *Margrethia obtusirostra*
Jespersen & Tåning, 1919

Margrethia obtusirostra Jespersen & Tåning, 1919: 222, Pl. 17, Figs. 11 and 12 (20°26′N, 61°03′W); Grey, 1964: 200*; Grindley & Penrith, 1965: 282; Mukhacheva, 1976: 81 (in part).

D 15-16; A 21-26; P 14-16; V 7-8; branchiostegal rays 16; total GR 14-16; vertebrae 33-34. Photophores: large and conspicuous, ORB 1, OP 3, BR 10-13, IV 13-16, VAV 4, AC 16-17, last 2 IV displaced ventrally; all photophores of anterior AC group over A base.

Yellowish, darker dorsally, opercle silver, C base and peduncle dark brown, P and V colourless. Attains 8-9 cm. Juveniles and adults in 100 - 600 m in all 3 major oceans, known from 25°26′S, 38°11′E and off Cape Agulhas.



74.15 *Margrethia obtusirostra:* 4.5 cm (after Grey, 1964).

74.16 *Margrethia valentinae*
Parin, 1982

Margrethia valentinae Parin, 1982: 70 (30°29′S, 88°44′E). *Margrethia obtusirostra* (*non* Jespersen & Tåning): Mukhacheva, 1976: 81 (in part).

D 15; A 24-25; P 15; V 8; total GR 14; photophores conspicuous: ORB 1, OP 3, BR 12, IV 15, VAV 4, AC 14+3, IC 36. IV straight, no photophores elevated. Ultimate photophore of anterior AC series posterior to last A ray base.

Attains 72 mm. Oceanic, mesopelagic. All 3 major oceans, probably part of circumglobal Subtropical Convergence fauna; off South Africa (ca. 37°S, 20°E-20°W).

Genus *Triplophos* Brauer, 1902

Monotypic

74.17 *Triplophos hemingi*
(McArdle, 1901)

Photichthys hemingi McArdle, 1901: 521 (Bay of Bengal). *Triplophos hemingi:* Grey, 1964: 107*; Karrer, 1973: 206; Lloris, 1982: 8.

D 10-12; A 53-67; P 9-11; V 6-7; branchiostegal rays 11-14 with no spines at their bases; total GR 23-25; vertebrae ca. 60. Pseudobranchiae absent. Premaxillary teeth biserial; edge of premaxilla straight, much longer than toothed part of maxilla. Vomer toothless or with 1 small tooth on each side; palatines toothed, pterygoids and tongue toothless. Photophores present on isthmus: ORB 1, OP 3, SO 1, BR 8-13, IV 24-30, VAV 5-7, AC 35-41, IC 68-76, OA 50-56; additional head photophores as series over premaxilla and single photophore above maxilla; OA extending well over A; additional rows of small photophores above OA. Dorsal adipose fin absent. D origin nearer snout than C base, well in advance of A origin; anus close to A origin. Scales present.

Yellowish-brown, black on head and abdomen, fins colourless, inside of mouth and gill covers black. Attains ca. 36 cm. From 200 - 800 m in tropical waters of all oceans; in eastern Atlantic to 18°S.

74.17 *Triplophos hemingi:* 13 cm SL (after Grey, 1964).

Family No. 75: STERNOPTYCHIDAE

by S.H. Weitzman

(Genera *Argyropelecus, Polyipnus* & *Sternoptyx* by R.C. Baird)

Hatchetfishes **Bylvisse**

Elongate to deep-bodied bioluminescent fishes, primarily of mesopelagic but some of bathypelagic habitat, found in all major oceans (*Argyripnus* may be benthic). Key under Stomiiformes gives distinguishing characteristics. Ten genera with a total of about 45 known species. Species of 3 deep-bodied hatchetfish genera reviewed by Baird (1971), Baird & Eckardt (1972), Borodulina (1978, 1979), and Badcock & Baird (1980). Slender species reviewed by Grey (1960, 1964). Northeastern Atlantic species reviewed by Badcock (1984). Ahlstrom (1973) reviewed sternoptychid patterns of metamorphosis. Osteology and relationships studied by Weitzman (1974); he assigns to the Sternoptychidae several genera previously included in the family Gonostomatidae. These include at least 2 non-hatchetfish genera that may be found in our area (i.e. *Maurolicus* and *Valenciennellus*). In the following key, genera in square brackets are not known from our area.

KEY TO GENERA

1a AC photophores comprised of single light organs more or less evenly spaced in series and of 2 organs clumped to form a compound organ also evenly spaced among other single and/or double organs; D origin well posterior to A origin 2

1b AC photophores sometimes comprised of evenly spaced single organs and always with clusters of at least 3-4 (or more in some genera) photophores in series and forming bands of compound organs surrounded by black or silvery skin; D origin in advance of or only slightly posterior to A origin 3

2a AC photophores immediately dorsal to A base in a series of 9-12 more or less equally spaced separate organs or in clusters of 2 organs each; A origin nearer to snout tip than to C base; distance from V origin to a vertical at tip of P much less than greatest body depth; D rays 9-12 ..... [*Thorophos*]

2b AC photophores immediately dorsal to A base in a series of 3-4 more or less evenly spaced separate organs or clusters of 2 organs each; A origin equidistant from snout tip and C base or nearer to C base; distance from V origin to tip of P equal to or greater than greatest body depth; D rays 13-17 ..... [*Araiophos*]

3a OA (lateral series) photophores 9 (rarely 10); SO (mental, i.e. symphysial lower jaw) photophores present; 3 cartilaginous V radials ..... *Maurolicus*

3b OA photophores 3-8; SO photophores absent; 6 cartilaginous V radials 4

4a Body relatively slender, greatest depth about 3.7 or more in SL; preopercular spines absent; external pelvic girdle spines absent; abdominal region not keeled 5

4b Body relatively deep, greatest depth 0.8-2.0 in SL; preopercular spines present; external pelvic girdle spines present; abdominal region keeled with specialised stiff scales or with a membranous keel ..... Tribe Sternoptychini (Genera *Argyropelecus, Polyipnus* & *Sternoptyx* see below)

5a A fin continuous, rays evenly spaced; AC photophores single and also arranged in clusters of no more than 4 light organs; bases of anterior 2-3 A rays with no AC photophores; adipose fin base about equal to or longer than horizontal eye diameter; D 6-7 6

5b A fin interrupted, with appearance of 2 separate fins; AC photophores arranged in serial clusters of 5 to many light organs; bases of anterior 2-3 A rays with AC photophores dorsal to them; adipose fin either absent or its base shorter than horizontal eye diameter; D 9-12 7

6a D anterior to midlength of body and well anterior to A origin; most AC photophores single, not clustered except for anterior and posterior organ groups of this series; adipose fin base much longer than horizontal eye diameter and about equal to or longer than head length ..... [*Danaphos*]

6b D about in midlength of body, over A origin; AC photophores clustered in 2-4 groups (occasionally a single organ present) evenly spaced with other groups; adipose fin base less than horizontal eye diameter ..... *Valenciennellus*

7a VAV and anterior group of several AC photophores forming a continuous serial group of 18-28 organs; D rays 10-14; D origin anterior to A origin; adipose fin present ..... [*Argyripnus*]

7b VAV and anterior group of 1 or 2 AC photophores forming a continuous serial group of 7-8 organs; D rays 8-9; D origin posterior to A origin; adipose fin absent (all known specimens so damaged that absence of this fin not a certainty) ..... [*Sonoda*]

Genus ***Maurolicus*** Cocco, 1838

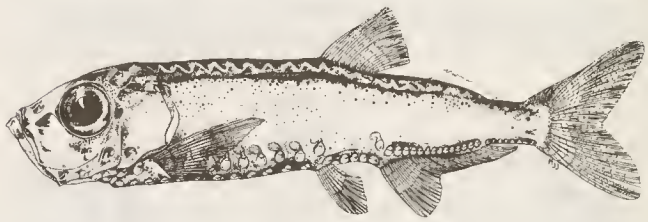
Mesopelagic, 1 species known.

75.1 *Maurolicus muelleri* (Gmelin, 1788)

Salmo Mülleri Gmelin, 1788: 1378 (Sondmör, Norway). *Maurolicus pennanti* (*non* Walbaum): Barnard, 1925: 151. *Maurolicus muelleri:* Smith, **SFSA No. 155*;** Grey, 1964: 226; Grindley & Penrith, 1965: 282.

D 10-11; A 19-23; P 17-19; V 6-7 (usually 7); GR (17-21)+(4-7). Depth 4.7-3.9; head 3.0-3.6.

Colour in life brilliant silvery with greenish blue back. Attains about 6 cm. In all oceans, more common in colder regions. Sometimes found on surface or thrown up on beaches after storms. A common species of some commercial importance.



75.1 *Maurolicus muelleri:* 4.5 cm SL (after Weitzman, 1974).

Genus ***Valenciennellus*** Jordan & Evermann, 1896

Mesopelagic, 1 species known.

75.2 *Valenciennellus tripunctulatus* (Esmark, 1871)

Maurolicus tripunctulatus Esmark, 1871: 489 (Madagascar). *Valenciennellus tripunctulatus:* Grey, 1964: 219; Grindley & Penrith, 1965: 282; Hulley, 1972: 204.

D 7; A 24-25; P 16; V 6-7; GR 12+2. Depth 4.0-4.7; head 3.5-3.7.

Colour in life silvery by day, apparently considerably darkened at night. Attains about 35 mm. In all oceans, tropical, subtropical and temperate waters.

75.2 *Valencienellus tripunctulatus:* 2.5 cm SL (after Weitzman, 1974).

Tribe **Sternoptychini**

by R.C. Baird

Hatchetfishes — Bylvisse

Small (<12 cm) silvery coloured fishes with rigid, deep, strongly compressed body. Bony scale-like plates form keel below ventral photophores (light organs). Pelvic fin support bones (basipterygia) joined vertically, fins lying in vertical plane. Dorsal pterygiophores (not dorsal fin spines) extend beyond body margin forming blade or spine-like projection anterior to dorsal fin rays. Prominent spines on preopercle (posterior to jaw) and on lower body margin. Light organs in distinct paired groups, characteristically 10-12 photophores in the major abdominal group, 6 in lower jaw or branchiostegal group and 4 in tail or subcaudal group.

Deep-sea pelagic fishes; juveniles and larvae generally found deeper than 150 m; adults mesopelagic, usually below 200 m, rarely in surface waters. Common in all oceans including Mediterranean Sea; nowhere abundant or commercially important. Three genera with about 31 species; 12 species of hatchetfishes proper can be expected to occur in our area.

KEY TO GENERA

1a Abdominal photophores 12; eyes telescopic, dorsally oriented; several pterygiophores form extensive blade anterior to D ..... *Argyropelecus*

1b Abdominal photophores 10; eyes normal; dorsal blade consisting of only 1 or 2 spines from a single or 2 fused pterygiophores 2

2a Anal photophores 6 or greater; a lateral photophore; dorsal blade reduced; no large transparent membrane above A rays ..... *Polyipnus*

2b Anal photophores 3; no lateral photophore; single large D spine with anterior serrate margin; A support elements greatly enlarged, with triangulate transparent membrane above fin rays ..... *Sternoptyx*

Genus ***Argyropelecus*** Cocco, 1829

Seven species; 4 in our area and 1 probably occurs rarely.

KEY TO SPECIES

1a Supra-abdominal, preanal, anal and subcaudal photophores in a nearly continuous straight line; distinct gap between each subcaudal photophore 3

1b Supra-abdominal, preanal, anal and subcaudal photophores not in a continuous straight line; subcaudal photophores in a continuous group set off from last anal photophore 2

2a A single, posteriorly directed, serrate, postabdominal spine; D rays 8; trunk and caudal region elongate ... *A. hemigymnus*

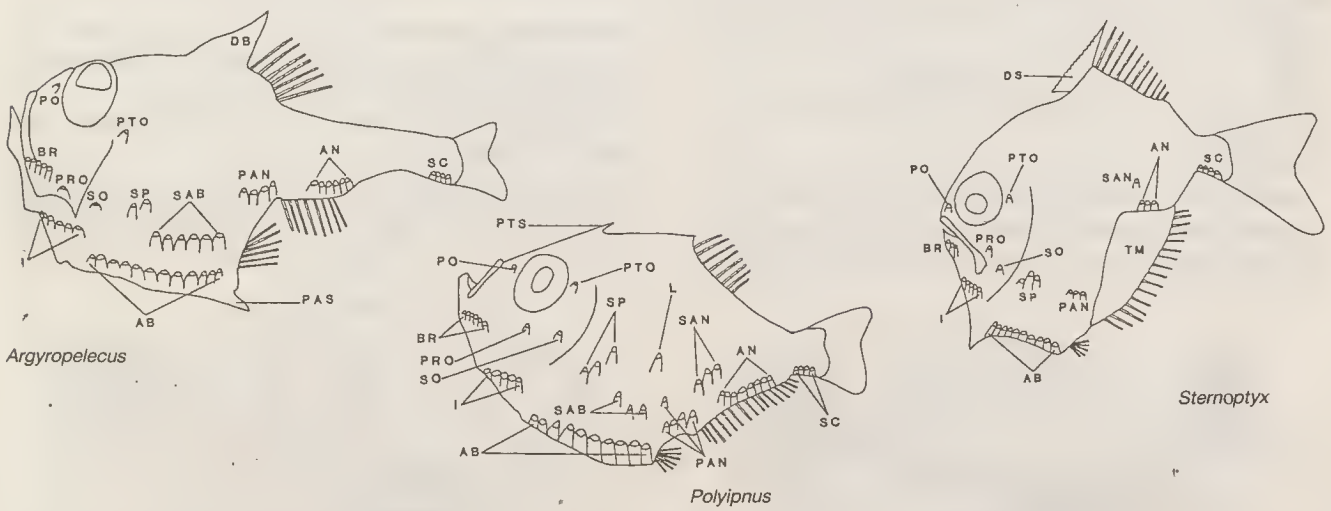
2b Two separate postabdominal spines; D rays 9 4

3a Dorsal blade height less than ⅓ its length; body margin not markedly raised posterior to dorsal blade; ventral keel scales do not extend below abdominal photophores ..... *A. affinis*

3b Dorsal blade height more than ⅓ its length; body margin markedly raised posterior to dorsal blade; ventral keel scales extend well below abdominal photophores forming flap-like process; prominent laterally directed spine near dorsoposterior edge of eye ..... *A. gigas*

4a Posterior postabdominal spine directed posteroventrally and markedly larger than the anterior spine; pair of enlarged canine teeth in lower jaw; subcaudal spines of about equal length and size; pair of large canine teeth in lower jaw ..... *A. aculeatus*

4b Postabdominal spines subequal; subcaudal spines absent; no large canine teeth ..... *A. sladeni*



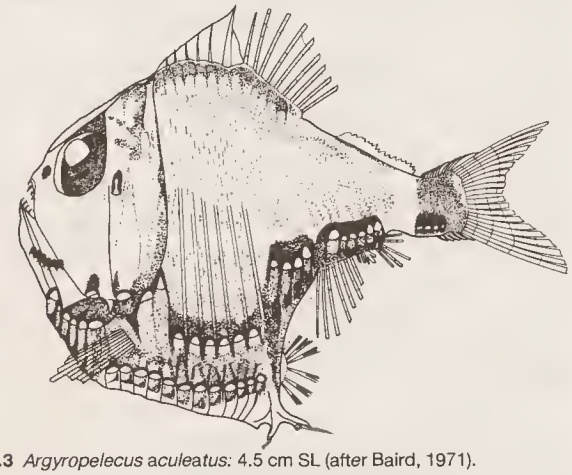
Diagrammatic configuration of photophores and other external features of the three hatchetfish genera: AB = abdominal, AN = anal, BR = branchial, DB = dorsal blade, DS = dorsal spine, I = isthmus, L = lateral, PAN = pre-anal, PAS = post-abdominal spine, PO = preorbital, PRO = preopercular, PTO = postorbital, PTS = post-temporal spine, SAB = supra-abdominal, SAN = supra-anal, SC = subcaudal, SO = subopercular, SP = suprapectoral, TM = transparent membrane. Pectoral fins not shown.

75.3 *Argyropelecus aculeatus*
Valenciennes, 1849

Argyropelecus aculeatus Valenciennes, *in* Cuv. & Val., 1849: 406 (Azores); Grindley & Penrith, 1965: 282; Baird, 1971: 48*; Hulley, 1972: 208; Borodulina, 1978: 40*. *Argyropelecus amabilis* Ogilby, 1888: 1313 (Lord Howe Id.); Grindley & Penrith, 1965: 282. *Argyropelecus caninus* Garman, 1899: 235 (Indian Ocean).

D 9; A 12; GR 15-17; vertebrae 34-36. Body depth at posterior of dorsal blade less than 1.4 in SL. Small serrate spines ventral to caudal photophores.

Exceeds 70 mm. In 200 - 500 m by day, diurnal vertical migration to about 150 m at night. Common in our area, particularly east of 20°E; worldwide in tropical and temperate seas.



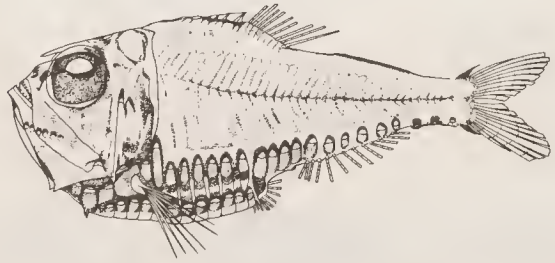
75.3 *Argyropelecus aculeatus:* 4.5 cm SL (after Baird, 1971).

75.4 *Argyropelecus affinis*
Garman, 1899

Argyropelecus affinis Garman, 1899: 237 (tropical North Atlantic); Smith, **SFSA No. 162;** Baird, 1971: 34*; Borodulina, 1978: 32*. *Argyropelecus pacificus* Schultz, 1961: 599, Fig. 4 (Pacific and Indian oceans).

D 9; A 12-13; GR 18-22; vertebrae 38-40. Subcaudal photophores separate; postabdominal spines of equal size with no marked curving; no sphenotic spine.

Body silvery with well-developed pigment markings at myomere borders and midlateral line. Attains 70 mm. Concentrated between 300 and 650 m depth; does not exhibit extensive diurnal vertical migration. Once reported from our area, but abundant north of 10°S latitude along west African coast and to at least 15°S near Madagascar in Indian Ocean. Expected to occur occasionally near northern boundaries of our area; widely distributed in all 3 major oceans.



75.4 *Argyropelecus affinis:* 5 cm SL (after Baird, 1971).

75.5 *Argyropelecus gigas*
Norman, 1930

Argyropelecus gigas Norman, 1930: 302, Fig. 10 (Gulf of Guinea); Schultz, 1961: 600*; Baird, 1971: 38*; Hulley, 1972: 208; Borodulina, 1978: 35*.

D 9-10; A 12-13; GR 18-21; vertebrae 38-39. Sphenotic bone with prominent spine.

Exceeds 110 mm. Found primarily in 400 - 600 m; no apparent vertical migration. Occurs commonly in our area, particularly west of 20°E and to 40°S, southeast of Cape of Good Hope; Indian Ocean to 40°S and in South Atlantic to 38°S; also reported from the Pacific.

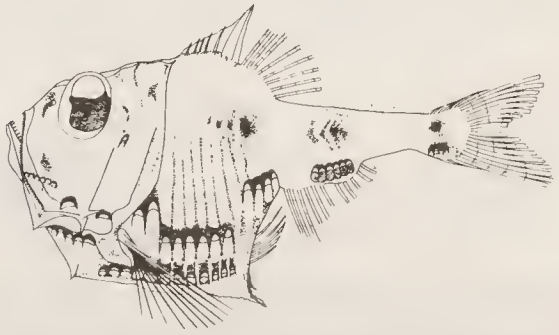
75.5 *Argyropelecus gigas:* 5 cm SL (after Baird, 1971).

75.6 *Argyropelecus hemigymnus*
Cocco, 1829

Argyropelecus hemigymnus Cocco, 1829: 146 (Mediterranean, Messina); Smith, **SFSA No. 160*;** Grindley & Penrith, 1965: 282; Baird 1971: 42*; Hulley, 1972: 208; Borodulina, 1978: 37*.

D 8; A 11; GR 18-24; vertebrae 36-38. Distinctive dwarf species with long, narrow "tail-like" trunk.

Body bright silvery; dark melanistic pigment changes with time of day, giving body and trunk a more dusky



75.6 *Argyropelecus hemigymnus:* 3 cm SL (after Baird, 1971).

coloration at night. Single, characteristic, subabdominal spine with prominent serrations. Rarely exceeds 38 mm. Generally found in 250 - 650 m; little apparent vertical migration. Common in our area to 35°S on either side of Cape of Good Hope; broad worldwide distribution.

75.7 *Argyropelecus sladeni*
Regan, 1908

Argyropelecus sladeni Regan, 1908: 218 (Chagos Archipelago, Indian Ocean); Baird, 1971: 65*; Hecht & Hecht, 1978: 202*; Borodulina, 1978: 45*. *Argyropelecus olfersi* (*non* Cuvier): Barnard, 1925: 153; Smith, **SFSA No. 161.**

D 9; A 12; GR 17-21; vertebrae 35-37. Body depth posterior to D 2 in SL; dorsal blade low, not pronounced; no large canine teeth; postabdominal spines small, nearly symmetrical.

Seldom exceeds 60 mm. Small vertical migration indicated: 100 - 350 m at night, 350 - 600 m by day. Probably limited in our area to west of 20°E. Worldwide; reported to 12°S in Indian Ocean.

75.7 *Argyropelecus sladeni:* 4.5 cm SL (after Baird, 1971).

Genus ***Polyipnus*** Günther, 1887

Twenty-one species, only 2 of which are known to occur in our area; the distribution of the genus is not well known however, and additional species may occur, particularly in the Indian Ocean. Species of *Polyipnus* are limited to the outer continental shelf or islands, and species new to science may well be present. "*Polyipnus spinosus*" of Smith, **SFSA No. 159*** appears to be a composite of 2 or 3 species. *P. omphus* and *P. meteori* are likely to be found in our area.

KEY TO SPECIES

1a Spine complex at posterodorsal margin of head (post-temporal bone) bears basal supplementary spines; ventral scales below abdominal photophores serrate ..... *P. indicus*
1b A single spine on post-temporal; ventral scales below abdominal photophores smooth 2

2a Post-temporal spine length greater than ¼ orbit diameter; anal photophores 10 or more ..... *P. omphus*
2b Post-temporal spine length less than ¼ orbit; anal photophores 9 or less 3

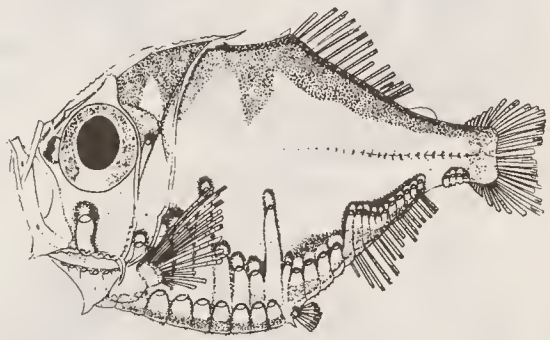
3a GR 20-24; dark pigment bar behind head not reaching dorsal midline ..... *P. polli*
3b GR 13-15; dark pigment bar behind head reaches dorsal midline ..... *P. meteori*
(Described by Kotthaus (1967: 26, Figs. 44-46) from 1 specimen taken off the Seychelles: D 12; A 16; vertebrae 12 + 21. Characteristic dentition along posterior shaft of vomer. Dark dorsal pigment of body discontinuous; border of dorsal pigment markedly raised above supra-anal photophores.)

75.8 *Polyipnus indicus*
Schultz, 1961

Polyipnus indicus Schultz, 1961: 645, Fig. 22 (off Zanzibar); Baird, 1971: 91*. *Polyipnus nuttingi* (*non* Gilbert): Norman, 1939: 20.

D 13-14; A 15-17; GR 20-22; vertebrae 33-34. Major post-temporal spine long and thin, single basal spine very short; frontal bone above eye serrate.

Known specimens less than 55 mm SL. Mesopelagic species likely found in 50 - 500 m; distribution and abundance not well documented; known only from east African coast from 30°S to 5°N latitude.

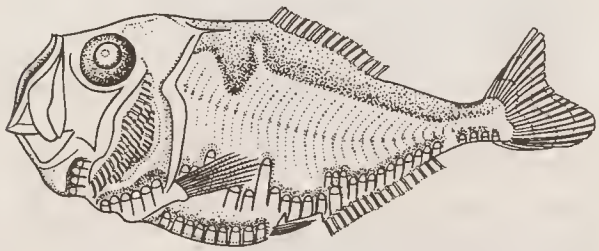


75.8 *Polyipnus indicus:* 4.5 cm SL holotype (after Schultz, 1961).

75.9 *Polyipnus omphus*
Baird, 1971

Polyipnus omphus Baird, 1971: 94, Fig. 71 (north of Madagascar). *Polyipnus laternatus* (*non* Garman): Kobayashi, 1963: 179.

D 14-15; A 16; GR 18-21; vertebrae 33. Preopercle spine triangulate, not extended into long spine; 1st 2 supra-anal photophores overlap supra-abdominal group.



75.9 *Polyipnus omphus:* 4.5 cm SL (after Baird, 1971).

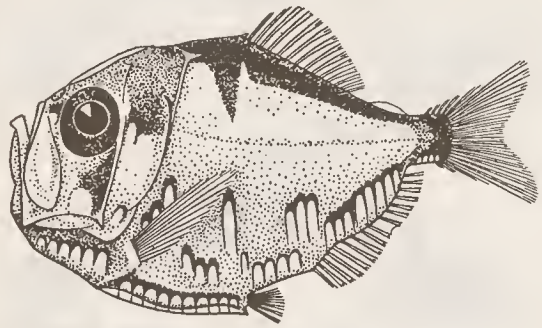
Dark dorsal pigment bar posterior to head does not reach midline. Largest specimen less than 50 mm SL. Known from a few specimens off Madagascar; several specimens reported from tropical Pacific.

75.10 *Polyipnus polli*
Schultz, 1961

Polyipnus polli Schultz, 1961: 535, Fig. 13 (off Congo); Baird, 1971: 98*; Karrer, 1975: 68. *Polyipnus laternatus* (*non* Garman): Norman, 1930: 303*; Poll, 1953: 64*. *Polyipnus spinosus* (*non* Günther): Smith, **SFSA No. 159*.**

D 14-16; A 15-18; GR 20-24; vertebrae 32-33. Post-temporal spines short, needle-like; body margin above A markedly curved; bony support elements (pterygiophores) extend well beyond body margin.

Seldom exceeds 50 mm SL. Little is known of vertical distribution. Eastern Atlantic continental margins from Gulf of Guinea to at least 25°S.



75.10 *Polyipnus polli*: 3.5 cm SL (after Norman, 1930).

Genus ***Sternoptyx*** Hermann, 1781

Four species; 2 species known to occur and 2 may be expected to occur uncommonly in our area. The species are very similar morphologically and identification is difficult. Anal (AN) photophore length is measured along the anterior/posterior axis of the photophore group and includes the black pigmented borders. The reader is referred to Haruta & Kawaguchi (1976) and Badcock & Baird (1980) for extended discussion of species characteristics. The identity of *S. diaphana* of Smith, **SFSA No. 158** based on Gilchrist & von Bonde, 1924, is dubious.

KEY TO SPECIES

1a Trunk depth (from end of D base to ventral margin of AN photophores) conspicuously less than trunk length; D length (from base of 1st ray to base of last) greater than dorsal blade height; pigment uniformly dark over whole trunk region ..... *S. obscura*

1b Trunk depth equal to or greater than trunk length; D length subequal to or shorter than dorsal blade height 2

2a Posterior AN photophore separated from A base; SAN photophore height 1.5-2.5 in trunk depth, often raised to mid trunk-line; non-uniform dark pigment on trunk ..... *S. pseudobscura*

2b Posterior AN photophore adjoining A base; SAN photophore raised ½ or less distance to mid trunk-line; little pigment in region of mid trunk-line 3

3a SAN photophore height 2-3 times in trunk depth (3½ in subadults); trunk depth about equal to trunk length; vertebrae 30-32, D rays usually 11-12, P pigmented in juveniles ..... *S. pseudodiaphana*

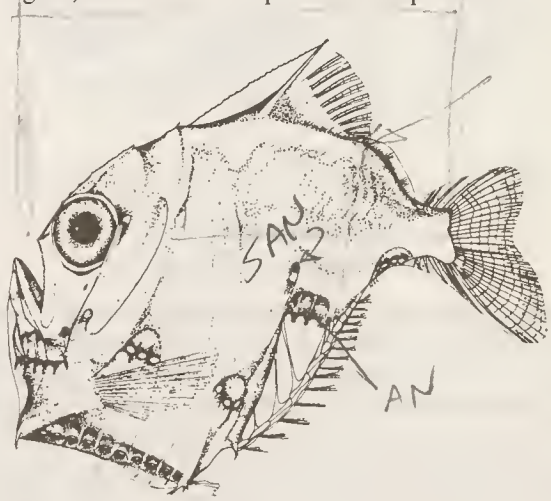
3b SAN photophore height 3-4 times in trunk depth; trunk depth conspicuously greater than trunk length; vertebrae 27-29; D rays 9-11, no P pigmentation in juveniles ..... *S. diaphana*

75.11 *Sternoptyx diaphana*
Hermann, 1781

Sternoptyx diaphana Hermann, 1781: 33 (tropical Atlantic); Baird, 1971: 75* (in part, not Southern Ocean population); Hulley, 1972: 209; Haruta & Kawaguchi, 1976: 148; Borodulina, 1978: 55*; Badcock & Baird, 1980: 806*.

D 9-11; A 14-16; GR 7-(8-9); vertebrae 27-29. SAN photophore low, almost in contact with AN photophores; posterior A supports short, not appreciably longer than AN photophore group; relatively little pigment in trunk region, very little on C rays.

Seldom exceeds 50 mm SL. Oceanic species usually found in 500 - 800 m both day and night. In our area primarily east of 30°E and north of 35°S; rare in Atlantic part of our region; worldwide in tropical and temperate seas.



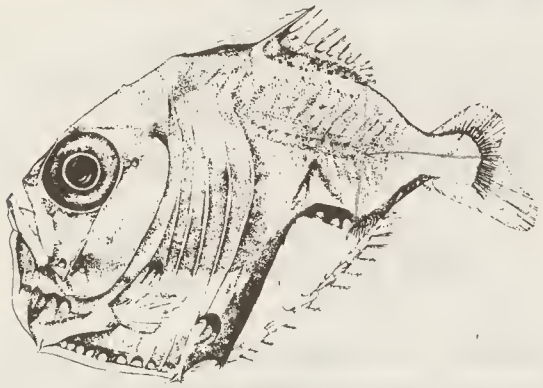
75.11 *Sternoptyx diaphana:* 3 cm SL (after Badcock & Baird, 1980).

75.12 *Sternoptyx obscura*
Garman, 1899

Sternoptyx obscura Garman, 1899: 232, Pl. 53, Fig. 1 ? (tropical East Pacific); Baird, 1971: 69*; Haruta & Kawaguchi, 1976: 147; Borodulina, 1978: 50*; Badcock & Baird, 1980: 806*.

D 9-11; A 12-13; GR 7-9; vertebrae 29-30. Pigment evenly distributed and extends as conspicuous corona at base of C rays; AN photophores separated from A base by a distinct gap; 1st posterior pterygiophore longer than anal photophore length; SAN photophore raised less than ½ distance to mid trunk-line.

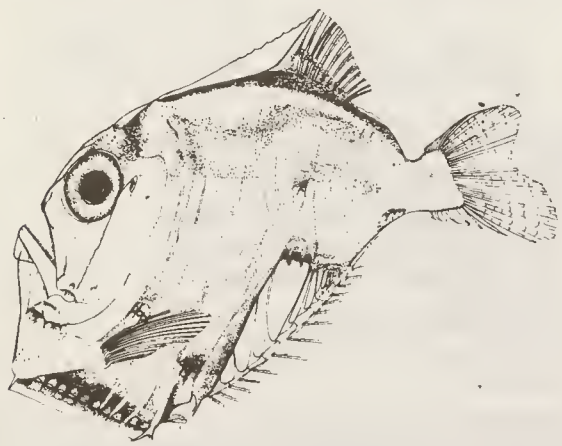
Seldom exceeds 45 mm SL. Indo-Pacific species taken in 500 - 1 000 m; not reported in our area, but common in Indian Ocean north of 15°S; reported to 30°S in Indian Ocean east of 50°E longitude.



75.12 *Sternoptyx obscura:* 4 cm SL (after Badcock & Baird, 1980).

75.13 *Sternoptyx pseudobscura*
Baird, 1971

Sternoptyx pseudobscura Baird, 1971: 72, Fig. 54 (western tropical Atlantic); Haruta & Kawaguchi, 1976: 149; Borodulina, 1978: 53*; Badcock & Baird, 1980: 806*.



75.13 *Sternoptyx pseudobscura:* 5.5 cm SL (after Badcock & Baird, 1980).

D 9-11; A 13-15; GR 7-9; vertebrae 27-30. AN photophores short; 1st posterior A support almost twice as long as AN photophore group, SAN photophore raised, often to mid-trunk line.

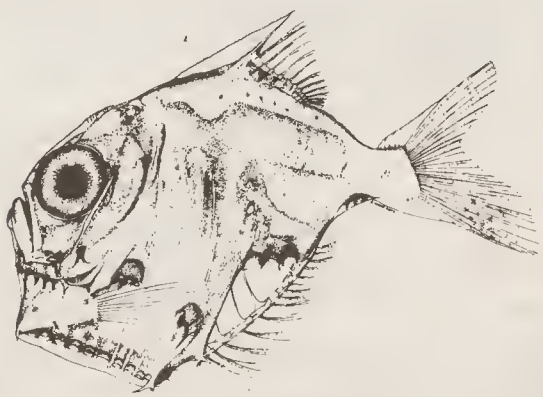
Seldom exceeds 55 mm SL. A worldwide species usually found in 800 - 1 200 m in tropical/subtropical seas; may occur at eastern boundary of our area and north of 35°S; in eastern Atlantic near 20°S and 10°E.

75.14 *Sternoptyx pseudodiaphana*
Borodulina, 1977

Sternoptyx pseudodiaphana Borodulina, 1977: 938, Fig. 1 (off Tasmania); Borodulina; 1978: 57*; Badcock & Baird, 1980: 806*. *Sternoptyx diaphana* (*non* Hermann): Baird, 1971: 33* (in part, Southern Ocean population).

D 9-13; A 12-13; GR 6-8; vertebrae (29)30-32. Posterior AN photophore adjoins A base; 1st posterior A support element (pterygiophore) conspicuously shorter than anal photophore length; in adults pigment streaks present on ventral C rays.

Largest species in genus, often exceeds 60 mm SL. Common in our area south of 35°S in Indian Ocean; in Atlantic, range extends northward near coast to at least 20°S; circumglobally distributed in Southern Ocean and its associated northward-moving boundary currents (e.g. Benguela current).



75.14 *Sternoptyx pseudodiaphana:* 6 cm SL (after Badcock & Baird, 1980).

Order AULOPIFORMES

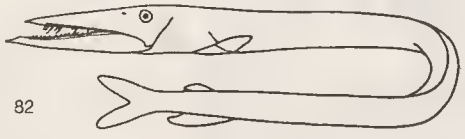
Pelvic fins with 8-12 rays, under or in front of dorsal fin; caudal fin forked; no fin spines; pectoral fin base midlateral or near ventral edge of body (above gill openings in giganturids); dorsal adipose fin usually present; soft-rayed dorsal fin (absent in Anotopteridae) well in front of anal fin. Swimbladder absent. Mouth large; teeth on jaws usually well developed (lost in adult notosudids); maxillae excluded from the gape (not toothed). The unique anatomical feature that characterises aulopiform fishes is the configuration of the dorsal elements of the second and third gill arches (Rosen, 1973).

The Aulopiformes comprise about 15 families of predatory marine fishes, most of which have become adapted to a deep-sea habitat.

KEY TO FAMILIES

1a Soft-rayed dorsal fin present; adipose dorsal fin base much shorter than anal fin base; pelvic fins distinct 2

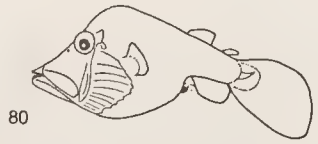
1b Soft-rayed dorsal fin absent; adipose dorsal fin base about as long as anal fin base; pelvic fins minute ..... ANOTOPTERIDAE (No. 82)


82

2a Soft-rayed dorsal fin origin at or behind middle of standard length 3

2b Soft-rayed dorsal fin origin distinctly in front of middle of standard length 6

3a Eyes tubular, directed forward; pectoral fins above gill opening, with 30-34 rays ..... GIGANTURIDAE (No. 80)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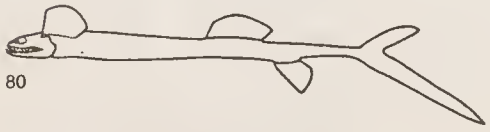
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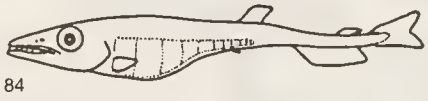
3b Eyes normal, directed laterally; pectoral fins behind gill openings, with 10-17 rays 4

4a Anal fin rays 14-16; lateral line present only on specimens smaller than 4 or 5 cm standard length ..... OMOSUDIDAE (No. 84)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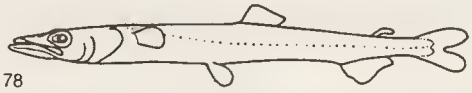
4b Anal fin rays 16-50; lateral line present 5

5a Anal fin rays 16-21; dorsal fin origin at about middle of standard length ..... NOTOSUDIDAE (No. 78)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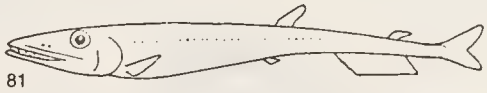
5b Anal fin rays 20-50; dorsal fin origin clearly behind middle of standard length ..... PARALEPIDIDAE (No. 81)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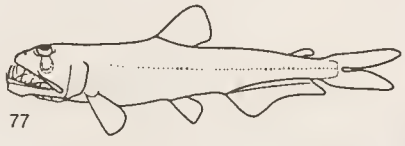
6a Body with scales (scales are more or less deciduous and on trawl-caught specimens they have often been rubbed off, but the scale "pockets" are usually discernible when the scales are missing); teeth in upper jaw in 2 or more series (mostly uniserial in scopelarchids) or in a band of variable width 7

6b Body naked except for lateral-line scales of some species; teeth in upper jaw in a single series 9

7a Eyes large, tubular, directed dorsally or dorsoanteriorly; upper jaw teeth mostly uniserial; tongue with large, fixed, uniserial teeth ..... SCOPELARCHIDAE (No. 77)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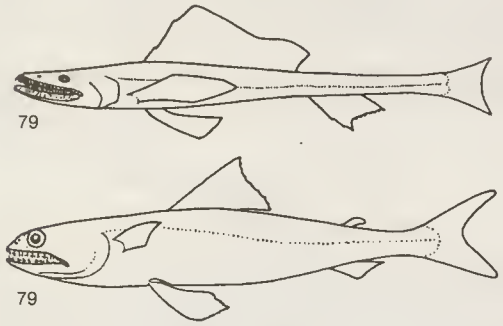
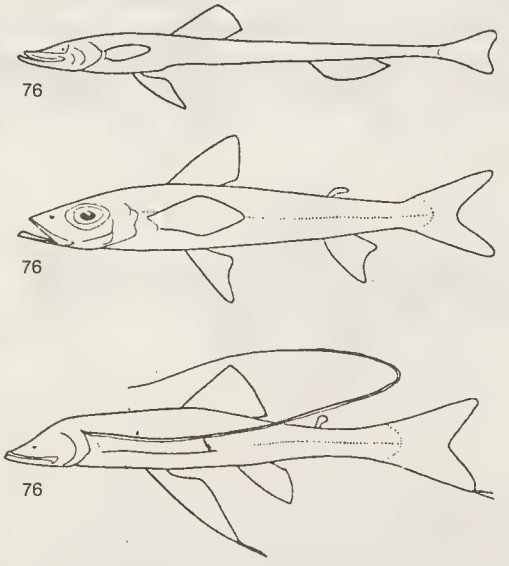
7b Eyes not tubular; upper jaw teeth in 2 or more series or in a band of variable width; no teeth on tongue (except in synodontids) 8

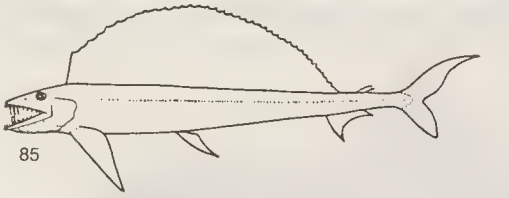
8a Teeth on jaws distinct; needle-like or lanceolate; tongue also with teeth; gill-rakers rudimentary or minute and spine-like ..... SYNODONTIDAE (No. 79)



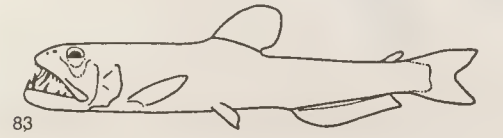
8b Teeth on jaws absent or small to minute (villiform); no teeth on tongue; gill-rakers normal, lath-like ..... CHLOROPHTHALMIDAE (No. 76)



9a Dorsal fin high and long, extending from head to over anal fin, with 36-48 rays ..... ALEPISAURIDAE (No. 85)



9b Dorsal fin short, with 10-13 rays, well behind head ..... EVERMANNELLIDAE (No. 83)



Family No. 76: CHLOROPHTHALMIDAE

by K. Sulak

Greeneyes **Groenogies**

Small, moderately compressed, fusiform fishes. Body covered with cycloid or ctenoid scales. Snout broad, flattened. Mouth terminal, non-protrusible. Lower jaw projecting with a bony knob at tip. Maxilla prominent, extending to or beyond eye, broadly expanded posteriorly; 1 supramaxilla. Jaw teeth small to minute, in bands. Eyes specialised in all genera: enlarged with keyhole-shaped pupil, peculiarly modified, or minute. Eye lens greenish or yellowish. A single soft dorsal fin; a small adipose fin in most species. Pelvic fins set far forward; outer rays stiffened and serving as props to support the body. Gasbladder absent. Musculature dense. An unossified gap present between skull and 1st vertebra.

Greeneyes are circumglobal at temperate and tropical latitudes. They are benthic fishes, dwelling on the outer continental shelf, slope, rise and abyssal plain. Most species are rare; a few are locally abundant. They feed mainly on small epibenthic and benthopelagic crustaceans. All species are synchronously hermaphroditic. Two subfamilies (Chlorophthalminae, Ipnopinae), 6 genera and 10 species in our area. Recent systematic treatments by Mead (1966), Nielsen (1966), Marshall & Staiger (1975), Sulak (1977) and Shcherbachev (1981).

KEY TO GENERA

1a Eyes large 2
1b Eyes minute or peculiarly modified 3

2a Maxilla extending beyond eye; anus closer to A base than to V base . . . . . *Bathysauropsis*
2b Maxilla reaching midpoint of eye, anus closer to V bases than to A base . . . . . *Chlorophthalmus*

3a Eyes modified into large, flat, dorsal plaques . . . . . *Ipnops*
3b Eyes minute 4

4a C and paired fins with elongate specialised rays . . . . . *Bathypterois*
4b C and paired fins without elongate specialised rays 5

5a GR of anterior arch long and blade-like . . . . . *Bathymicrops*
5b GR reduced to short spiny knobs or plaques . . . . . *Bathytyphlops*

Genus *Bathymicrops* Hjort & Koefoed, 1912

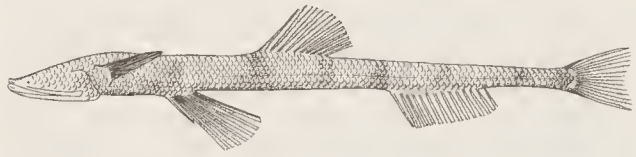
Two species; 1 in our area. *B. brevianalis* Nielsen, 1966 known from northwestern Indian Ocean and southwestern Pacific, may also occur in our area; it has 9-10 A rays and 76-80 vertebrae.

76.1 *Bathymicrops regis*
Hjort & Koefoed, 1912

Bathymicrops regis Hjort & Koefoed, 1912: 88, Fig. 305, 501d (off Canary Ids., 5 000 - 5 500 m); Mead, 1966: 154; Nielsen, 1966: 63*; Sulak, 1984: 414*.

D 8-10; A 12-15; P 9-10; V 8; C principal rays 15-18; LL 65-75; GR (4-6)+(10-12); vertebrae 65-69. D insertion over vertebra 31-33. Depth 6-8, head 14-17, preventral distance 28-30 %SL.

Body thin and elongate, with 6-8 dark pigment bands. Attains 12 cm. Taken once off Port Elizabeth in the Agulhas Basin, 4 360 m; also in North Atlantic.



76.1 *Bathymicrops regis:* 10 cm SL.

Genus ***Bathypterois*** Günther, 1878

Pectoral fin with uppermost 2 rays joined and greatly elongated; the tiny rudimentary rays always present at top of fin, and those sometimes present between the upper and lower section are omitted from the counts. Eighteen species; 5 in our area; 3 others probable: *B. grallator* (Goode & Bean, 1886), *B. longipes* Günther, 1878 and *B. viridensis* (Roule, 1916). Shcherbachev (1981: 57) recorded "*Bathypterois* sp. 2" from off our area and compared it with *B. atricolor;* Shcherbachev's species may pertain instead to *B. ventralis* Garman, 1899, which has P with 11-14 rays in lower half, V 9, LL 57-59, and a subcaudal notch.

KEY TO SPECIES

1a Gular fold scaled; first V ray 58-144% SL; 34-37 GR 2
1b Gular fold unscaled; first V ray 19-56% SL; 38-49 GR 4

2a Adipose fin absent; body uniform black; LL 58-60; produced V ray greater than SL . . . . . *B. grallator*
(N. Atlantic, W. Pacific & SW Indian Ocean at 14°S)
2b Adipose fin present; body alternately banded white and dark; LL 51-56; produced V ray 60-90% SL 3

3a Body with 2 dark bands; area under D dark; C white . . . . . *B. guentheri*
3b Body with 3 dark bands; area under D white; C dark . . . . . *B. viridensis*
(N. Atlantic to Gulf of Guinea)

4a No notch at base of C; 8 or 9 V rays 5
4b Small but distinct notch at base of C; 9 V rays 6

5a V 8; P with 11-14 long rays in lower portion . . . . . *B. filiferus*
5b V 8-9; P with 9-11 long rays in lower portion . . . . . *B. longipes*
(N. & S. Atlantic, off Brazil, Pacific; below 2 500 m)

6a Body whitish; outlines and centres of scale pockets marked with dark pigment specks . . . . . *B. perceptor*
6b Body black; outlines of scale pockets white 7

7a P with 7-9 rays in lower half . . . . . *B. phenax*
7b P with 9-11 rays in lower half . . . . . *B. atricolor*

76.2 *Bathypterois atricolor*
Alcock, 1896

Bathypterois atricolor Alcock, 1896: 306 (Indian Ocean, Laccadive Sea, 1 630 m); Sulak, 1977: 87; Shcherbachev, 1981: 57*.

D13-16; A 8-10; P 12-13 (rarely 11); V 9; LL 57-62; vertebrae 54-57. Head 20-25, longest P ray 81-189, longest V ray 24-58, and longest C ray 15-33 %SL.

Body and fins black. Attains 20 cm. Taken twice off Delagoa Bay (22-26°S, 34-36°E, 500 - 960 m) during International Indian Ocean Expedition. Nearly circumglobal (except western Atlantic and eastern Atlantic above 10°N); eurybathic (258 - 5 150 m).

76.2 *Bathypterois atricolor:* 15 cm SL.

76.3 *Bathypterois filiferus*
Gilchrist, 1908
PLATE 11

Bathypterois filiferus Gilchrist, 1908: 166, Pl. 48 (off Cape Point, 1 097 m); Smith, **SFSA No. 182;** Winterbottom, 1974: 3; Sulak, 1977: 96.

76.3 *Bathypterois filiferus:* 22.5 cm SL (after Gilchrist, 1908).

Bathypterois capensis Gilchrist & von Bonde, 1924: 8* (off Cape Point, 2 232 m); Smith, SFSA **No. 183***; Winterbottom, 1974: 2; Pakhorukov, 1976: 325; Shcherbachev, 1981: 62.

D 14-16; A 9-10; P 13-16; V 8; LL 57-60; vertebrae 52- 55. Head 23-26, longest P ray 122-128, longest V ray 41-54, and longest C ray 32-36 %SL. Scales thick and adherent.

Body greenish to brownish. Attains 26 cm. Off Cape Point in 1 055 - 2 835 m; also off southern Brazil in 1 300 - 1 580 m.

76.4 *Bathypterois guentheri*
Alcock, 1889

Bathypterois guentheri Alcock, 1889: 450 (Indian Ocean, Andaman Sea, 896 m); Sulak, 1977: 82*; Shcherbachev, 1981: 56.

D 13; A 11; P 13, V 8; LL 48-55; vertebrae 50. Head 26-29, longest P ray 42-81, longest V ray 76-104, and longest C ray 54-76 %SL.

76.4 *Bathypterois guentheri*: 12 cm SL.

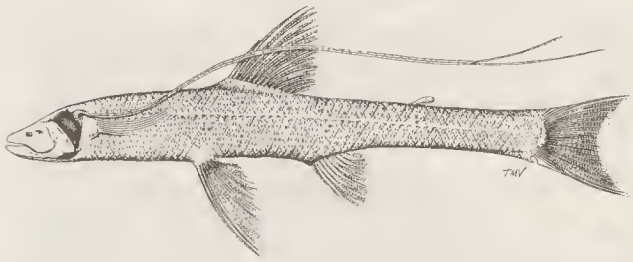
Head bluish black below and laterally, light above; gill covers and thoracic region dark. Body whitish with 2 dark bands: 1 beneath D, another on caudal peduncle. C black basally, white distally; other fins black. Attains 26 cm. Off our east coast at 22°-33°S in 800 - 1 300 m; also north-central and northeastern Indian Ocean, and from central western Pacific. Its banded counterpart, *B. viridensis* (Roule, 1916) is probable off west coast of South Africa.

76.5 *Bathypterois perceptor*
Sulak, 1977

Bathypterois perceptor Sulak, 1977: 86, Pl. 6, Fig. 1 (off southern Brazil, 1 200 m); Shcherbachev, 1981: 56.

D 14; A 9; P 15-16; V 9; LL 57-61; vertebrae 59. Head 19, longest P ray 93-138, longest V ray 19-24, and longest C ray 17-21 %SL.

Body silvery, pinkish white. Scale pockets outlined in minute black pigment specks with a black dot at centre of each pocket. Gill covers and underside of head dark. Attains 16 cm. Off Beira (21°18′S, 36°18′E) and south of Madagascar (30°06′S, 45°59′E); also off southern Brazil. Depth range 700 - 1 600 m.



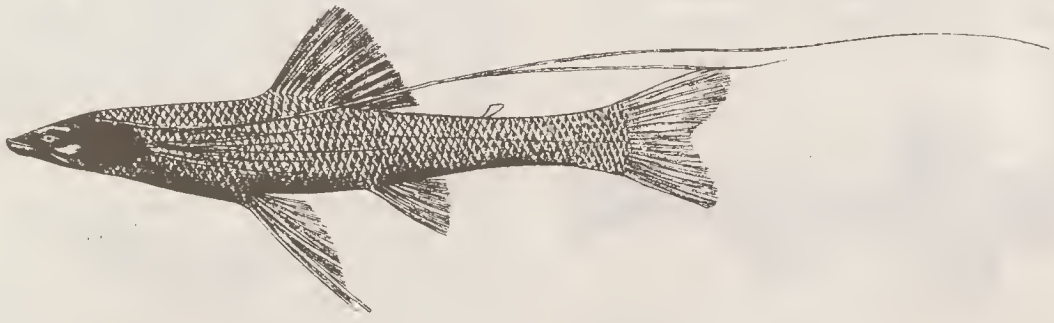
76.5 *Bathypterois perceptor*: 15 cm SL holotype.

76.6 *Bathypterois phenax*
Parr, 1928

Bathypterois atricolor phenax Parr, 1928: 31 (Atlantic, south of Turks and Caicos Ids., 1 646 - 1 728 m). *Bathypterois phenax* Mead, 1966: 136*; Sulak, 1977: 90. ?*Bathypterois ater* Gilchrist, 1908: 167* (off Cape Point, 1 646 m; holotype lost; synonymy with *B. phenax* probable, but original description inconclusive); Smith, SFSA **No. 181**; Pakhorukov, 1976: 325.

D 13-15; A 8-10; P 9-10 (rarely 11); V 9; LL 55-60; vertebrae 53-56. Head 20-24, longest P ray 111-131, longest V ray 27-39, and longest C ray 21-30 %SL.

Body and fins black. Attains 18 cm. Known off South Africa only from type of *B. ater*, taken off Cape Point; also Gulf of Guinea, Azores, western North Atlantic and off southern Brazil. Depth range 827 - 2 657 m.



76.6 *Bathypterois phenax*: 14.5 cm SL (after Gilchrist, 1908).

Genus ***Bathysauropsis*** Regan, 1911

Three species; 1 in our area.

76.7 *Bathysauropsis gracilis*
(Günther, 1878)
PLATE 11

Chlorophthalmus gracilis Günther, 1878: 182 (off Juan Fernandez Ids., 2 515 m); Günther, 1887: 194*. *Bathysauropsis gracilis:* Smith, **SFSA No. 185*;** Golovan, 1976: 302; Shcherbachev, 1981: 51.

D 10-11; A 11; P 22-24; V 8-9; LL 58-60; GR 6+20; vertebrae 58. Head 28, predorsal distance 40, and preanal distance 77 %SL. Maxilla extending beyond eye. Interorbital space wide, equal to or exceeding vertical eye diameter. Adipose fin opposite A.

Body and head uniform purplish to brownish black, fins lighter. Attains 32 cm. Off Cape Point (1 055 - 2 835 m) and south of Madagascar; circumglobal in southern oceans.

Genus ***Bathytyphlops*** Nybelin, 1957

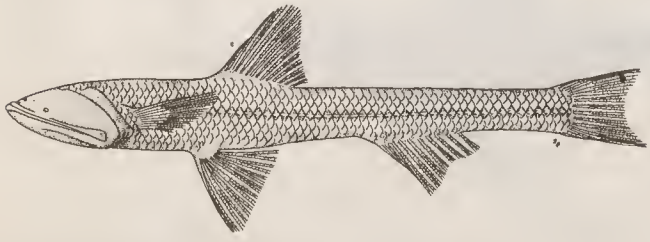
Two species; *B. sewelli* (Norman, 1939), known from very deep water of the Arabian Sea, may occur in our area; it has 16 A rays, 11-13 D and 8 P rays and 68-70 LL scales.

76.8 *Bathytyphlops marionae*
Mead, 1959

Bathytyphlops marionae Mead, 1959: 370, Fig. 4 (Caribbean Sea, off Honduras, 1 006 m); Mead, 1966: 157*; Nielsen, 1966: 71*; Sulak, 1974: 570; Shcherbachev, Levitsky & Portsev, 1978: 187; Merrett, 1980: 101; Shcherbachev, 1981: 65.

D 12-13; A 12-14; P 12-15; V 8; C principal rays 19; LL 64-66; GR (6-7)+(13-15) 1 elongate raker at angle, others rudimentary; vertebrae 62-65. Head 22-23, depth 11-16, D base 12-13, A base 12-14, and length of elongate GR 3.3-4.2 %SL. Body elongate, but fairly robust. Top and sides of head completely scaled. Eyes vestigial, covered over by skin and scales in large fish.

Body grey to brown; scale pocket outlines darker. Head dark. Attains 38 cm. Off Beira (21°18′S, 36°18′E), Durban and Agulhas Bank; circumglobal, but not in eastern Pacific. Depth range 869 - 1 920 m. Distinctive *"Macristiella"* larval stage (Okiyama, 1972).



76.8 *Bathytyphlops marionae:* 18 cm SL.

Genus ***Chlorophthalmus*** Bonaparte, 1840

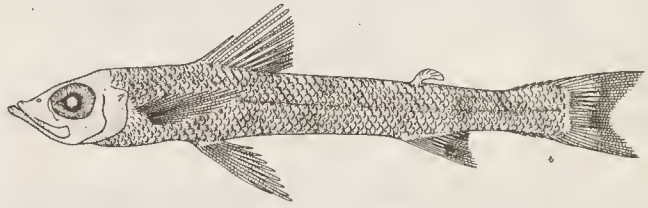
About 17 named species; 1 in our area. The status of nominal species of *Chlorophthalmus,* including *C. punctatus,* is uncertain. Many of the nominal forms are doubtfully distinct (Mead, 1966); they comprise a complex for which *C. agassizii* Bonaparte, 1840 is the oldest available name. For the present, however, it would seem advisable to refer to the South African greeneye as *C. punctatus. C. atlanticus* Poll, 1953 is the species reported in the eastern Atlantic from just north of our area to Sierra Leone (Poll, 1953; Maurin et al., 1977).

76.9 *Chlorophthalmus punctatus*
Gilchrist, 1904

Chlorophthalmus punctatus Gilchrist, 1904: 15, Pl. 35 (off Cape Point, 282 m); Mead, 1966: 165; Shcherbachev, 1981: 48. C. *agassizi:* Smith, **SFSA No. 184*.**

D 11-12; A 9-10; P 15-17; V 9; LL 50-55; GR 5 + 18; vertebrae 47-49. Head 27, depth 15 %SL. Interorbital space equal to about ½ of vertical eye diameter. Adipose fin opposite A. Scales ctenoid.

Body yellow-brown with irregular darker blotching. Attains 20 cm. Occurs in deep outer shelf and upper slope water (282 - 439 m) along both coasts of South Africa. *C. punctatus* unreported elsewhere; but other species in the *C. agassizii* complex are circumglobal in warm seas.



76.9 *Chlorophthalmus punctatus:* 12 cm SL.

Genus ***Ipnops*** Günther, 1878

Three very similar species: *I. murrayi* Günther, 1878; *I. agassizii* and *I. meadi* Nielsen, 1966. *I. murrayi* is known from numerous Atlantic localities, all west of the Mid-Atlantic Ridge in 1 206 - 3 475 m. *I. agassizii* is the eastern Atlantic and Indo-Pacific counterpart of *I. murrayi,* occurring in 1 392 - 4 163 m. *I. meadi* occurs at abyssal depths (3 310 - 4 940 m) in the Indo-Pacific and may occur in our area; it has 11-13 A rays, 17-20 total GR, 49-53 LL scales, and 51-55 vertebrae.

76.10 *Ipnops agassizii*
Garman, 1899

Ipnops agassizii Garman, 1899: 259, Pl. H, Fig. 2 (off Galapagos Ids., 2 487 m); Mead, 1966: 151; Nielsen, 1966: 56*; Shcherbachev, 1981: 52.

Ipnops murrayi (*non* Günther): Smith, **SFSA No. 189** (in part, figure is of *I. murrayi*).

D 9-11; A 15-19; P 13-16; V 8; LL 55-58; vertebrae 57- 61; GR (total) 20-24. Head 18-21, depth 6-8, preanal distance 61-66, and length of A base 18-26 %SL.

Head black; eye plaques yellow or whitish in fresh specimens. Body dark; scale pockets distinctly outlined in white. Attains 14 cm. Gilchrist's specimen from off Cape Point has been lost; its description is inadequate to confirm its specific identity. However, Gilchrist's observation that the anal fin is set farther forward than in the type of *I. murrayi* suggests agreement with *I. agassizii* (cf. Nielsen, 1966). Also, *I. agassizii* is the most probable identity for Gilchrist's specimen, given the eastern Atlantic locality and bathyal depth of capture. Two other specimens of *I. agassizii* known from our area: 1 from east of Walvis Ridge, 1 off Beira (1 510-4 163 m).

76.10 *Ipnops agassizii*: ca. 12 cm (drawn after Garman, 1899).

Family No. 77: SCOPELARCHIDAE

by R.K. Johnson

Pearleyes **Pêreloë**

Body moderately to strongly compressed. Fin spines absent. Dorsal fin with 5-10 rays. Adipose dorsal fin present. Pelvic fins abdominal with 9 rays. Normal gill-rakers absent, replaced by teeth fixed on bony plates, on first 3 or 4 gill arches. Body and postorbital regions of head covered with cycloid scales. Lateral-line scales 40-66, consisting of a large bony plate pierced by a pore, with a bony shelf attached behind the pore and mostly or completely covering the pore. Vertebrae 40 to 65. Lingual teeth large, straight to strongly hooked, fixed and uniserial over basibranchials and/or basihyal. Dentary teeth in 2 series; outer teeth small and fixed, the medial teeth large, depressible, barbed canines. Premaxillary teeth numerous, small, retrorse, uniserial. Maxillaries excluded from gape. Palatine teeth in 1 or 2 irregular rows, more medial and anterior teeth are large, barbed canines. Eyes large, tubular, directed dorsad or dorsoanteriad, with a glistening white oval lens pad on side of eye tube (the lens pad is white and rather opaque in preservative, but apparently transparent in life).

Scopelarchids are oceanic and mesopelagic or bathypelagic in habitat. They reach a relatively large size for midwater fishes (record for family: 234 mm SL in *Benthalbella elongata*, a Southern Ocean species). The principal prey of scopelarchids are other midwater fishes (Gonostomatidae, Photichthyidae, Myctophidae, etc.). Despite the presence of an elongate, muscular stomach, scopelarchids are apparently unable to swallow very large prey, unlike certain other midwater iniomous fishes (e.g. evermannellids, omosudids). The family occurs worldwide, except in the Arctic Ocean and Mediterranean Sea. Scopelarchids have no commercial importance. Four genera with a total of 17 species; 8, possibly 10, species in our area. Recently revised by Johnson (1974).

KEY TO GENERA
(adults)

1a Distinct subequal stripes of pigment above and below LL extending forward from C peduncle; P longer than V; (P rays 18-22; no marked concentration of pigment on upper C lobe) ..... *Scopelarchus*

1b Distinct stripes of pigment above or below LL absent, or, if present, markedly unequal, with pigment concentrated either side of LL; P equal to or distinctly less than V (P longer than V in *Scopelarchoides signifer* which has 22-25 P rays, upper C lobe distinctly dusky, and no pigment stripes associated with LL) 2

2a V insertion posterior to D origin; (either marked stripes of pigment associated with LL, or A rays 24-29, or both) ..... *Scopelarchoides* (in part)

2b V insertion anterior to D origin 3

3a P & V subequal; teeth present over basihyal and 1st 2 basibranchials; (no stripes of pigment associated with LL) ..... *Rosenblattichthys*

3b V longer than P; lingual teeth essentially restricted to elongate basihyal 4

4a Pigment stripes along LL present ..... *Scopelarchoides* (in part)

4b Pigment stripes along LL absent ..... *Benthalbella*

Genus ***Benthalbella*** Zugmayer, 1911

Five species, 2 known from our area and *Benthalbella elongata* (Norman, 1937), probably occurs here.

KEY TO SPECIES
(adults)

1a A rays 35-39 ..... *B. macropinna*

1b A rays 30 or fewer 2

2a P rays 19-23 ..... *B. elongata*
(Circumglobal in Antarctic and subantarctic waters)

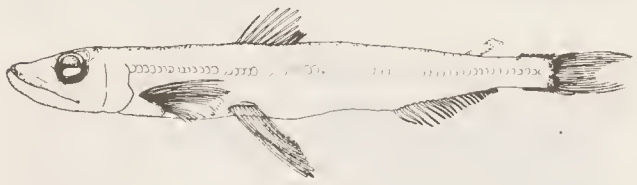
2b P rays 25-28 ..... *B. infans*

77.1 *Benthalbella infans*
Zugmayer, 1911

Benthalbella infans Zugmayer, 1911: 14 (eastern North Atlantic); Merrett, Badcock & Herring, 1973: 1*; Johnson, 1974: 76*.

D 8-9; A 20-25; P 25-28; LL 55-59; vertebrae 55-58. Luminous organs present on isthmus (IO), within V musculature (POa), just posterior to V bases (POp), and just anterior to anus (AO); only latter 2 (POp and AO) are readily evident externally (see Merrett et al., 1973, p. 32).

Colour in alcohol: uniform dull brown, with edges of scale pockets emphasised by slightly heavier pigmentation; dense black stripe on midventral contour between POp and AO luminous organs. Attains 14 cm SL. Oceanic, mesopelagic or bathypelagic; most adults taken in hauls to depths considerably in excess of 500 m. Off southwest Cape coast and off Xai-Xai, Mozambique; tropical/subtropical in all 3 major oceans.



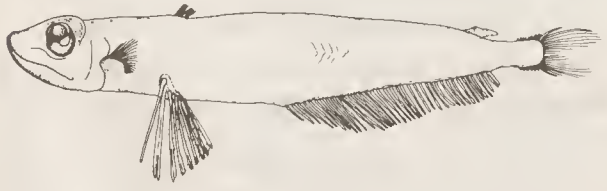
77.1 *Benthalbella infans:* 14 cm SL (after Johnson, 1974).

77.2 *Benthalbella macropinna*
Bussing & Bussing, 1966

Benthalbella macropinna Bussing & Bussing, 1966: 53, Fig. 1 (SE of Cape Horn; 56°17'S, 58°09'W); Johnson, 1974: 88*.

D 5-6; A 35-39; P 25-27; LL 62-65; vertebrae 60-62.

Colour in alcohol: uniform dull brown, but with scale pockets distinctly outlined by heavier pigmentation; dense black cap of enlarged melanophores at dorsal margin of lens pad. Attains 23 cm SL. Oceanic, mesopelagic or bathypelagic; most adults taken in depths considerably in excess of 500 m. Off southwest Cape coast; circumpolar in subantarctic and Antarctic waters.



77.2 *Benthalbella macropinna:* 18 cm SL (after Johnson, 1974).

Genus ***Rosenblattichthys*** Johnson, 1974

Three species; 1 known from off southern Africa.

77.3 *Rosenblattichthys hubbsi*
Johnson, 1974

Rosenblattichthys hubbsi Johnson, 1974: 452 (equatorial Atlantic); 1974: 103*; 1982: 158*. *Rosenblattichthys alatus* (*non* Fourmanoir): Johnson, 1974: 97 (in part; record of larva from off Mozambique).

D 8-9; A 23-25; P 21-23; LL 53 (n=1); vertebrae 49 (n=1).

Colour in alcohol: more or less uniform yellow-brown, with more intense pigmentation outlining scale pockets; P and V covered with small, scattered melanophores; a black streak bordering anterior margin of eye. Attains at least 145 mm SL. Oceanic, mesopelagic or bathypelagic; known from 1 adult (equatorial Atlantic in 0 - 657 m) and 45 larval or juvenile specimens, some taken in less than 60 m from central water areas in all 3 major oceans; has been taken off Xai-Xai, Mozambique.

77.3 *Rosenblattichthys hubbsi:* 14.5 cm SL (after Johnson, 1974).

Genus ***Scopelarchoides*** Parr, 1929

Five species, 2 known from our area and *S. kreffti* Johnson, 1972 probably occurs here.

KEY TO SPECIES
(adults)

1a P longer than V; no pigment stripes associated with LL; (pigment well developed on upper C lobe, lacking or very faint on lower lobe; P rays 22-25) ..... *S. signifer*
1b P shorter than V; pigment stripes associated with LL well developed 2

2a V insertion posterior to D origin; (upper C lobe with pigment faint or lacking, well developed on lower C lobe); P rays 20-22 ..... *S. danae*
2b V insertion anterior to D origin; P rays 23-25 ..... *S. kreffti* (Transition Region of South Atlantic, presumed circumtropical in southern Transition Region).

77.4 *Scopelarchoides danae*
Johnson, 1974

Scopelarchoides danae Johnson, 1974: 453 (South China Sea); 1974: 124*; 1982: 165.

D 6-9; A 24-27; P 20-22; LL 50-52; vertebrae 48-50.

Dark stripe just ventral to LL and extends to lower C lobe; pigment lacking or weakly developed elsewhere on

77.4 *Scopelarchoides danae:* 9.5 cm SL holotype (after Johnson, 1974).

body. Attains 12 cm SL. Oceanic, mesopelagic; most adults taken in depths of 300 - 800 m. Numerous records in Mozambique Channel and off Xai- Xai, Mozambique. Circumtropical; most records near continental and insular land masses.

77.5 *Scopelarchoides signifer*
Johnson, 1974

Scopelarchoides signifer Johnson, 1974: 454 (central equatorial Pacific); 1974: 145*; 1982: 167.

D 9-10; A 26-29; P 22-25; LL 49-52; vertebrae 48-49.

No dermal pigment stripes on body; upper C lobe dusky; pigment lacking or very weakly developed on ventral lobe. Attains 10 cm SL. Oceanic, mesopelagic; most adults taken in 300 - 500 m. Numerous records in Mozambique Channel and off Xai-Xai, Mozambique; tropical Indian and Pacific oceans, not in the Atlantic.

77.5 *Scopelarchoides signifer:* 8 cm SL holotype (after Johnson, 1974).

Genus ***Scopelarchus*** Alcock, 1896

Four species, 3 known from off southern Africa.

KEY TO SPECIES
(adults)

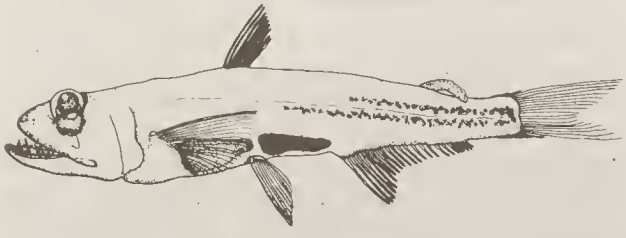
1a No pigment on P; A rays 24-29 ..... *S. guentheri*
1b P pigmented; A rays 18-26 3

2a A rays 21-26; LL scales 45-50; vertebrae 44-49 ..... *S. analis*
2b A rays 18-21; LL scales 40-44; vertebrae 40-44 ..... *S. michaelsarsi*

77.6 *Scopelarchus analis*
(Brauer, 1902)

Dissomma anale Brauer, 1902, p. 278 (off Ivory Coast; Antarctic record is presumably in error). *Scopelarchus analis:* Smith, **SFSA No. 180*;** Johnson, 1974: 154*; 1982: 169.

D 7-9; A 21-26; P 18-22; LL 45-50; vertebrae 44-49.



77.6 *Scopelarchus analis:* 11 cm SL (after Johnson, 1974).

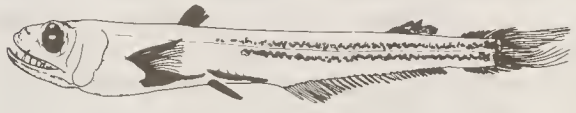
Pigment on P either on fin-ray bases or whole fin as individually distinguishable melanophores. Pigment on body limited to dark stripes dorsal and ventral to LL. Attains 126 mm SL. Oceanic, mesopelagic; most adults taken in depths exceeding 500 m, but some captured in less than 300 m. Common off southern Africa; tropical/subtropical waters of all oceans.

77.7 *Scopelarchus guentheri*
Alcock, 1896

Scopelarchus guentheri Alcock, 1896: 306 (Arabian Sea); 1897, pt. 4, Pl. 18, Fig. 7; Johnson, 1974: 173*; 1982: 171.

D 7-8; A 24-29; P 18-21; LL 47-52; vertebrae 46-51.

Pigment on body limited to dark stripes dorsal and ventral to LL. Attains 12 cm SL. Oceanic, mesopelagic; most adults from depths in excess of 500 m; some from the upper 150 m. Off Durban; mainly tropical in the Atlantic, tropical/subtropical in the Indian and Pacific oceans.



77.7 *Scopelarchus guentheri:* 5 cm SL (after Johnson, 1974).

77.8 *Scopelarchus michaelsarsi*
Koefoed, 1955

Scopelarchus michaelsarsi Koefoed, 1955: 6, Pl. 2, Fig. 6 (central North Atlantic); Johnson, 1974: 183*; 1982: 171.

D 7-9; A 18-21; P 18-21; LL 40-44; vertebrae 40-44.

Medial face of P covered with dense black pigment (except 5 ventralmost rays); individual melanophores not readily discernible (in adults). Attains 10 cm SL. Oceanic, mesopelagic; most adults taken deeper than 500 m. Southeast of Durban; tropical/subtropical in all oceans.

77.8 *Scopelarchus michaelsarsi:* 3 cm SL (after Johnson, 1974).

Family No. 78: NOTOSUDIDAE

by G. Krefft

Notosudids **Notosudiede**

Body slender, elongate, round to slightly compressed in the abdominal region. No spiny fin rays. A single dorsal fin of 9-14 rays at about middle of body; pectoral fin rays 10-15; pelvic fins of 8-10 rays, below or somewhat in front of dorsal fin; anal fin of 16-21 rays, on rear quarter of body length; dorsal adipose fin narrow, over anal fin. Snout relatively long, spatulate with rounded tip. Gill-rakers slender, lath-like; 1-3 on upper limb of 1st gill arch, 14-31 on lower limb. When approaching maturity, notosudids lose their gill-rakers and teeth completely. Scales large, cycloid and deciduous, covering body and tail; head with scales on cheeks. No luminescent organs. Vertebrae 42-69 (excluding 1st preural).

Adults of most species near bottom in 300 - 2 000 m, some of them pelagic or mesopelagic; all, however, leave the slope areas with approaching maturity to spawn pelagically under oceanic conditions. Notosudids (at least all species known from adults) are simultaneous hermaphrodites. Small (15 cm) to moderately large (50 cm) fishes occurring in all oceans, but nowhere of commercial importance. Three genera, with a total of 18 (or 19) species; about 8 in our area. Recently revised by Bertelsen, Krefft & Marshall (1976).

KEY TO GENERA

1a Snout length more than 10% SL; end of maxilla below front half of eye; posterior circumorbital bones fused into a large, crescentic plate with nearly smooth posterior border; lower GR 26-30 ..... *Luciosudis*

1b Snout length 6-10% SL; end of maxilla below or behind rear half of eye (in adults); circumorbital bones separate, lower GR 13-21 2

2a V inserted below or just in front of D origin; posterior circumorbitals forming simple half tubes, without posterior expansions; ventral body wall thin and transparent ..... *Ahliesaurus*

2b V distinctly in front of D origin; posterior circumorbitals with lobed posterior expansions; ventral body wall relatively thick, not (except just around anus) transparent ..... *Scopelosaurus*

Genus ***Ahliesaurus*** Bertelsen, Krefft & Marshall, 1976

Two species; 1 in our area. *A. brevis* of the northern Indian and Pacific oceans has fewer vertebrae (42-46) and pyloric caeca (4-8).

78.1 *Ahliesaurus berryi* Bertelsen, Krefft & Marshall, 1976

Ahliesaurus berryi Bertelsen, Krefft & Marshall, 1976: 22, Figs. 13-16 (South Atlantic).

D 10-11; A 19-21; P 10-12; V 9; GR 1+(14-16); LL 45-50; vertebrae 47-50; pyloric caeca 8-11. Body depth 5.3-8.6% SL.

Olive-brown, edges of scale pockets blackish; ventrally 2 black bands formed by peritoneum showing through the body wall; opercles and interior of mouth black; a large blackish triangular spot on C base. Attains 28 cm. Mesopelagic to bathypelagic; occasionally taken in pelagic trawls fishing deeper than 500 m. Subtropical and tropical Atlantic, also Indian and central Pacific oceans.

78.1 *Ahliesaurus berryi:* 27 cm holotype and ventral view (after Bertelsen, Krefft & Marshall, 1976).

Genus ***Luciosudis*** Fraser-Brunner, 1931

A single species.

78.2 *Luciosudis normani* Fraser-Brunner, 1931

Luciosudis normani Fraser-Brunner, 1931: 220, Fig. 2 (? 11°05'S, 03°20'E; Fraser-Brunner's presumed type-locality probably is in error, as the species is known only from about 30° to 45°S); Bertelsen et al., 1976: 92*.

D 10-13; A 17-20; P 12-14; V 9-10; GR 1+(27-31); LL 56 (+5 non-perforated scales); vertebrae 57-59; pyloric caeca 10-14.

Body, head and fins blackish; midventral scale row dull silvery. Attains 23 cm. Mesopelagic to bathypelagic in 500 - 800 m; mainly inside Subtropical Convergence area of southern oceans; larvae in western Indian Ocean northward to about 15°S.

78.2 *Luciosudis normani:* 19 cm (after Bertelsen et al., 1976).

Genus ***Scopelosaurus*** Bleeker, 1860

Thirteen (perhaps 15) species; about 6 in our area (a few larvae of a species closely related to the North Pacific *S. harryi* taken off the east coast of our area have been omitted). *S. hoedti* Bleeker, 1860, the type-species of *Scopelosaurus,* is widely distributed in the (eastern) Indian and Pacific oceans; it was caught once off the east coast of South Africa as an expatriated very small juvenile, and is thus included in the key.

KEY TO SPECIES

1a LL scales and vertebrae 63-67 . . . . . *S. hamiltoni*
1b LL scales and vertebrae 53-62 2

2a A distinct black spot surrounding anus . . . . . *S. meadi*
2b No distinct black spot surrounding anus 3

3a Mandibular pores never heavily outlined with black pigment, primary pores small, in a single row and obscured by numerous secondary pores; 53-56 LL scales and vertebrae . . . . . *S. smithii*
3b Mandibular pores heavily outlined with black pigment, primary pores large, arranged in pairs and always distinct; 54-62 LL scales and vertebrae 4

4a LL scales and vertebrae 60-62 . . . . . *S. herwigi*
4b LL scales and vertebrae 54-59 5

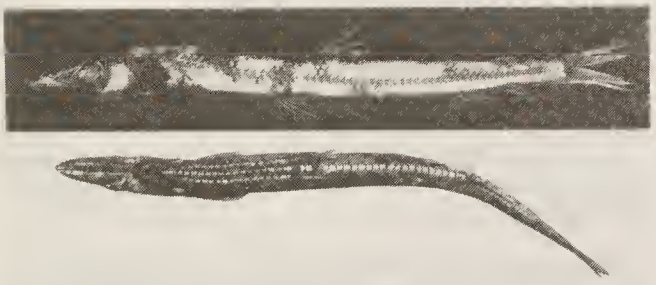
5a 54-56 (rarely 57) LL scales and vertebrae; GR 1+(15-17); 6-13 pyloric caeca . . . . . *S. hoedti*
5b 58-59 (rarely 57) LL scales and vertebrae; GR 1+(16-19); 15-18 pyloric caeca . . . . . *S. ahlstromi*

78.3 *Scopelosaurus ahlstromi*
Bertelsen, Krefft & Marshall, 1976

Scopelosaurus ahlstromi Bertelsen, Krefft & Marshall, 1976: 37, Fig. 24 (40°00′S, 30°35′W).

D 10-12; A 16-18; P 12-13; V 9; GR 1+(16-19); LL 57-59; 15-18 pyloric caeca.

Body brownish; scale pockets on dorsum and upper lateral part of body densely speckled with melanophores; lower lateral parts much lighter, milky-bluish on abdomen, and whitish on ventral side of belly behind vent; interior of mouth, opercles and peritoneum black. In life, all scales below LL bright silvery. Attains 20 cm. Epipelagic to mesopelagic; feeding adults on continental slope in 400 - 500 m; from about 32° to 45°S, in all 3 oceans; small adolescents in Indian Ocean northward to about 12°S.



78.3 *Scopelosaurus ahlstromi:* 11 cm holotype and ventral view (after Bertelsen et al., 1976).

78.4 *Scopelosaurus hamiltoni*
(Waite, 1916)

Notosudis hamiltoni Waite, 1916 (Maquarie Id.). *Scopelosaurus hamiltoni:* Bertelsen et al., 1976: 87*.

D 10-13; A 18-21; P 11-14; V 9; GR 1+(18-21); LL 63-67; vertebrae 63-67; 15-20 pyloric caeca.

Body dark brownish to blackish, paler below; an indistinct blackish anal spot of the peritoneum showing through the skin may be observed in scaleless specimens; no silvery scales on ventral parts of body. Attains 50 cm. Mesopelagic (juveniles) to benthopelagic (adults) down to 1 000 m; southern oceans from about 30° to 60°S.

78.4 *Scopelosaurus hamiltoni:* 14 cm (after Bertelsen et al., 1976).

78.5 *Scopelosaurus herwigi*
Bertelsen, Krefft & Marshall, 1976

Scopelosaurus herwigi Bertelsen, Krefft & Marshall, 1976: 40, Fig. 26 (27°57′S, 40°52′W).

D 10-12; A 17-19; P 12-14; GR 1+(14-15); LL 60-62; vertebrae 60-62 (specimens from New Zealand with 59-60 vertebrae); 15-17 pyloric caeca. Very similar to *S. ahlstromi*.

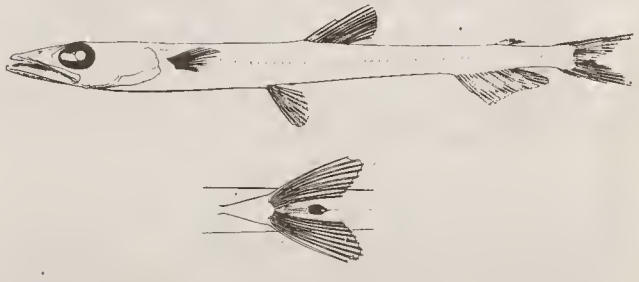
Juveniles with silvery scales on ventral part of body. Attains 35 cm. Juveniles epipelagic to mesopelagic inhabiting warm currents sweeping southwest from the equator; adults benthopelagic in slope areas of southern Africa in Atlantic and Indian oceans, down to about 750 m; also off New Zealand.

78.5 *Scopelosaurus herwigi:* 10.5 cm holotype (after Bertelsen et al., 1976).

78.6 *Scopelosaurus meadi*
Bertelsen, Krefft & Marshall, 1976

Scopelosaurus meadi Bertelsen, Krefft & Marshall, 1976: 64, Figs. 43-44 (40°18′S, 39°12′W).

D 10-12; A 17-20; P 12-14; V 9; GR 1+(18-20); LL 57-60; vertebrae 57-60; 12-17 pyloric caeca.



78.6 *Scopelosaurus meadi:* 6 cm paratype; ventral view of pelvic fins and anus below (after Bertelsen et al., 1976).

Body translucent greyish, above LL densely marked with melanophores; innermost V rays heavily pigmented with black. Attains 20 (?) cm. From about 19° to 43°S, epipelagic to mesopelagic when adolescent, benthopelagic on slopes in about 500 m when adult; all 3 oceans.

78.7 *Scopelosaurus smithii*
Bean, 1925

Scopelosaurus smithii Bean, 1925: 13 (off Brazil); Bertelsen et al., 1976: 44*.

D 10-12; A 17-19; P 11-14(15); V 9; GR 1+(13-17); LL 53-56; vertebrae 53-56; 12-16 pyloric caeca.

Blackish on head and back, somewhat paler below; live juveniles bright silvery below LL. Attains 25 cm. Mainly tropical between 20°N and 20°S, larger juveniles and adults migrating into subtropical waters in all 3 oceans. Juveniles epipelagic to mesopelagic, adults benthopelagic over continental and insular slopes. A single adult taken by the Russian research trawler *Fiolent* at 24°40′S, 35°38′E.

78.7 *Scopelosaurus smithi*: 13 cm (after Bertelsen et al., 1976).

Family No. 79: SYNODONTIDAE

by R.F. Cressey

Lizardfishes **Akkedisvisse**

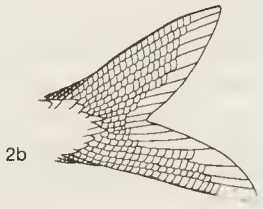
Body fusiform. Fins with branched and unbranched rays, no spines. Pelvic fins with 8 or 9 rays. Nostrils double, anterior with dermal flap on posterior margin. Mouth large, with caniniform teeth along margins of both jaws, 2 or 4 groups of palatine teeth. Gill-rakers minute. Scale counts above lateral line are from dorsal fin origin diagonally to lateral line; scales below lateral line are diagonally from lateral line to anal fin origin.

Adults taken from shore out to 4 100 m. Distribution of most species restricted to major oceans, few circumglobal. Four genera, with 50 species. Indo-West Pacific *Synodus* (21 species) recently revised by Cressey (1981). Data on *Bathysaurus* supplied by K. Sulak.

KEY TO GENERA

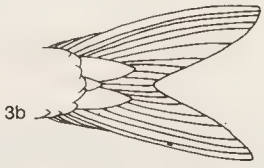
1a D rays 15-18; LL scales enlarged (depth range 900 - 4 100 m) ..... *Bathysaurus*
1b D rays 9-14; LL scales not enlarged (depth range 1 - 300 m) 2

2a V rays 8; primary C rays without scales 3
2b V rays 9; procurrent and primary C rays with scales ..... *Saurida*



3a Snout length less than diameter of bony orbit; procurrent C rays with scales; length of A base 23-27% SL ..... *Trachinocephalus*

3b Snout length greater than diameter of bony orbit; procurrent and primary C rays without scales; length of A base 8-18% SL ..... *Synodus*



Genus *Bathysaurus* Günther, 1878

Two species; 1 in our area. *B. mollis* Günther, 1878 has been reported from near the Comoro Ids.; it has an adipose fin and the LL does not extend onto C.

79.1 *Bathysaurus ferox*
Günther, 1878

Bathysaurus ferox Günther, 1878: 181 (New Zealand); Smith, **SFSA No. 179***; Mead, 1966: 105.

D 17; A 12-13; P 15; vertebrae 63; LL 65; scales above LL 13, below LL 14. No adipose fin; LL extends onto C. P reaches well past line from D origin to V origin.

Preserved specimens darker below than above; fins darker than body, paired fins nearly black. Attains 60 cm.

79.1 *Bathysaurus ferox*: 52 cm (from Mead, 1966).

Off the Cape in 1 000 - 2 560 m, both sides of Atlantic Ocean and off New Zealand.

Genus ***Saurida*** Valenciennes, 1849

Fourteen species; 2 in our area.

KEY TO SPECIES

1a D rays 9-11; prominent dark blotches on dorsolateral part of body; no dark spots along upper edge of C ..... *S. gracilis*
1b D rays 11-13; a series of dark spots along front edge of D and upper edge of C ..... *S. undosquamis*

79.2 *Saurida gracilis*
(Quoy & Gaimard, 1824)

Graceful lizardfish — Sierlike akkedisvis

Saurus gracilis Quoy & Gaimard, 1824: 224 (Hawaiian Ids. and Mauritius). *Saurida gracilis:* Smith, **SFSA No. 175.** ?*Saurida tumbil* (*non* Bloch): Smith, **SFSA No. 177.**

D 9-11; A 8-10; P 13-14; vertebrae 47-50; LL 47-51; scales above LL 3½, below LL 4½. P reaches line from D origin to V origin. Teeth on tongue minute. Anterior nostril flap large, heavily pigmented, medial portion attenuated and triangular.

Prominent dorsal and lateral pigment blotches distinguish this species from all other Indo-West Pacific *Saurida*. Attains 20 cm. Common in shallow water over sandy bottoms. A widely-distributed Indo-West Pacific species extending south to Algoa Bay.

79.2 *Saurida gracilis:* 14 cm.

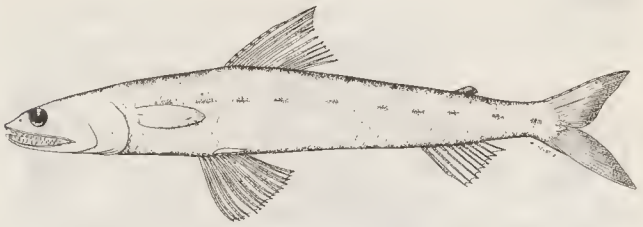
79.3 *Saurida undosquamis*
(Richardson, 1848)

Largescale lizardfish — Grootskub-akkedisvis

Saurus undosquamis Richardson, 1848: 138, Pl. 51, Figs. 1-6 (Northwest Australia). *Saurida undosquamis:* Günther, 1864: 400; Smith, **SFSA No. 176*;** van der Elst, 1981: 341*. *Saurida grandisquamis* Günther, 1864: 400 (Australia).

D 11-13; A 9-12; P 14-15; vertebrae 45-48; LL 45-50; scales above LL 4½, below LL 5½. P reaches line from D origin to V origin. Anterior nostril flap short, rounded, extending only slightly beyond nostril margin when depressed anteriorly.

A series of dark spots along front edge of D and upper edge of C separates this species from all other Indo-West Pacific *Saurida*. Attains 50 cm. Common throughout Indo-West Pacific (immigrant to Mediterranean), from shore to 100 m; extends west to Knysna.



79.3 *Saurida undosquamis:* 17 cm.

Genus ***Synodus*** Gronow, 1763

Thirty-five species; 6 in our area. *Sy. synodus* (Linnaeus) was erroneously recorded from Natal by Fowler (1925), see Smith (**SFSA No. 173**).

KEY TO SPECIES

1a 3½ scales above LL 2
1b 4½-6½ scales above LL 4

2a P rays 13; 2 small black streaks at upper edge of operculum ..... *Sy. indicus*
2b P rays 11-13; upper edge of operculum with or without a black blotch, but not 2 small black streaks 3

3a Conspicuous black blotch on upper edge of operculum; P reaches line from D origin to V origin ..... *Sy. hoshinonis*
3b No conspicuous black blotch on operculum; P reaches beyond line from D origin to V origin ..... *Sy. binotatus*

4a Scales on cheek behind mouth; dermal flap of front nostril short ..... *Sy. englemani*
4b No scales on cheek behind mouth; nostril flap short or long 5

5a C peduncle with conspicuous dark blotch; dermal flap of front nostril short ..... *Sy. jaculum*
5b No dark blotch on C peduncle; anterior nostril flap extends well past nostril margin when depressed anteriorly ..... *Sy. variegatus*

79.4 *Synodus binotatus*
Schultz, 1953

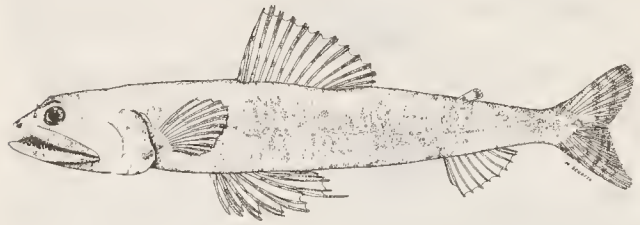
Spotnose lizardfish — Kolneus-akkedisvis

Synodus binotatus Schultz, 1953: 35, Fig. 8 (Marshall Ids.); Cressey, 1981: 9*.

D 12-14; A 8-10; P 12; vertebrae 51-55; LL 52-55; scales above LL 3½, below LL 5. Anterior nostril flap long and spatulate.

Tip of snout usually with 2 conspicuous dark spots dorsally. Body dorsally with 4 dark brown or reddish saddle-like bars; 3 pale bands between each dark band in preserved specimens; pigmentation similar to that of *Sy. variegatus* and *englemani* but *binotatus* paler. Attains 16 cm. Common

throughout Indo-West Pacific, usually in less than 10 m; reaching south to Sodwana Bay (first record for southern Africa).



79.4 *Synodus binotatus:* 11.5 cm.

79.5 *Synodus englemani*
Schultz, 1953
PLATE 11

Redband lizardfish — Rooistreep-akkedisvis

Synodus englemani Schultz, 1953: 41, Fig. 9 (Marshall Ids.); Winterbottom, 1978: 44; Cressey, 1981: 14*.

D 11-13; A 8-10; P 13; vertebrae 59-62; LL 60-63; scales above LL 5½, below LL 7. P reaches line from D origin to V origin. Anterior nostril flap not extending much beyond nostril margin when depressed anteriorly.

Live fish with a scarlet band along scale row below LL intersecting a series of vertical red bars and blotches; C with indistinct reddish brown bars; D and V rays with reddish brown spots. Pigment pattern of preserved specimens as in *Sy. variegatus*, except most fish with a wide dark stripe along LL. Attains 23 cm. Often collected with *Sy. variegatus;* commoner at shallower depths of their combined depth ranges. Common throughout Indo-West Pacific to 60 m; extending south to Sodwana Bay.

79.5 *Synodus englemani:* 13.5 cm.

79.6 *Synodus hoshinonis*
Tanaka, 1917

Blackpatch lizardfish — Swartvlek-akkedisvis

Synodus hoshinonis Tanaka, 1917: 38 (Japan); Cressey, 1981: 19*.

D 12-14; A 8-10; P 11-12; vertebrae 54-57; LL 55-57; scales above LL 3½, below LL 5. Scales on cheek behind mouth. Anterior nostril flap rounded, barely reaching nostril margin when depressed anteriorly.

Dorsum with alternating light and dark saddle-like blotches extending laterally to form diamond-shaped patches at level of LL; conspicuous black blotch on upper edge of operculum. Attains 25 cm. Northern Mozambique (19°09'S), Indian Ocean and Japan; usually at depths over 50 m. A closely related species (*Sy. tectus* Cressey, 1981) interrupts the distribution in the central West Pacific.

79.6 *Synodus hoshinonis:* 10.5 cm.

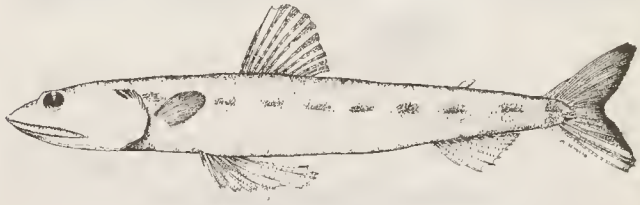
79.7 *Synodus indicus*
(Day, 1873)
PLATE 11

Indian lizardfish — Indiese akkedisvis

Saurus indicus Day, 1873: 526 (India). *Synodus indicus:* Smith, **SFSA No. 172***; Cressey, 1981: 21*.

D 11-13; A 9-11; P 13; vertebrae 52-59; LL 52-60; scales above LL 3½, below LL 5. P not reaching line from D origin to V origin. Anterior nostril flap long and triangular (somewhat spatulate in specimens over 15 cm). Anterior palatine teeth not longer than posterior teeth in specimens under 15 cm, slightly longer in larger specimens.

Nine dark blotches along LL in preserved specimens (more conspicuous in large specimens); 2 small black streaks at upper edge of operculum. Attains 33 cm. Throughout Indian Ocean in 20 - 100 m; common in Natal, occasional specimens reach Mossel Bay.



79.7 *Synodus indicus:* 16.5 cm.

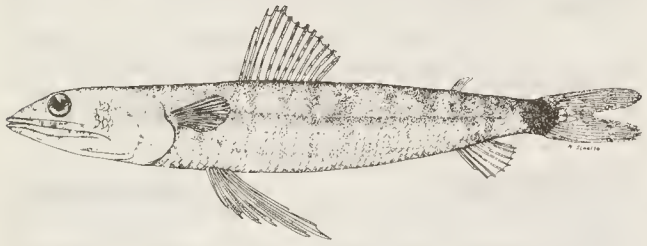
79.8 *Synodus jaculum*
Russell & Cressey, 1979

Blacktail lizardfish — Swartstert-akkedisvis

Synodus jaculum Russell & Cressey, 1979: 169, Fig. 2 (Great Barrier Reef); Cressey 1981: 23*.

D 11-13; A 8-10; P 12-13; vertebrae 59-62; LL 59-62; scales above LL 5½ - 6½, below LL 9. P reaches line from D origin to V origin. Post-oral portion of cheeks naked. Anterior nostril flap short and triangular as in *Sy. englemani.*

Pigmentation of preserved specimens like *Sy. variegatus,* except C peduncle with conspicuous dark blotch. Attains 15 cm. Throughout Indo-West Pacific; usually associated with coral reefs at depths of 50 - 100 m. Several specimens from Sodwana Bay (1st record for southern Africa).



79.8 *Synodus jaculum:* 6 cm.

79.9 *Synodus variegatus*

Lacepède, 1803

PLATE 11

Variegated lizardfish — Bont akkedisvis

Synodus variegatus Lacepède, 1803: 157 (Mauritius); Smith, **SFSA No. 174*;** Cressey, 1981: 6*.

D 10-13; A 8-10; P 11-13; vertebrae 55-60; LL 56-61; scales above LL 4½ - 5½, below LL 7. P reaches line from D origin to V origin. No scales on cheek behind mouth.

Body with a series of 8-9 dark brown (dorsal half of alternate blotches reddish in life) saddle-like blotches, widest dorsally, constricted towards LL, widening at LL to diamond shape with ventral apex elongated. Attains 22 cm. Common throughout Indo-West Pacific, usually at depths less than 20 m; extends south to Durban.

79.9 *Synodus variegatus:* 16 cm.

Genus *Trachinocephalus* Gill, 1862

One species in all 3 major oceans, but not in eastern Pacific.

79.10 *Trachinocephalus myops*

(Forster, 1801)

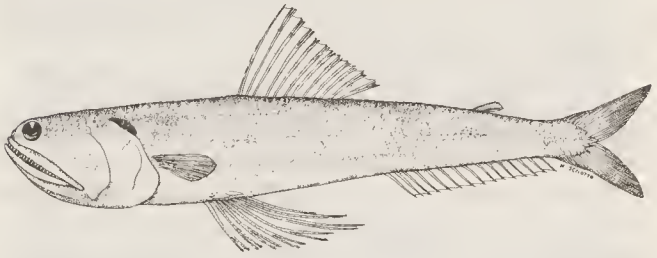
PLATE 11

Painted lizardfish — Beskilderde-akkedisvis

Salmo myops Forster, *in* Bloch & Schneider, 1801: 421 (St. Helena). *Trachinocephalus myops:* Smith, **SFSA No. 178*;** Anderson et al., 1966: 38*.

D 11-14; A 13-18; P 11-13; vertebrae 52-58; LL 51-61; scales above LL 3½, below LL 5½. P reaches line from D origin to V origin.

Attains 38 cm. From estuaries and shore out to 200 m. Pantropical in distribution; along east coast to Knysna, and in the Atlantic south to Lüderitz, Namibia.



79.10 *Trachinocephalus myops:* 18.5 cm.

Family No. 80: GIGANTURIDAE

by R.K. Johnson

Telescopefish — **Teleskoopvisse**

Eyes tubular, directed straight forward, in parallel with main axis of body. Mouth extending far behind eye. Teeth fang-like, unbarbed, recurved, depressible; jaws with a medial row of enlarged canines and 1 or 2 lateral rows of smaller canines; anteriormost canine in each jaw recurving anteriad. Skin loose, scales lacking, a thick layer of mesenchymal jelly, adding substantially to an overall characteristic flabbiness. Bases of pectoral fins nearly horizontal, above gill openings, with 30-43 rays. Caudal fin forked, middle rays of lower lobe greatly elongated. The following elements (among others) are lacking in adults: pelvic fins, dorsal adipose fin, branchiostegal rays, gill-rakers, and most of first 3 gill arches (cf. Regan, 1925; Walters, 1961, 1964; Rosen, 1973).

Giganturids are oceanic and deep mesopelagic or bathypelagic. Juveniles and adults have most commonly been captured at depths exceeding 500 m, and specimens have been taken in closing net hauls at depths exceeding 2 000 m. The larvae are mostly in the upper 200 m. There is no evidence for diel migration. Adults feed mainly on fishes. Two monotypic genera, one, possibly both, in our area. Regan (1925), Walters (1961, 1964), and Rosen (1973) constitute the most important accounts of the group. The monotypic Rosauridae (Tucker, 1954) is based on a larval specimen of *Rosaura indica* and adults, formerly placed in *Bathyleptus* Walters, are now placed in *Rosaura* Tucker, 1954.

KEY TO SPECIES

1a P 30-33; A 8-10; C peduncle depth > 11.5% SL (larvae), > 8% SL (juveniles and adults) ..... *Gigantura chuni*

1b P 36-42; A 11-14; C peduncle depth < 11.5% SL (larvae), < 5% SL (juveniles and adults) ..... *Rosaura indica*

80.1 *Gigantura chuni*
Brauer, 1901

Gigantura chuni Brauer, 1901: 128 (Gulf of Guinea). *Gigantura vorax* Regan, 1925: 54, Figs. 1-4; Pl. 7, Fig. 2 (central North Atlantic); Walters, 1964: 574* (western North Atlantic).

D 16-19; A 8-10; P 30-33; V 5 (in larvae), lacking in adults; vertebrae 29-30 (Walters, 1964: 574). Body heavy and compressed; C peduncle depth 8-12% SL in adults.

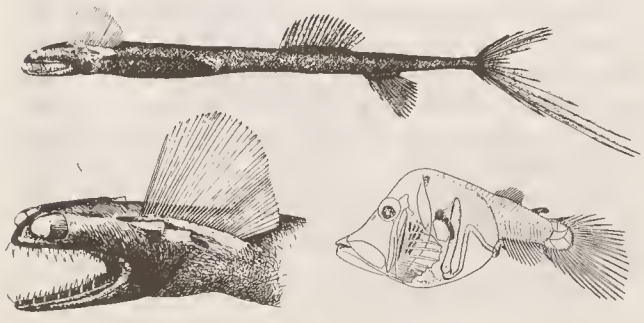
Colour black to greyish brown in alcohol. A burnished iridescent silvery coloration has been described for fresh material in good condition. Attains at least 16 cm SL. Mainly tropical in all 3 major oceans. Nearest capture to our area at 16°12′S, 42°04′E, thus it presumably occurs within the northern Indian Ocean sector of our area.

80.1 *Gigantura chuni:* 15.5 cm SL (after Walters, 1964).

80.2 *Rosaura indica*
(Brauer, 1901)

Gigantura chuni indica Brauer, 1901: 129 (Indian Ocean). *Gigantura indica:* Brauer, 1906: 311*. *Gigantura gracilis* Regan, 1925: 54, Pl. 7, Fig. 1 (western North Atlantic, Caribbean Sea, Gulf of Mexico). *Rosaura rotunda* Tucker, 1954: 167, Figs. 1-8 (western equatorial Atlantic); Berry & Perkins 1965: 654*. *Bathyleptus lisae* Walters, 1961: 316, Fig. 1 (central North Pacific). *Bathyleptus gracilis:* Walters, 1964: 572*. *Bathyleptus indicus:* Walters, 1964: 572.

D 16-19; A 11-14; P 36-42; V 5 (in larvae); vertebrae 30-31 (Walters, 1961: 316). Trunk pencil-shaped; C peduncle depth ca. 2.5-4.5 % SL in adults.



80.2 *Rosaura indica:* 18 cm SL adult and head (after Berry & Perkins, 1965). Bottom right: 0.8 cm SL larva, holotype of *R. rotunda* (after Tucker, 1954).

Colour in alcohol brown to blackish brown, presumably with a silvery, iridescent sheen in life. Attains at least 11 cm SL. Tropical/subtropical in all 3 major oceans, both adults and larvae (numerous examples) well known from Indian Ocean part of our area, from 35°49′S, 23°09′E to the northern Indian Ocean.

Family No. 81: PARALEPIDIDAE

by A. Post

Barracudinas **Barrakudinas**

Body elongate and slender, subcylindrical to laterally compressed. A single short dorsal fin set behind midpoint of body. Anal fin long, with 20 to 50 rays, its origin well behind dorsal fin. Pectoral fins set low on body. Pelvic fins small, behind middle of body, with 8-12 rays. No spiny rays in fins. Dorsal adipose fin always present above last anal fin rays; ventral adipose fin present in some genera. Caudal fin small, forked, with 18-20 principal rays. Snout pointed; mouth terminal. Alternately fixed and depressible fang-like teeth on dentary and palatines; premaxillae with 1 row of canines (2-4 anteriormost teeth enlarged and depressible in some species). Gill-rakers reduced to teeth or spines in multiple series on bony shields. Scales, when present, cycloid and very easily shed. Lateral line present. Light organs present (in 2 genera) or absent. No swimbladder.

Small to medium-sized, pelagic fishes ranging from about 15 to more than 100 cm total length (adults of many species still unknown). Barracudinas are common in all oceans from the Arctic to the Antarctic, and are important as food for swift predators such as tunas. There are 12 genera with about 50 species in this family. In our area, 7 genera are represented by 12 species; 5 additional species may turn up here and are included in the keys.

KEY TO GENERA

1a Longest P ray distinctly longer than A base; large, fixed mandibular teeth with serrate edges ..... *Sudis*
1b Longest P ray shorter than A base; large, depressible mandibular teeth with smooth edges 2

2a V origin below or behind D origin 3
2b V origin well before D origin (by at least 1 eye diameter) 6

3a Ventral adipose fin present between anus and A; band of luminous tissue on ventral midline from between V to isthmus; easily visible between opercles (on belly sometimes hidden by fleshy ridge) ..... *Lestidium*
3b No ventral adipose fin; no band of luminous tissue ventrally ... 4

4a A 21-25; V origin more or less below D origin 10
4b A 28-33; V origin below or behind last D ray 5

5a Body scaled, but scales easily shed; "gill-rakers" forming numerous rows of short needle-like filaments ..... *Notolepis* (in part)

5b Body scaleless; "gill-rakers" tooth-like on bony bases . . . . . *Macroparalepis* (in part)

6a Two parallel ventral bands of luminous tissue on belly from between V to isthmus; prominent black spot immediately before eye . . . . . *Lestrolepis*
6b No luminous organ on belly; no black spot before eye 7

7a Body vertically striped; stripes caused by accessory tubes, running from each LL scale to dorsal and ventral midline . . . . . *Notolepis* (in part)
7b Body not vertically striped; LL scales normally shaped 8

8a Ventral adipose fin absent between anus and A; D 12-13 . . . . . *Macroparalepis* (in part)
8b Ventral adipose fin present between anus and A; D 8-10 9

9a A 28-31 . . . . . *Lestidiops*
9b A 35-38 . . . . . *Stemonosudis*

10a 3-4 dark peritoneal sections in young; 59-73 vertebrae (urostyle excluded) . . . . . *Magnisudis*
10b 9 or more peritoneal sections in young; 74-77 vertebrae . . . . . *Paralepis*

Genus ***Lestidiops*** Hubbs, 1916

About 15 species, 2 in our area. The 2 species described below belong to a *L. sphyraenoides/jayakari*-complex of 9 nominal species and subspecies. Possibly only 2 species are valid and might be represented by different subspecies in different areas; nevertheless, *L. jayakari* and *L. similis* as described herein, are different species.

KEY TO SPECIES

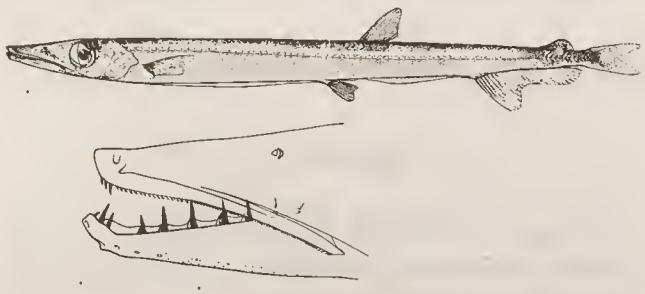
1a A 29-31; vertebrae 78-81 (without urostyle) . . . . . *L. jayakari*
1b A 28-30; vertebrae 86-91 . . . . . *L. similis*

81.1 *Lestidiops jayakari*
(Boulenger, 1889)

Sudis jayakari Boulenger, 1889: 241, Fig. 1 (Gulf of Oman); Rofen, 1966: 346*.

D 9-10; A 29-31; P 11-12; LL 63-72; GR (5-8)+(22-28). Depth 10.3-13.3; head 4.6-5.6. Gill-plates with 1-3 teeth. Anterior nostril in front of rear tip of maxilla. LL ending above 20th to 25th A ray.

Body pale, with dark dorsal band, formed by multiple melanophores. Attains about 20 cm. Epipelagic to bathypelagic from 50 to more than 2 000 m, mainly in 300 - 600 m; worldwide in tropical to temperate waters.



81.1 *Lestidiops jayakari:* 17 cm SL (after Rofen, 1966).

81.2 *Lestidiops similis*
(Ege, 1933)

Paralepis similis Ege, 1933: 225 (eastern Atlantic, near Cape Verde); Ege, 1953: 92*

D 9-10; A 28-30; P 11-12; LL 67-76; GR (7-10)+(25-28). Depth 11-15; head 4.8-5.7. Gill-plates with 1-4 teeth. Anterior nostril in front of rear tip of maxilla. LL ending above 20th to 25th A ray.

Body pale with greyish dorsal band, formed by multiple minute melanophores (expanded 0.1-0.5 mm in diameter). Attains about 20 cm. Epipelagic to bathypelagic, mainly in 200 - 600 m; known from temperate and tropical Atlantic between 45°N and 45°S.

81.2 *Lestidiops similis:* 5.5 cm (S. Atlantic; after Ege, 1953).

Genus ***Lestidium*** Gilbert, 1905

Four species; 1 in our area.

81.3 *Lestidium atlanticum*
Borodin, 1928

Lestidium atlanticum Borodin, 1928: 10, Pl. 1, Fig. 2 (Jamaica); Rofen, 1966: 308*.

D 9-10; A 26-30; P 12-13; LL 114-126; GR (10-12)+(30- 36). Depth 11-12.5; head 4.3-5.0. Gill-plates with 1-3 teeth. Anterior nostril in front of rear tip of maxilla. LL running from upper rim of operculum to C base.

Body pale, except for a greyish dorsal band formed by tiny melanophores; C peduncle heavily pigmented in adults, except for a light band along LL. Attains about 25 cm. Epipelagic to mesopelagic from 50 m (young) to 1 000 m; tropical to subtropical in all oceans.

81.3 *Lestidium atlanticum:* 17 cm SL (after Rofen, 1966).

Genus ***Lestrolepis*** Harry, 1953

Three species; 1 in our area.

81.4 *Lestrolepis intermedia*
(Poey, 1868)

Paralepis intermedius Poey, 1868: 416 (Cuba). *Lestrolepis intermedia:* Rofen, 1966: 372*.

D 9; A 40-43; P 11; LL 69-77, extending to above middle of A. Gill-plates with 1-3 teeth. Ventral adipose fin present between anus and A.

Body pale, with dark dorsal band consisting of stellate melanophores, ending well above LL. Attains about 25 cm. Epipelagic (young) to bathypelagic; strictly tropical in all oceans; off South Africa only in Agulhas Current.

81.4 *Lestrolepis intermedia:* 12.5 cm SL (after Rofen, 1966).

Genus ***Macroparalepis*** Ege, 1933

Eight species; 2 in our area. *M. longilateralis* Post, 1973 and *M. mirabilis* (Ege, 1933) may occur in our area and are included in the key.

KEY TO SPECIES

1a LL extending from upper rim of operculum to C base; D origin about midway between origins of V and A . . . . . [*M. longilateralis*]
1b LL terminating above A; D origin distinctly nearer to V than to A origin 2

2a V origin slightly behind D origin; D rays 9 or 10 . . . . [*M. mirabilis*]
2b V origin before D origin; D rays 12 or 13 3

3a A 24-28; vertebrae 94-101 . . . . . *M. affinis*
3b A 29-32; vertebrae 107-110 . . . . . *M. macrogeneion*

81.5 *Macroparalepis affinis*
Ege, 1933

Macroparalepis affinis Ege, 1933: 231* (25°07'N, 19°20'W); Rofen, 1966: 392*; Post, 1973: 208*.

D 11-14; A 24-28; P 10-11; LL 81-91; GR (20-58)+(3-11), number highly variable, with reduction of GR and total loss in adults. Depth 10-19; head 4.3-5.9.

Body pale, with dark dorsal band in young, black in adult specimens. Attains 55 cm. Mesopelagic to bathypelagic. Anti-tropical in Atlantic Ocean; from the South Pacific known only from stomachs of *Alepisaurus*.

81.5 *Macroparalepis affinis:* 12.5 cm (after Rofen, 1966).

81.6 *Macroparalepis macrogeneion*
Post, 1973

Macroparalepis macrogeneion Post, 1973: 218* (38°38'S, 51°55'W); Trunov, 1976: 658*.

D 12-13; A 29-32; P 11-12; LL 91-99; GR (7-8)+(29-51). Depth 15-22; head 4.8-5.6. Gill-plates with 2-4 teeth. Anterior naris above rear tip of maxilla, slightly anterior to this point in juveniles and subadults.

LL scales marked by isolated black spots; intensity of colour increasing during ontogeny; adults black. Attains 42 cm. Mesopelagic to bathypelagic. South Atlantic subtropical convergence area from South Africa to continental slope off South America.

81.6 *Macroparalepis macrogeneion:* 27 cm; diagrammatic (after Post, 1973).

Genus ***Magnisudis*** Harry, 1953

Four species; 1 in our area. *M. atlantica* (Kröyer, 1868) and *M. indica* (Ege, 1953) may occur in the area and are included in the key.

KEY TO SPECIES

1a Four peritoneal sections in juveniles; vertebrae 59-61 (without urostyle) . . . . . [*M. indica*]
1b Three peritoneal sections in juveniles; 63-73 vertebrae 2

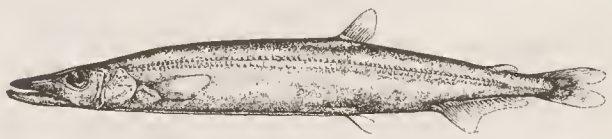
2a 63-66 vertebrae . . . . . [*M. atlantica*]
2b 68-73 vertebrae . . . . . *M. prionosa*

81.7 *Magnisudis prionosa*
(Rofen, 1963)

Paralepis atlantica prionosa Rofen, 1963: 1 (Antarctic, from stomachs of whales). *Paralepis atlantica* (*non* Kröyer): Rofen, 1966: 222*.

D 9-11; A 22-25; P 15-17; LL 57-64; GR (7-10)+(25-31), forming bony plates with 3 to 6 flexible filaments. Depth 9-11; head 3.6-4.2. Anterior naris in front of tip of maxilla. Body scales easily shed.

Body pale, with brownish dorsal band. Attains about 55 cm. Mesopelagic to bathypelagic. Circumglobal in southern oceans from 20°S to the Antarctic.



81.7 *Magnisudis prionosa:* 44.5 cm SL (after Rofen, 1966).

Genus ***Notolepis*** Dollo, 1908

Three species; 2 in our area. Following Harry, 1951, *rissoi* has been placed in *Notolepis,* though its generic position is doubtful. *N. annulata* Post, 1978 may occur in our area and is included in the key.

KEY TO SPECIES

1a V origin posterior to D origin; LL scales without dorsal and ventral prolongations . . . . . *N. rissoi*
1b V origin anterior to D origin; LL scales with dorsal and ventral prolongations . . . . . [*N. annulata*]

81.8 *Notolepis rissoi*
(Bonaparte, 1840)

Paralepis risso Bonaparte, 1840: (338) 152, fasc. XIX, Pl. 124, Fig. 2 (Mediterranean). *Notolepis rissoi:* Rofen, 1966: 280*; Post, 1968: 103.

D 9-10; A 28-33; P 11-13; LL 59-67; GR (8-9)+(30-33) forming bony bases with 12 to 25 needle-like teeth. Depth 12.5- 16.5; head 3.7-4.5. Anterior naris above rear tip of maxilla. Body scales easily shed.

Scattered large melanophores in dorsal colour band; distinct black spot at A origin. Attains 30 cm. Mesopelagic to bathypelagic; worldwide in temperate and tropical waters.

81.8 *Notolepis rissoi:* 24 cm SL (after Rofen, 1966).

Genus ***Paralepis*** Cuvier, 1816

Six species, 1 may occur in our area.

81.9 *Paralepis elongata*
(Brauer, 1906)

Omosudis elongatus Brauer, 1906: 140, Fig. 68 (Gulf of Guinea); ?Gilchrist & von Bonde, 1924: 10; ?Smith, SFSA **No. 186***; Post, 1972: 156. *Paralepis elongata:* Maul, 1962: 539*; Post, 1972: 156.

D 10-12; A 23-25; P 16; LL 63; GR (2-5)+(13-15). Depth 10, head 4.1. Gill-plates with 5 or 6 teeth. Anterior nostril in front of rear tip of maxilla. LL nearly reaches C base. Young stages (< 40 mm SL) with 9-13 peritoneal pigment patches, the anterior 4 sections are very large and separated by extremely narrow intervals.

Attains at least 21 cm. Gulf of Guinea and off west Africa. (Data from Maul, 1962.) The specimen from Natal, listed by Gilchrist & von Bonde (1924), is lost; and the occurrence of *P. elongata* in our area thus needs confirmation.

81.9 *Paralepis elongata:* 20 cm (after Maul, 1962).

Genus ***Stemonosudis*** Harry, 1951

Thirteen species; 3 in our area, known from postlarvae and from young adolescents only; morphometric data as well as colour pattern may be considerably different in adults.

KEY TO SPECIES

1a D 8 or 9; distance from snout to D 57-59%, and to V 46-49% SL; nostrils distinctly anterior to rear tip of maxilla . . . . . *S. macrurus*
1b D 10; distance from snout to D 61-66%, and to V 51-56% SL; nostrils above rear tip of maxilla 2

2a About 15 peritoneal pigment sections . . . . . *S. gracilis*
2b 5 to 8 peritoneal pigment sections . . . . . *S. elegans*

81.10 *Stemonosudis elegans*
(Ege, 1933)

Macroparalepis elegans Ege, 1933: 232 (33°59.5′S, 159°00′E); 1957: 23*.

D 10; A 35-38. Depth 20-23; head 5-6. Postlarvae without prominent prolongation of lower jaw.

Juveniles pale, transparent when fresh. Attains 55 mm. Epipelagic to mesopelagic in tropical Indo-Pacific; off South Africa only in Agulhas Current.

81.10 *Stemonosudis elegans:* 5.5 cm type (after Ege, 1957).

81.11 *Stemonosudis gracilis*
(Ege, 1933)

Macroparalepis gracilis Ege, 1933: 234 (00°06′N, 118°43′E). *Macroparalepis gracile:* Rofen, 1966: 435*.

D 10; A 36-38; P 11-12. Depth 22-25; head 5.5-6.5. Slight prolongation of lower jaws.

Body pale, transparent when fresh; upper part of snout pigmented. Known only from juveniles; probably attains 20+ cm. Epipelagic to mesopelagic in tropical Indo-Pacific and Caribbean Sea; off South Africa only in Agulhas Current.

81.11 *Stemonosudis gracilis:* 9.5 cm (after Ege, 1957).

81.12 *Stemonosudis macrurus*
(Ege, 1933)

Macroparalepis macrurus Ege, 1933: 232 (05°17′S, 97°06′E); 1957: 4*.

D 8-9; A 35-37; P 10-11. Depth 16-19; head 6-7. Postlarvae with prominent non-ossified prolongation at tip of lower jaw.

Juveniles pale, transparent when fresh; a row of small stellate melanophores at each side of dorsal midline; 16-17 peritoneal pigment sections. Known only from juveniles up to 15 cm; probably attains 25+ cm. Epipelagic to mesopelagic in tropical waters of Indian and Pacific oceans; off South Africa only in Agulhas Current.

81.12 *Stemonosudis macrurus:* 6 cm holotype (after Ege, 1957).

Genus ***Sudis*** Rafinesque, 1810

Two species, 1 in our area. *S. atrox* Rofen, 1963 of the eastern North Pacific has fewer vertebrae (53-54).

81.13 *Sudis hyalina*
Rafinesque, 1810

Sudis hyalina Rafinesque, 1810: 60; Rofen, 1966: 448*; Shcherbachev et al., 1978: 187.

D 12-16; A 21-24; P 13-15; LL 59-77; vertebrae 59-60. Depth 9-10; head 2.9-3.2, strongly compressed. Number of GR highly variable, increasing during growth of specimens. Anterior naris in front of rear tip of maxilla. Origin of V slightly in front of D origin. No ventral adipose fin between anus and A.

Maximum size observed, a juvenile specimen about 40 cm; possibly this species grows to more than 100 cm. Colour light with dark dorsal band, but may be black in adults. Mesopelagic to bathypelagic; Atlantic Ocean from 50°N to South Africa.

81.13 *Sudis hyalina*: 27 cm SL.

Family No. 82: ANOTOPTERIDAE

by P.A. Hulley

Daggertooths **Dolktandvisse**

Body elongate, laterally compressed anteriorly, but more or less oval in cross section posteriorly. Head long, with nostrils high on snout and well in front of laterally directed eyes. Jaws about 75% as long as head, extending posteriorly beyond vertical through anterior margin of eye; lower jaw with fleshy, pointed prolongation, extending in front of upper jaw; fixed and depressible series of teeth on jaws; palatines with single row of large teeth, increasing in size posteriorly. Dorsal fin absent; anal fin situated far posteriorly; pectoral fins laterally inserted at ventral profile; ventral fins small and abdominal; well-developed dorsal adipose fin above base of anal fin. Lateral line consisting of single, weakly developed, superficial segmented tube in adults; absent or barely evident in juveniles. Scales, photophores and gill-rakers absent.

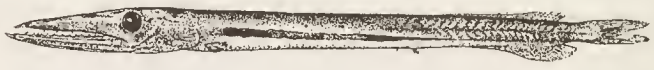
Worldwide, bathypelagic; uncommon. One species only.

82.1 *Anotopterus pharao*
Zugmayer, 1911

Anotopterus pharao Zugmayer, 1911: 13 (34°54′30″N, 11°49′W); 1911: 138*; Rofen, 1966: 498*; Maul, 1973: 211; Parin, 1970: 81; Shcherbachev et al., 1978: 186.

A 14-16; P 12-15; V 9-11; Depth 15.2-19.2; head 3.7-4.2.

Iridescent brassy silver with broad band along dorsum. Attains 90 cm. Off west coast below 700 m, also south of Cape Agulhas, off Transkei and in Mozambique Channel. Worldwide between 25°N and 65°S.



82.1 *Anotopterus pharao:* 5 cm SL (after Rofen, 1966).

Family No. 83: EVERMANNELLIDAE

by R.K. Johnson

Sabretoothed fishes **Sabeltandvisse**

Body strongly compressed, essentially ribbon-like posteriorly. Fin spines absent. Dorsal fin with 10 to 13 rays. Adipose dorsal fin present. Pelvic fins abdominal in position with 9 rays. Normal gill-rakers absent, replaced by gill teeth fixed on bony plates, restricted to lower limb of second gill arch. Scales lacking on head and body. Lateral line scales lacking, replaced (in some species) by a series of membranous, shield-like structures arranged segmentally along midlateral body surface, with posterior extent of series varying between species. Vertebrae 45 to 54. Maxillaries excluded from gape. Dentary teeth in one or two series, including some large fangs; no lingual teeth. Premaxillary teeth numerous, small, retrorse, uniserial. Anteriormost palatine tooth an enormous fang. Tail musculature with an externally visible tripartite division of epaxial and hypaxial musculature separated by a midlateral band of muscle tissue along the vertebral column.

Evermannellids are oceanic and mesopelagic in habitat; they reach a relatively large size for midwater fishes (record for family: 185 mm SL in *Coccorella atlantica).* Most species feed on fishes and are able to swallow very large prey;

limited evidence suggests that species of *Coccorella* may specialise on oceanic squid. Evermannellids occur in all oceans approximately between 40°N and 40°S; they are of no commercial importance. Three genera and 7 species, 3 species in our area. *Odontostomops normalops* (Parr, 1928) and *Coccorella atrata* (Alcock, 1893) have not yet been recorded from the area, but are included in the key. Recently revised by Johnson (1982).

KEY TO SPECIES

1a Eyes "normal" not tubular, directed laterad; aperture in adipose eyelid much smaller than lens of eye; (anteriormost palatine fang and at least some dentary fangs barbed; no fossa at dentary symphysis; pyloric caecum lacking) ..... *Odontostomops normalops*
(Tropical/subtropical in all 3 major oceans; taken to the west (Atlantic Ocean) and north (Indian Ocean) of our area).

Odontostomops normalops: 10 cm SL (after Rofen, 1966).

1b Eyes semitubular or tubular, directed dorso-laterad or dorsad; aperture in adipose eyelid slightly to markedly greater than lens of eye 2

2a Eyes semitubular, directed dorsolaterad; aperture in adipose eyelid only slightly greater than lens of eye; jaw teeth unbarbed; anteriormost palatine tooth an enormous, unbarbed, sabre-like fang, 7.1-10% SL; no fossa at dentary symphysis; pyloric caecum extending into head, visible on floor of mouth as a distinct black tube beneath basibranchial series 3

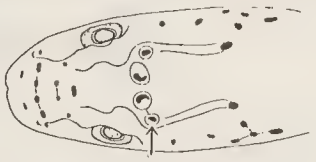
Coccorella atlantica: 4 cm SL (after Rofen, 1966).

2b Eyes tubular, directed dorsad and slightly anteriad; aperture in adipose eyelid much larger than lens of eye; anteriormost palatine fang 4.6-7.3% SL; at least some dentary teeth distinctly barbed; a vertically elongate fossa centred on dentary symphysis; no pyloric caecum 4

Evermannella indica: 8 cm SL (after Rofen, 1966).

3a Vertebrae 48-50; bony interorbital width 3.2-4.7% SL; typically 6 pores, 3+3, in frontal canal commissure (a series of latero-sensory pores behind interorbital region of frontals, forming a transverse connection between infraorbital series of each side ..... *Coccorella atlantica*

3b Vertebrae 45-47; bony interorbital width 4.7-6.1% SL; typically 4 pores, 2+2, in frontal canal commissure ..... *C. atrata*
(Tropical Indo-Pacific; has been taken at 14°16′S, 41°48′E).



Coccorella atrata: dorsal view of head; arrow indicates the series of 4 frontal canal pores.

4a A rays 33-37; vertebrae 52-54 ..... *Evermanella balbo*
4b A rays 27-31; vertebrae 48-52 ..... *E. indica*

Genus ***Coccorella*** Roule, 1929

Two species, 1 known to occur off southern Africa.

83.1 *Coccorella atlantica*
(Parr, 1928)

Evermannella atrata atlantica Parr, 1928: 166, Fig. 39b (off Bermuda). *Coccorella atlantica:* Wassersug & Johnson, 1976: 273*; Johnson, 1982: 117*.

D 11-13; A 26-30; P 12-13. Body depth at A origin, 14-19% SL; head length 19-24% SL. Luminous tissue probably associated with ventral wall of pyloric caecum and intestine (Herring, 1977: 297).

Colour in alcohol: dark brown over body and fins without any distinct concentration of pigment into stripes, bars or markings. In well-preserved specimens a brassy-green iridescent layer is present along flanks, beneath eyes and on cheeks. Attains 185 mm SL. Oceanic, usually in depths exceeding 500 m, but has been taken in 100 - 400 m. Central water areas of all 3 major oceans; off western and south-western Cape coast; 1 specimen from 31°34′S, 30°09′E.

83.1 *Coccorella atlantica:* 4 cm (after Rofen, 1966).

Genus ***Evermannella*** Fowler, 1901

Four species, 2 are known off southern Africa.

83.2 *Evermannella balbo*
(Risso, 1820)

Scopelus balbo Risso, 1820: 268 (Mediterranean Sea). *Evermanella balbo:* Johnson, 1982: 127*.

D 12-13; A 33-37; P 12. Body depth at A origin 14-18% SL; head length 21-25% SL.

Colour in alcohol: varies from light to dark brown, with numerous variably-sized melanophores on body and head; melanophores on body in 7 to 13 irregular rows. Attains 150 mm SL. Oceanic; most adults taken in depths exceeding 400 m, but some from 100 - 300 m. Numerous South Atlantic records just to the west of our boundary, and 4 specimens from off southern Natal. Occurs in cooler, more productive regions of North and South Atlantic, and Mediterranean Sea; presumed to be circumglobal in Transition Region of southern oceans.

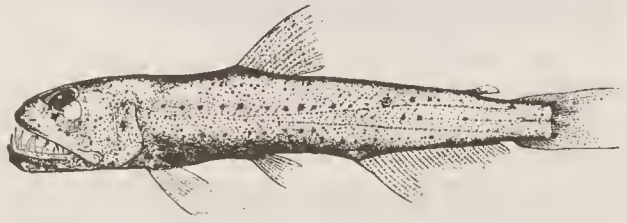
83.2 *Evermannella balbo:* 17 cm SL (after Rofen, 1966).

83.3 *Evermannella indica*
Brauer, 1906

Evermannella indica Brauer, 1906: 135; Johnson, 1982: 136*.

D 12-13; A 27-31; P 11-12. Body depth at A origin 14-17% SL; head length 22-26% SL.

Colour in alcohol usually a light brown with numerous, variably-sized melanophores on head and body. *E. indica* exhibits marked variation in intensity of pigmentation, with individuals throughout the range of the species varying from pale-coloured with sparse pigmentation to specimens covered with brownish-black pigment. Attains 119 mm SL. Oceanic; frequently taken in depths of 500 - 800 m, but adults occur in upper 200 m. Central and equatorial areas of all oceans; taken just to the west (Atlantic Ocean) and north (Indian Ocean) of our area and unquestionably occurs within our limits.



83.3 *Evermannella indica:* 8 cm SL (after Rofen, 1966).

Family No. 84: OMOSUDIDAE

by G.E. Maul

Omsosudids **Omosudiede**

Body moderately deep, strongly compressed. No fin spines; dorsal fin small, behind middle of SL; anal fin base longer than that of dorsal, situated well behind dorsal; pelvics small, situated under dorsal; caudal forked; dorsal adipose fin above end of base of anal. Scales absent. Lateral line only present in specimens less than 4-5 cm SL. Head strongly compressed, its bones soft and smooth; upper jaw bones slender; large scale-like supramaxilla present. Luminous organs absent. Teeth on palatines and lower jaw large but greatly varying in length, those of premaxilla small, in close-set row. Branchiostegal rays 7. Vertebrae 39-41. Gasbladder absent.

Only one species known. Hermaphroditic.

84.1 *Omosudis lowei*
Günther, 1887

Omosudis lowii Günther, 1887: 201, text Fig. 6 & Pl. 52, Figs. C, C' (Madeira & Celebes Sea). *Omosudis lowei:* Ege, 1958: 15*.

D 9-12; A 14-16; P 11-13; lower GR (consisting of short, sharply pointed spines) about 20-25. Depth 4.7-6; head 3.3-3.8 in SL; eye (orbit) 3.6-4.1 in head.

Attains about 20 cm SL. Body brownish dorsally; sides silvery, iridescent, with black peritoneum showing through. Occurs in 100 - 1 000 m. One specimen taken not far off east coast at about 25°S; otherwise known from all oceans between 40°N and 40°S.

84.1 *Omosudis lowei:* 10 cm (after Goode & Bean, 1896).

Family No. 85: ALEPISAURIDAE

by P.C. Heemstra & M.M. Smith

Lancetfishes **Lansetvisse**

Body elongate, compressed, without scales; fleshy keel along each side of caudal peduncle. Dorsal fin high and long; anal fin much shorter, located under rear end of dorsal fin; short adipose fin behind dorsal fin; caudal fin forked; no fin spines. Mouth very large, with fearsome teeth.

Large pelagic fishes, attaining a length of 2 metres.

85.1 *Alepisaurus brevirostris*: 68 cm SL holotype (after Gibbs, 1960).

Lancetfishes occur in the lower epipelagic realm of the open ocean and are often caught on tuna longlines. They feed on a variety of fishes, cephalopods and crustaceans; occasionally caught by anglers trolling lures. Like many of their relatives, lancetfish are synchronous hermaphrodites with male and female parts of the gonad active at the same time (Smith & Atz, 1973). Data in the following species accounts are compiled from the literature. One genus, *Alepisaurus* Lowe, 1833, with 2 species.

KEY TO SPECIES

1a Snout length 31-37% head length; head length 6.2-8.5 in SL, twice or more in distance between P and V origins; D origin distinctly in advance of P origin ..... *A. brevirostris*

1b Snout length 41-47% head length; head length 4.3-6.3 in SL, 1.2-1.7 in distance between P and V origins; D origin over or behind P origin ..... *A. ferox*

85.1 *Alepisaurus brevirostris*
Gibbs, 1960

Shortsnout lancetfish — Kortneus-lansetvis

Alepisaurus brevirostris Gibbs, 1960: 2, Fig. 1 (western Atlantic: 38°49′N, 64°02′W); Gibbs & Wilimovsky, 1966: 489*; Smith, 1975: 21.

D 40-48; A 13-16; P 12-14; V 8-10; GR (3-6)+(17-23). V origin about midway between P and A origins; eye diameter (fleshy orbit) greater than half snout length; D margin evenly curved.

Body iridescent brownish-black dorsally, paler below; D black with horizontal row of white spots some distance above base. Attains 96 cm. One specimen from off Algoa Bay; in all major oceans.

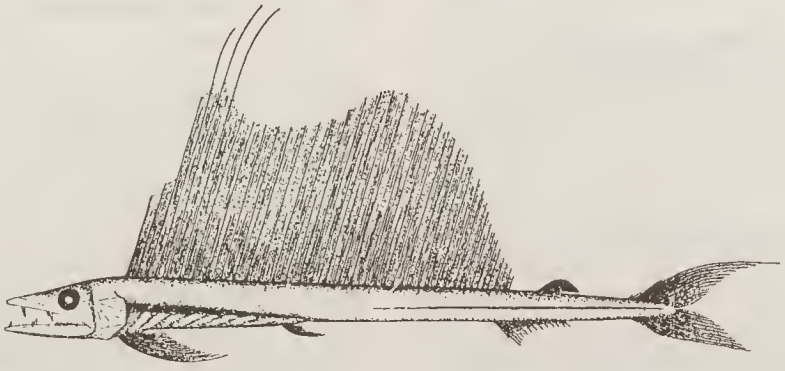
85.2 *Alepisaurus ferox*
Lowe, 1833

Longsnout lancetfish — Langneus-lansetvis

Alepisaurus ferox Low, 1833: 104 (seas off Madeira); Smith, **SFSA No. 187***; de Jager, Nepgen & van Wyk, 1963: 13; Smith, 1965: 16*; Gibbs & Wilimovsky, 1966: 491*; Penrith, 1967: 544; Merrett, 1968: 201.

D 32-45; A 13-18; P 12-15; V 8-10; GR (3-7)+(16-24); vertebrae 47-51. V origin much nearer P origin than A origin; fleshy orbit diameter less than half snout length; D margin not evenly curved, some anterior rays elongated.

Body iridescent and rather pale, slightly darker dorsally; fins brown to black; no white spots on D. Attains 200 cm. Walvis Bay to Sodwana Bay; in all major oceans.



85.2 *Alepisaurus ferox*: ca. 100 cm (after Gibbs, 1960).

Order MYCTOPHIFORMES

by P.A. Hulley

Lanternfishes — Lanternvisse

Small to moderate-sized fishes, head and body compressed; maxillary toothless and excluded from gape by premaxillary; adipose fin present; body photophores present or absent; upper pharyngeal dentition reduced; hinge-joint between fourth tooth-plate and toothed surface of third pharyngobranchial, and between tooth-plate of second epibranchial and toothed surface of second pharyngobranchial; cartilaginous fourth pharyngobranchial reduced; separate internal division of *retractor arcuum branchialium* muscle, which inserts on third pharyngobranchial; second preural neural spine in caudal skeleton reduced to low crest, with first epural growing forward and downward over the crest.

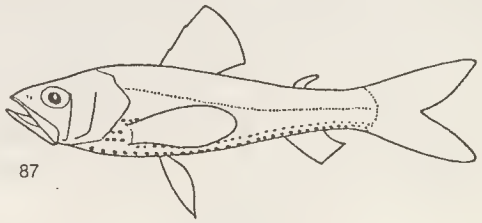
Two families now recognised (Rosen, 1973): Myctophidae and Neoscopelidae. Paxton (1972) has given osteological characters that will distinguish myctophids from neoscopelids.

KEY TO FAMILIES

1a Photophores absent on ventral part of body 2
1b Photophores present on ventral part of body 3

2a Caudal peduncle with well-developed supracaudal and infracaudal glands bordered by heavy pigment ..... MYCTOPHIDAE (in part)
2b Caudal peduncle without supracaudal and infracaudal glands ..... NEOSCOPELIDAE (in part)

3a No photophores externally on head (some on sides of tongue in *Neoscopelus*) ..... NEOSCOPELIDAE (in part)



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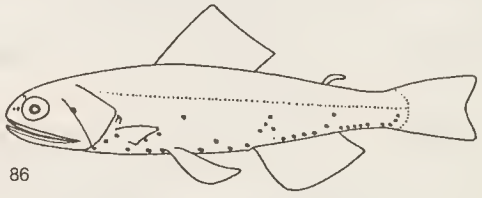
3b At least one photophore (on operculum) on head ..... MYCTOPHIDAE (in part)



86

Family No. 86: MYCTOPHIDAE

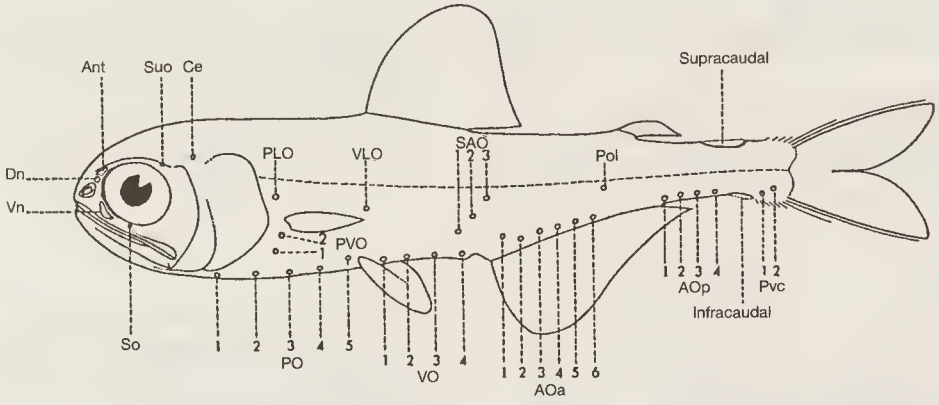
by P.A. Hulley

Lanternfishes — Lanternvisse

Head and body compressed. Eyes large and lateral (dorsolateral in *Protomyctophum* (*Hierops*)). Mouth terminal (subterminal in *Centrobranchus, Gonichthys, Loweina*), extending beyond vertical through middle of eye; upper edge of jaw formed by premaxillary only. Teeth small. Rudimentary spine at base of dorsal, anal, uppermost pectoral and outermost ventral fin ray. Adipose fin present. Anal fin origin under or close behind base of dorsal fin. Scales cycloid or ctenoid. Photophores (light organs) present (absent in *Taaningichthys paurolychnus*), arranged in distinct groups on head and trunk. Smaller "secondary" photophores on head, trunk and fins in some species. Luminous organs of various shapes and sizes on head or caudal peduncle, and at base of adipose fin in some species.

High-oceanic mesopelagic/bathypelagic or pseudoceanic pelagic/epibenthic from Arctic to Antarctic waters. Mesopelagic and pseudoceanic pelagic species exhibiting diurnal migration to between the surface and 200 m at night; some show size stratification with depth, and some with adults or juveniles non-migratory; bathypelagic and pseudoceanic epibenthic species not exhibiting vertical migration. Mainly opportunistic feeders on copepods, amphipods, ostracods, euphausiids, chaetognaths, fish eggs and fish larvae; some species show a degree of selectivity. Most species abundant, some rare. Limited commercial exploitation only in southeast Atlantic (*Lampanyctodes hectoris*) and Southern Ocean (*Gymnoscopelus* species), but potentially important for production of fish oil and fish meal. Thirty genera with more than 370 nominal species; 28 genera with a total of 125 species known or likely to be found in our area. The configuration of the photophores is very important for identification of the species. CPD = least depth of caudal peduncle; CPL = caudal peduncle length from base of last anal ray to posterior end of last entire centrum.

Editors' note: The term "high oceanic" is used here to denote fishes that normally occur in ocean waters beyond the continental shelf. "Epibenthic" (= benthopelagic) fishes are found near or just above the bottom. The "Antarctic Polar Front" (= Antarctic Convergence) is the region of the southern ocean at about 50°S where the surface temperature of the sea drops sharply to 2 °C as one proceeds southwards. "Subantarctic" waters is the region of the ocean between the Subtropical Convergence and the Antarctic Polar Front. See glossary for additional definitions.



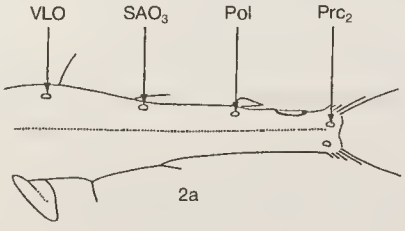
Distribution of luminous organs and their abbreviated terminology.

KEY TO GENERA

1a Minute "secondary" photophores on head and body, under each scale pocket and on fin membranes; "primary" photophores indistinct ..... *Scopelopsis*

1b "Secondary" photophores absent, or if present clearly distinct from "primary" photophores 2

2a VLO, SAO_3 and Pol close to dorsal contour of body; 2 Prc, with Prc_2 well above horizontal septum .... *Notolychnus*

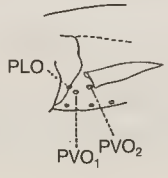


2b VLO, SAO_3 and Pol below or slightly above LL, well below dorsal contour of body; 2 or more Prc, with Prc_2 never above horizontal septum or LL 3

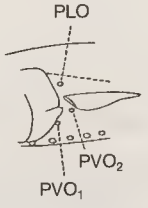
3a Two Prc 4

3b More than 2 Prc 15

4a PLO from less than its diameter above to well below level of upper end of P base 5



4b PLO more than its diameter above level of upper end of P base 11



5a Mouth subterminal; snout conical and more or less protruding; PLO at or slightly above level of upper end of P base; AO series divided into AOa and AOp; C peduncle markedly slender, its least depth 2.5 or more times in its length 6

5b Mouth terminal; snout not protruding; PLO well below level of upper end of P base; AO series continuous; C peduncle not markedly slender, its least depth less than 2.5 times in its length 8

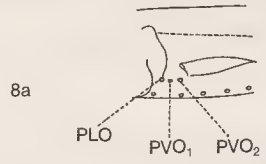
6a GR absent – reduced to spiny knobs ..... *Centrobranchus*

6b GR present 7

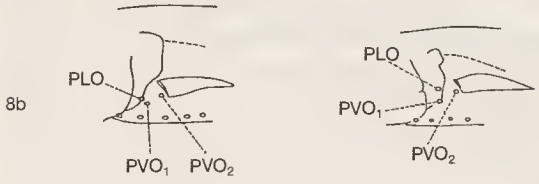
7a A origin under middle of D base; none or only one AOp above A; least depth of C peduncle about 2.5 times in its length ..... *Loweina*

7b A origin on or slightly in advance of vertical through base of last D ray; 5-7 AOp over A base; least depth of C peduncle 3.5 or more in its length ..... *Gonichthys*

8a Body slender, with dorsal and ventral profiles parallel; PLO, PVO_1 and PVO_2 on same straight horizontal line; 2 SAO; Prc_2 above anterior procurrent C ray, Prc_1 in front ..... *Krefftichthys*



8b Dorsal and ventral profiles not parallel; PLO slightly above to well above PVO_1; 3 SAO; Prc_1 above anterior procurrent C ray, Prc_2 behind 9



9a PLO in front of and slightly higher than PVO_1; PLO, PVO_1 and PVO_2 on somewhat angulate line ..... *Protomyctophum*

9b PLO almost directly above PVO_1; PLO, PVO_1 and PVO_2 forming a triangle 10

10a VO_2 elevated; posterodorsal margin of operculum sharply rounded and serrate ..... *Metelectrona*

10b VO_2 level with rest of series or only slightly raised; posterodorsal margin of operculum broadly rounded and without serrations ..... *Electrona*

11a PVO series horizontal, with PVO_1 not more than its own diameter below level of PVO_2; VO_2 elevated 12

11b PVO series on an inclined line, with PVO_1 more than its own diameter below level of PVO_2; VO series level 13

12a Prc horizontal, or with Prc_2 only very slightly raised, lying more than 2 times its diameter below LL; outer, posterior teeth in both jaws broad-based and hooked ..... *Diogenichthys*

12b Prc_2 much higher than Prc_1, lying at or less than its diameter below LL; outer posterior teeth in both jaws small and conical ..... *Benthosema*

13a Two Pol ..... *Hygophum*

13b One Pol 14

14a SAO series strongly angulate, with SAO_1 in advance (seldom directly over) VO_3 ..... *Symbolophorus*

14b SAO series in a straight or slightly angulate line, with SAO_1 behind the vertical through VO_3 ..... *Myctophum*

15a PO_1, PVO_1 and PVO_2 on a straight ascending line; VO_1, VO_2 and VO_3 on a straight ascending line 16

15b PO_1, PVO_1 and PVO_2 not on a straight ascending line; VO_1, VO_2 and VO_3 not on a straight ascending line 17

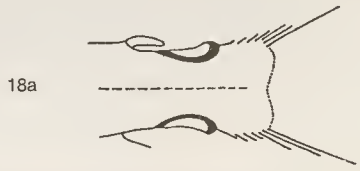
16a Dn and Vn present on head; supracaudal and infracaudal luminous glands absent in both sexes ..... *Diaphus*

16b Dn present on head, Vn absent; supracaudal (males) and infracaudal (females) luminous glands well developed ..... *Lobianchia*

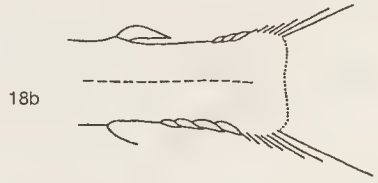
17a Dn present 18

17b Dn absent 24

18a Supracaudal and infracaudal glands large, singular and bordered by heavy black pigment 19



18b Supracaudal and infracaudal glands consisting of a series of overlapping scale-like structures, not bordered by heavy black pigment 20



19a D origin behind vertical through outer base of V; a large crescent of whitish tissue on rear ½ of iris; 1 SAO ..... *Taaningichthys*

19b D origin on or somewhat in advance of vertical at outer base of V; no large crescent of whitish tissue on rear ½ of iris (*Lampadena chavesi* with whitish crescent on dorsal ½ of iris); 3 SAO ..... *Lampadena*

20a PO_4 not elevated; luminous scale-like structures midventrally between bases of V and anus ..... *Ceratoscopelus*

20b PO_4 highly elevated; no luminous scale-like structures between bases of V and anus 21

21a Patches of luminous tissue at bases of median and paired fins 22

21b No patches of luminous tissue at bases of median and paired fins; luminous tissue (other than photophores) restricted to supracaudal and infracaudal glands and sometimes to base of adipose fin 23

22a Only 3 Prc; crescent of whitish tissue on rear ½ of iris; posterodorsal margin of operculum sharply pointed and rear margin markedly concave ..... *Bolinichthys*

22b Four (sometimes more) Prc; no crescent of whitish tissue on rear ½ of iris; posterodorsal margin of operculum broadly rounded, rear margin only slightly concave ..... *Lepidophanes*

23a Four (rarely 5) VO, level or with VO_2 elevated; opercular head of hyomandibula with small dermal process ..... *Lampanyctus*

23b Five VO, with VO_2 or VO_2 and VO_3 elevated; opercular head of hyomandibula without dermal process ..... *Triphoturus*

24a PVO horizontal; PO_3 and PO_5 elevated ..... *Lampanyctodes*

24b PVO vertical; PO series level 25

25a VO_2 elevated; 12-14 A rays ..... *Hintonia*

25b VO series level; more than 17 A rays 26

26a "Secondary" photophores present on head and body; 3-7 "primary" cheek photophores; 3 Pol forming a right angle ..... *Lampichthys*

26b No "secondary" photophores on head and body; no cheek photophores; 2 or 3 Pol, in horizontal or subvertical line with last AOa 27

27a AOa^1 abruptly elevated; 2 Pol in subvertical line with last AOa; 4 (or more) Prc ..... *Gymnoscopelus*
27b AOa^1 not elevated; 2 or 3 Pol in a horizontal line; 3 Prc ..... *Notoscopelus*

Genus ***Benthosema*** Goode & Bean, 1896

Maxilla expanded posteriorly, extending past orbit; A base longer than D base. Dn and Vn small and poorly defined; 5 PO; 4 VO; SAO series moderately to strongly angulate; 1 Pol; AO series divided into AOa and AOp. Five species; 3 in our area.

KEY TO SPECIES

1a So present; SAO_3 about on vertical through A origin; PLO nearer upper base of P than LL; total GR 13-15 ..... *B. suborbitale*
1b So absent; SAO_3 well behind vertical through A origin; PLO about midway between upper base of P and LL or nearer LL; total GR 20-29 2

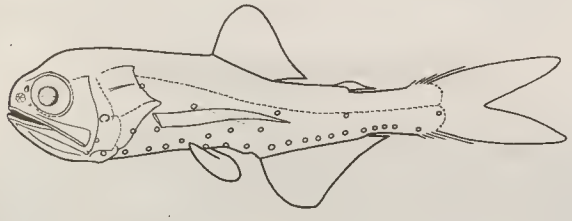
2a Op_2 on level of ventral margin of orbit; PLO markedly nearer LL than upper P base; SAO_1 well below line connecting VLO with SAO_2 ..... *B. fibulatum*
2b Op_2 well above level of ventral margin of orbit; PLO midway between LL and upper P base; SAO_1 on line connecting VLO with SAO_2 ..... *B. pterotum*

86.1 *Benthosema fibulatum*
(Gilbert & Cramer, 1897)

Myctophum fibulatum Gilbert & Cramer, 1897: 411, Pl. 38, Fig. 2 (Kaiwi Channel, Hawaii). *Benthosema fibulatum:* Nafpaktitis & Nafpaktitis, 1969: 12*; Kotthaus, 1972: 14*; Gjøsaeter & Beck, 1981: 255*; Hulley, 1984: 66*.

D 12-14; A 18-20; P 14-17; GR (6-7)+(13-15); AO (5-6)+(4-5). Posterodorsal opercular margin sharply angulate. Mature males with large supracaudal and smaller infracaudal luminous gland; mature females with single, small supracaudal and much smaller infracaudal luminous patch.

Attains 90 mm. High-oceanic, mesopelagic; upper 200 m (night). Indian Ocean (18°N-20°S) to 42°S in Agulhas Current; central Pacific (21°N-10°S) and north of New Guinea.



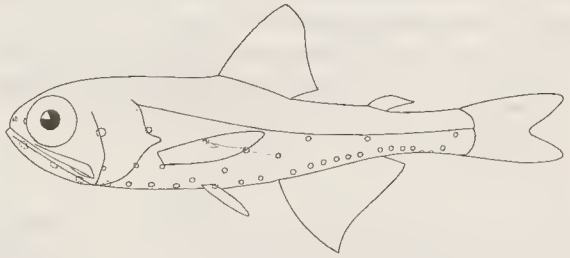
86.1 *Benthosema fibulatum:* 1.7 cm SL.

86.2 *Benthosema pterotum*
(Alcock, 1890)

Scopelus (Myctophum) pterotus Alcock, 1890: 217 (18°30′N, 86°46′E). *Benthosema pterotum:* Kotthaus, 1972: 15*; Gjøsaeter & Beck, 1981: 255*.

D 13-14; A 17-22; P 14; GR (6-9)+(15-20); AO 6+(4-5). Posterodorsal opercular margin broadly rounded. Mature males and females usually without caudal luminous glands; some males with indistinct supracaudal luminous patch and some females with 1-2 poorly developed infracaudal patches.

Attains 60 mm. High-oceanic, mesopelagic; 130 - 200 m and 220 - 300 m (day); 10 - 200 m (night). Indian Ocean from Arabian Sea to about 25°S off Mozambique; western North Pacific.



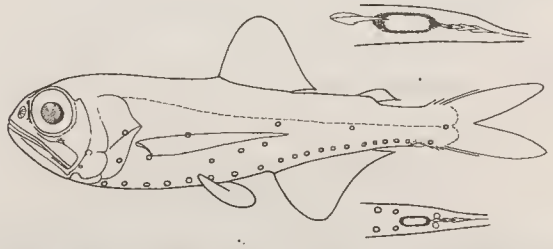
86.2 *Benthosema pterotum:* adult female (after Bolin, 1939).

86.3 *Benthosema suborbitale*
(Gilbert, 1913)

Myctophum suborbitale Gilbert, 1913: 82 (Suruga Bay, Japan). *Myctophum pterotum* (*non* Alcock): Smith, **SFSA No. 197.** *Benthosema fibulata* (*non* Gilbert & Cramer): Grindley & Penrith, 1965: 282. *Benthosema suborbitale:* Nafpaktitis & Nafpaktitis, 1969: 11*; Kotthaus, 1972: 14*; Hulley, 1972: 220; 1981: 57*; 1984: 66.

D 12-14; A 16-18; P 14; GR 3+(10-11); AO (5-7)+(4-6). Posterodorsal opercular margin broadly rounded. Mature males with single supracaudal luminous gland; mature females with single infracaudal luminous gland, sometimes constricted.

Attains 39 mm. High-oceanic, mesopelagic; 375 - 750 m (day); taken near surface and down to 125 m at night. Broadly tropical distribution in Atlantic, Indian and Pacific oceans, with extensions to 50°N and 50°S in western boundary currents.



86.3 *Benthosema suborbitale:* 3 cm SL.

Genus ***Bolinichthys*** Paxton, 1972

Maxilla expanded posteriorly, extending half an eye-diameter or less past orbit; A base slightly longer than D base. Posterodorsal margin of operculum sharply angulate; rear opercular margin anteriorly concave. Dn absent; Vn small; 5 PO; 4 VO; AO series divided into AOa and AOp; 2 Pol; 2+1 Prc. Supracaudal and infracaudal luminous patches present; luminous tissue at base of D, A and V, often on dorsal surface of head and on trunk. Seven species; 2 (possibly 4) in our area.

KEY TO SPECIES

1a VLO 3-5 photophore diameters below LL; no luminous scale at V base ..... *B. supralateralis*
1b VLO at LL; luminous scale at bases of V present 2

2a Preopercle with strongly developed antrorse spine at posteroventral margin; luminous scale at PVO_1 present ..... *B. photothorax*
2b Preopercle with only small projection at posteroventral margin; luminous scale at PVO_1 absent 3

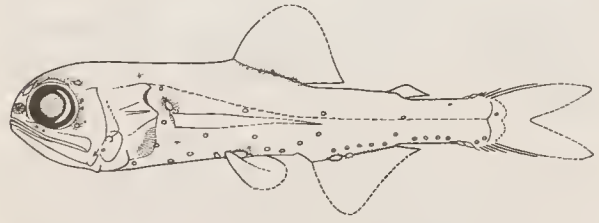
3a No luminous patch above P; GR (5-6)+(10-14) total 16-20; infracaudal gland not reaching last AOp ..... *B. longipes*
3b Luminous patch above P present; GR 4 (3-5)+(11-13) total 15-18; infracaudal gland reaching last AOp ..... *B. indicus*

86.4 *Bolinichthys indicus*
(Nafpaktitis & Nafpaktitis, 1969)

Lepidophanes indicus Nafpaktitis & Nafpaktitis, 1969: 72, Figs. 72-75 (22°34′S, 65°55′E); Hulley, 1972: 225. *Lampanyctus pusillus:* Hulley, 1972: 224 (in part). *Bolinichthys indicus:* Hulley, 1981: 227*; 1984: 67*.

D 12-14; A 12-14; P 12-14; GR (3-5)+(11-13); AO (5-7)+(3-5). Mature males with luminous patches above nostrils and at posterodorsal margin of orbit; females with traces of luminous tissue corresponding to male pattern.

Attains 45 mm. High-oceanic, mesopelagic; 500 - 900 m (day); 25 - 300 m (night). Indian Ocean (20°-45°S); Atlantic (20°-50°N and 20°-40°S).



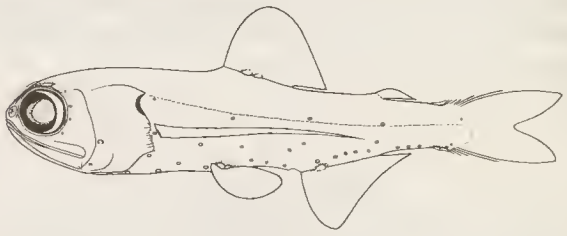
86.4 *Bolinichthys indicus:* 3 cm SL.

86.5 *Bolinichthys longipes*
(Brauer, 1906)

Myctophum (Myctophum) longipes Brauer, 1906: 236, Fig. 155 (Indian Ocean). *Lepidophanes longipes:* Nafpaktitis & Nafpaktitis, 1969: 58*; Kotthaus, 1972: 33*. *Bolinichthys longipes:* Wisner, 1976: 204*; Gjøsaeter, 1981: 220.

D 11-14; A 13-15; P 12-13; GR (5-6)+(11-14); AO (5-7)+(2-4). Mature males with 4 conspicuous luminous patches, sometimes confluent, on interorbital region; mature females with traces of luminous tissue corresponding to male pattern.

Attains 49 mm. High-oceanic, mesopelagic; 525 - 725 m (day); 50 - 150 m (night). Not yet recorded from our area. Indian Ocean (20°N-18°S), southeast Asian seas and western Pacific to 30°N, and in eastern Pacific (30°N-20°S).



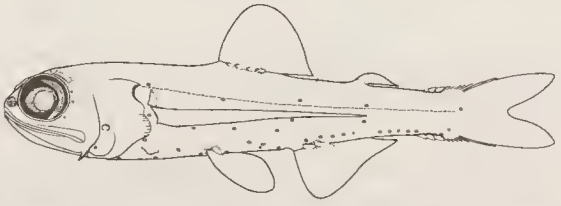
86.5 *Bolinichthys longipes:* 4 cm SL female (after Nafpaktitis & Nafpaktitis, 1969).

86.6 *Bolinichthys photothorax*
(Parr, 1928)

Lampanyctus photothorax Parr, 1928: 95, Fig. 13 (23°55′N, 77°09′W); Norman, 1930: 329 (in part). *Lepidophanes photothorax:* Nafpaktitis & Nafpaktitis, 1969: 59*. *Bolinichthys photothorax:* Hulley, 1981: 230*.

D 12-14; A 13-15; P 12-14; GR (5-7)+(13-17); AO (6-8)+(3-6). Conspicuous patches of luminous tissue on head and upper rear edge of orbit, not sexually dimorphic.

Attains 73 mm. High-oceanic, mesopelagic; 425 - 750 m (day); 40 - 500 m (night). Not yet recorded in our area. Atlantic (30°N-10°S, with extensions in western boundary currents to 40°N and 38°S), Indian Ocean (10°N-30°S), western tropical Pacific and eastern Pacific (30°N-25°S).



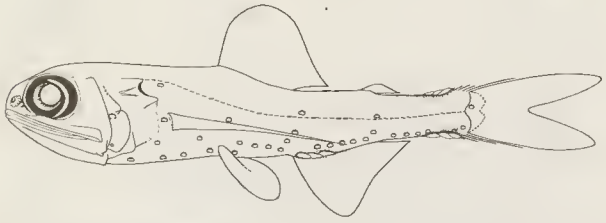
86.6 *Bolinichthys photothorax:* 6 cm SL female (after Nafpaktitis & Nafpaktitis, 1969).

86.7 *Bolinichthys supralateralis*
(Parr, 1928)

Lampanyctus supralateralis Parr, 1928: 94, Fig. 12 (23°42′N, 76°43′W). *Lampanyctus superlateralis:* Grindley & Penrith, 1965: 283. *Lampanyctus pyrosobolus:* Grindley & Penrith, 1965: 283 (in part). *Lepidophanes supralateralis:* Hulley, 1972: 241*. *Bolinichthys supralateralis:* Hulley, 1981: 230*; 1984: 68.

D 12-14; A 12-15; P 12-15; GR (5-7)+(12-16); AO (4-7)+(3-5). No luminous tissue on head in mature males and females.

Attains 117 mm. High-oceanic, mesopelagic; 375 - 750 m (day); 40 - 650 m (night); adults probably non-migratory. Off Cape Peninsula and in Agulhas Current. Atlantic (40°N-02°S and 32°-40°S), Indian Ocean (21°-30°S), west coast of Australia, and near Hawaii.



86.7 *Bolinichthys supralateralis:* 2.5 cm SL.

Genus ***Centrobranchus*** Fowler, 1904

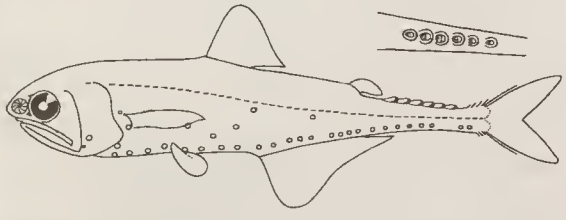
Anal fin base much longer than D base. Dn and Vn present; 5 PO; 4 VO; SAO series almost straight; AO series divided into AOa and AOp; 1 Pol. Four species; 1 in our area.

86.8 *Centrobranchus nigroocellatus*
(Günther, 1873)

Scopelus nigroocellatus Günther, 1873: 267 (South Atlantic). *Centrobranchus nigro-ocellatus:* Bekker, 1964: 58*. *Centrobranchus nigroocellatus:* Nafpaktitis & Nafpaktitis, 1969: 32*.

D 10-11; A 16-19; P 13-15; GR reduced to spiny knobs; AO (5-7)+(8-11). Mature males with 4-7 well-defined luminous supracaudal organs; mature females with 3-6 non-overlapping, oval patches of luminous tissue infracaudally.

Attains 50 mm. High-oceanic, mesopelagic; 600 - 700 m (day); nyctoepipelagic at surface. Atlantic (40°N-36°S), Indian Ocean (08°-34°S) and off Chile and New Zealand.



86.8 *Centrobranchus nigroocellatus:* 4 cm SL.

Genus ***Ceratoscopelus*** Günther, 1864

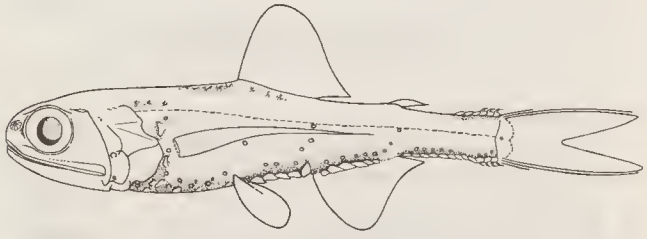
Maxilla extending well behind orbit; P large, extending beyond origin of A. Vn present; 5 PO; 5 VO; AO series divided into AOa and AOp; 2 Pol; patches and scale-like structures of luminous tissue on trunk. Three species; 1 in our area.

86.9 *Ceratoscopelus warmingii*
(Lütken, 1892)

Scopelus (Nyctophus) warmingii Lütken, 1892: 259, Fig. 19 (32°06'N, 39°28'W). *Lampanyctus townsendi* (*non* Eigenmann & Eigenmann): Smith, **SFSA No. 205.** *Ceratoscopelus townsendi* (*non* Eigenmann & Eigenmann): Grindley & Penrith, 1965: 283. *Lampanyctus leucosaurus* (*non* Eigenmann & Eigenmann): Grindley & Penrith, 1965: 283. *Ceratoscopelus warmingi:* Nafpaktitis & Nafpaktitis, 1969: 63*; Hulley, 1972: 226; Kotthaus, 1972: 34*; Gjøsaeter, 1981: 220. *Ceratoscopelus warmingii:* Wisner, 1976: 206*; Hulley, 1981: 235*; 1984: 68.

D 13-15; A 13-15; P 12-15; GR (3-5)+(9-12); AO (5-8)+(4-6).

Attains 81 mm. High-oceanic, mesopelagic; 900 m (day); 25 - 200 m (night); small juveniles apparently non-migratory. Sexual maturity may be attained at smaller size in equatorial populations. Common in our area; Atlantic (42°N-40°S), Indian Ocean (20°N-45°S) and tropical/subtropical Pacific (replaced by *C. townsendi* Eigenmann & Eigenmann, 1889 in eastern North Pacific).



86.9 *Ceratoscopelus warmingii:* 5 cm SL.

Genus ***Diaphus*** Eigenmann & Eigenmann, 1890

Maxilla not or only slightly expanded posteriorly, extending from slightly behind to well behind orbit. Pterotic spine sometimes well developed. At least 1 pair of sexually dimorphic, luminous glands on head; 5 PO; 5 VO; SAO series curved to strongly angulate; AO series divided into AOa and AOp; AOa[1] usually elevated, sometimes level; 1 Pol, sometimes continuous with AOa; 4 Prc. Supracaudal and infracaudal luminous glands absent; usually a luminous scale at PLO. More than 60 species; 24 (possibly 32) in our area.

KEY TO SPECIES

1a So always present, on ventral margin of orbit, completely separated from Vn or connected with Vn by a strand of dark tissue; Vn more or less elongate, along ventral margin of orbit (or spreading anteroventrad in adult males) 2

1b So absent; Vn along anterior, anteroventral or ventral orbital margin, in contact with or separated from Dn 11

2a Vn longer than horizontal diameter of pupil, occupying anteroventral and most of ventral margin of orbit; So behind vertical through rear margin of pupil, no luminous scale at PLO 3

2b Vn elongate, but shorter than horizontal diameter of pupil; So in advance of vertical through rear margin of pupil; luminous scale at PLO present 4

3a HD less than 4 times in SL; ED and CPD less than 8 times in SL ..... *D. brachycephalus*
3b HD more than 4 times in SL; ED and CPD 8 or more times in SL ..... *D. richardsoni*

4a Vn and So about equal in size, roundish or oval, small, about ⅓ to ½ size of general body photophore, and widely separated from each other; body photophores placed low, very large and separated by narrow spaces, those between AO series equal to about ½ photophore-diameter .... *D. anderseni*
4b Vn elongate, much longer than roundish/oval So; body photophores moderate in size, those of AO series separated by spaces greater than ½ photophore-diameter 5

5a AOa^1 elevated 6
5b AOa series level or AOa^1 only slightly raised 8

6a Vn longer than distance between Vn and So; operculum with straight, horizontal dorsal margin, rear margin deeply concave; lower GR broad-based and leaf-like ..... *D. mollis*
6b Vn shorter than distance between Vn and So; operculum with convex dorsal margin, rear margin slightly concave; lower GR slender and lath-like 7

7a Body photophores widely spaced, from at least 1.5 (AOa and AOp) to at least 2.5 (VO) photophore-diameters apart; SAO_3 and Pol their diameter or less below LL; upper jaw less than 17.5% SL ..... *D. fulgens*
7b Body photophores not widely spaced, from 1 (AOa and AOp) to 2 (VO) photophore-diameters apart or less; SAO_3 and Pol more than their diameter below LL; upper jaw 18.5% SL or more ..... *D. aliciae*

8a Vn not longer than distance between Vn and So; operculum with prominent lobe posterodorsally; CPD less than 1.5 times in CPL ..... *D. parri*
8b Vn much longer than distance between Vn and So; operculum without prominent lobe posterodorsally; CPD more than 1.5 times in CPL 9

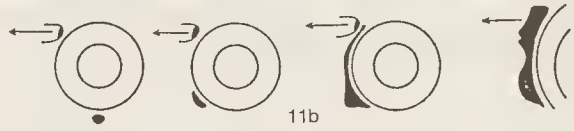
9a Prc continuous with AOp, so that distance Prc_1-Prc_3 is greater than AOp-Prc_1 interspace; C peduncle elongate and narrow; anterior margin of lower GR of 1st arch fleshy ..... *D. subtilis*
9b Prc separated from AOp; distance Prc_1-Prc_3 equal to or shorter than AOp-Prc_1 interspace; C peduncle normal; anterior margin of lower GR of 1st arch not fleshy 10

10a Total GR 16-20; luminous scale at PLO striated posteroventrally ..... *D. meadi*
10b Total GR 22-28; luminous scale at PLO mottled ..... *D. hudsoni*

11a Dn small (better developed in males than in females) and directed anterolaterally; Vn larger than Dn, at anteroventral aspect of orbit usually extending dorsally along front margin of orbit to Dn 12

11a

11b Dn ranging in size from smaller than body photophore to much larger than nasal rosette, in more or less deep recess and directed forward; Vn may be (i) restricted to ventral aspect of orbit, (ii) restricted to anteroventral aspect of orbit, (iii) extend dorsally to reach Dn, or (iv) spread over most of entire area of snout 18



11b

12a Vn round and small, half the size of general body photophore, completely separated from Dn and located at ventral margin of orbit on, or slightly in advance of, vertical through front margin of pupil; PLO in advance of vertical through upper base of P, about 1-2 photophore-diameters below LL; SAO series markedly angulate ..... *D. dumerilii*
12b Vn at anteroventral aspect of orbit, somewhat larger than Dn and connected to Dn by thin streak of luminous tissue, extending between eye and nasal apparatus; PLO on or behind vertical through upper base of P, more than 2 photophore-diameters below LL; SAO series not or only slightly angulate 13

13a Total GR 13-15 ..... *D. problematicus*
13b Total GR more than 15 14

14a SAO_1 in line with VO_4 and VO_5 or nearly so; SAO_3 and Pol about one photophore-diameter below LL, adult males with well-developed Ant ..... *D. jenseni*
14b SAO_1 not in line with VO_4 and VO_5; SAO_3 and Pol in contact with or immediately below LL 15

15a PLO nearer LL than to upper base of P ..... *D. garmani*
15b PLO nearer upper base of P than to LL (rarely midway) 16

16a D 4 times or less in SL; V not reaching A origin; Prc_4 about 2 photophore-diameters below LL; AOa^2-AOa^3 interspace usually not enlarged; both Dn and Vn greatly enlarged in adult males, with Dn larger than Vn ..... *D. malayanus*
16b D more than 4 times in SL; V extending at least to A origin; AOa^2-AOa^3 interspace usually enlarged; Vn subequal to much larger than Dn 17

17a Distance between VLO and V base 1.5-2.0 times larger than distance between VLO and LL; AOa^1 directly over or, usually, behind AOa^2; Vn about equal in size to Dn (slightly larger than Dn in adult males); D origin behind vertical through outer base of V ..... *D. signatus*
17b VLO midway between base of V and LL or slightly higher; AOa^1 directly over, or slightly in front of AOa^2; Vn larger than Dn, especially in adult males; D origin on or slightly in advance of vertical through outer base of V ..... *D. nielseni*

18a Vn widely separated from Dn, confined to ventral or anteroventral aspect of orbit but connected to Dn by a strand of dark tissue along front margin of orbit 19
18b Vn extending dorsally between front margin of orbit and nasal apparatus, to make contact with or become confluent with Dn 21

19a SAO_1 well above level of VO_5; maxilla extends less than an eye diameter past orbit ..... *D. taaningi*

19b SAO_1 on same level with, or only slightly higher than VO_5; maxilla extends more than diameter of eye past orbit 20

20a Vn very long, extending along most of ventral border of eye, its dorsal margin with small, round, bud-like projections ..... *D. luetkeni*
20b Vn roundish or oval, located on ventral margin of eye about under centre of pupil, or extending from this region as a posterior wedge, with no dorsal bud-like projections ..... *D. diadematus*

21a Ant absent 22
21b Ant present 24

22a Dn larger than nasal rosette, its dorsal margin extending higher than level of dorsal margin of orbit; D 17-18 (rarely 16) ..... *D. lucidus*
22b Dn smaller than nasal rosette, its dorsal margin below dorsal margin of orbit; D 14-15 (rarely 16) 23

23a Vn barely reaching vertical at front margin of pupil; supraorbital spine well developed; total GR 17-18 (rarely 19) ..... *D. splendidus*
23b Vn extending beyond vertical at front margin of pupil; supraorbital spine absent or weakly developed; total GR 20-22 (rarely 19) ..... *D. antonbruuni*

24a Dn smaller than nasal rosette 25
24b Dn equal to or larger than nasal rosette 26

25a PLO nearer upper base of P than LL; SAO_3 and Pol 3 photophore-diameters or more below LL ..... *D. watasei*
25b PLO nearer LL than to upper base of P; SAO_3 and Pol 1 photophore-diameter or less below LL ..... *D. knappi*

26a Head about as long as it is deep 27
26b Head much longer than it is deep 28

27a Vn extending along ventral margin of orbit to somewhat behind vertical at centre of pupil; PLO nearer LL than to upper base of P; VLO nearer LL than to V base; last 2 AOa photophores not elevated or raised ..... *D. metopoclampus*
27b Vn not extending to front edge of pupil; PLO midway between LL and upper base of P; VLO about midway between LL and V base; last 2 AOa photophores elevated ..... *D. ostenfeldi*

28a SAO_3 and Pol 1.5-3.0 photophore-diameters below LL 29
28b SAO_3 and Pol in contact with or less than 1 photophore-diameter below LL 30

29a Total GR 17-22 ..... *D. effulgens*
29b Total GR 24-27 ..... *D. phillipsi*

30b Dn hardly extending higher than dorsal margin of eye; total GR 17-24; posterodorsal margin of operculum evenly abruptly rounded (with serrations in adults) and rear margin sharply concave; inner series of teeth on lower jaw small and densely packed ..... *D. perspicillatus*
30b Dn hardly extending higher than level of dorsal margin of eye; total GR 17-24; posterodorsal margin of operculum evenly rounded and rear margin slightly concave anteriorly; inner series of teeth on lower jaw markedly enlarged and bent forward, widely but more or less regularly spaced 31

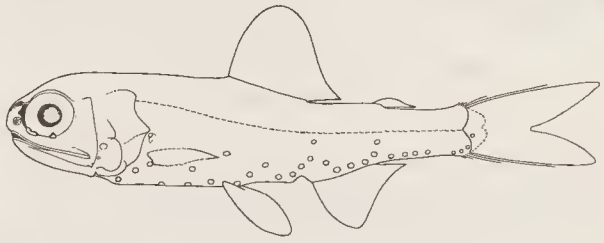
31a Total GR 17-18; D 17-19; A 16-18; PLO 1.5-2.0 times nearer LL than to upper base of P ..... *D. fragilis*
31b Total GR 20-24; D 15-17; A 14-16; PLO midway between LL and upper base of P or lower ..... *D. thiollieri*

86.10 *Diaphus aliciae*
Fowler, 1934

Diaphus aliciae Fowler, 1934: 295, Fig. 53 (Philippines); Nafpaktitis, 1978: 73*; Hulley, 1984: 68*.

D 13-14; A 12-13; P 10-11; GR (5-6)+(12-14); AO (4-6)+(3-5).

Attains 60 mm. High-oceanic, mesopelagic. In the Agulhas Current southwards to about 33°S. Indo-Pacific.



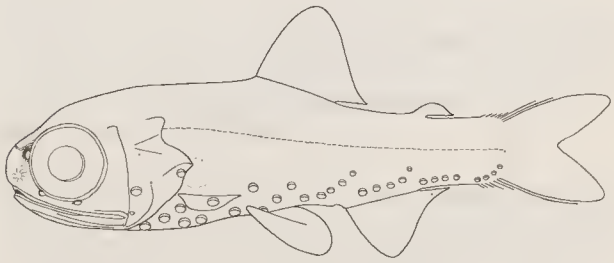
86.10 *Diaphus aliciae:* 1.5 cm SL.

86.11 *Diaphus anderseni*
Tåning, 1932

Diaphus anderseni Tåning, 1932: 134, Fig. 6 (20°00′S, 174°29′E); Nafpaktitis et al., 1977: 169*; Nafpaktitis, 1978: 83; Hulley, 1981: 117*.

D 12-14; A 11-13; P 10-12; GR (4-6)+(11-15); AO (3-5)+(4-6).

Attains 32 mm. High-oceanic, mesopelagic; 300 - 560 m (day); upper 100 m (night). Not yet recorded from our area. In Atlantic (15°N to Subtropical Convergence, but absent in Benguela Upwelling Region), near Hawaii, eastern Pacific (35°N-20°S) and South Pacific (20°-27°S).



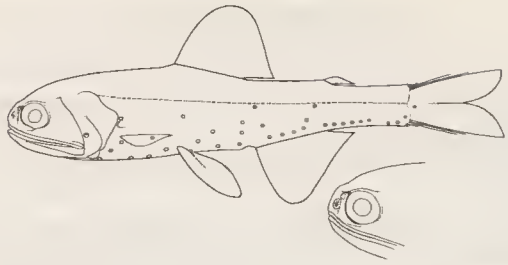
86.11 *Diaphus anderseni:* 2 cm SL holotype (after Nafpaktitis, 1978).

86.12 *Diaphus antonbruuni*
Nafpaktitis, 1978

Diaphus antonbruuni Nafpaktitis, 1978: 25, Figs. 22-23 (07°56′S, 64°14′E); Kawaguchi & Shimizu, 1978: 108*.

D 14-15; A 15-17; P 11-12; GR (6-7)+(12-15); AO (5-7)+(5-7).

Attains 55 mm. High-oceanic, mesopelagic; upper 500 m (night). Not yet recorded from our area; Indian Ocean (western sector: 04°-12°S, 40°-65°E; eastern sector: 17°02′S, 94°50′E).



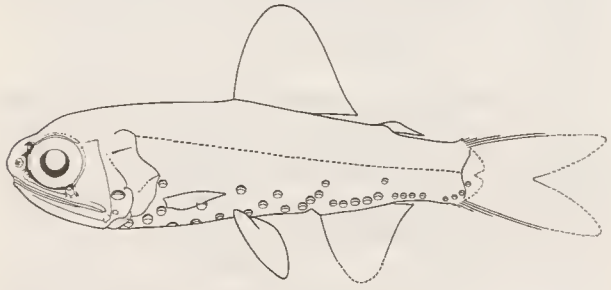
86.12 *Diaphus antonbruuni*: 4 cm SL female holotype (after Nafpaktitis, 1978).

86.13 *Diaphus brachycephalus*
Tåning, 1928

Diaphus brachycephalus Tåning, 1928: 59 (19°22'N, 24°06'W); Wisner, 1976: 141*; Nafpaktitis, 1978: 80*; Kotthaus, 1979: 53*; Hulley, 1981: 121*; 1984: 69. *Diaphus theta:* Grindley & Penrith, 1965: 283 (in part).

D 12-14; A 12-14; P 10-12; GR (5-7)+(11-14); AO (4-6)+(3- 5).

Attains 57 mm. High-oceanic, mesopelagic; 175 - 550 m (day); near surface to 225 m (night); large males partially or non-migratory. In Agulhas Current and off west coast in Agulhas Water pockets; broadly tropical distribution in Atlantic and Indo-Pacific.



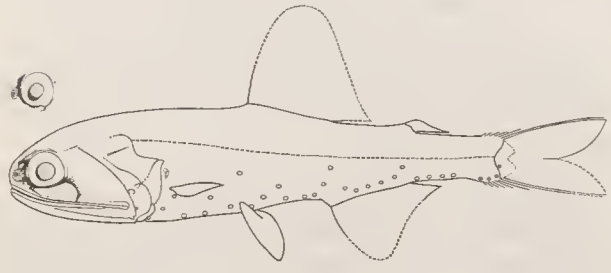
86.13 *Diaphus brachycephalus:* 2.5 cm SL.

86.14 *Diaphus diadematus*
Tåning, 1932

Diaphus diadematus Tåning, 1932: 137, Fig. 9 (24°33'S, 38°26'E); Grindley & Penrith, 1965: 283; Krefft, 1974: 231*; Wisner, 1976: 107*; Nafpaktitis, 1978: 38*; Hulley, 1981: 123; 1984: 69; Gjøsaeter, 1981: 220.

D 13-14; A 13-15; P 10-12; GR (4-5)+(11-12); AO (4- 6)+(3-5).

Attains 42 mm. High-oceanic, mesopelagic; upper 100 m (night). In Agulhas Current and off west coast in Agulhas Water pockets and warmed, upwelled Central Water northwards to 18°S. Indian Ocean (02°N-38°S and in Mozambique Channel, but absent in central sector).



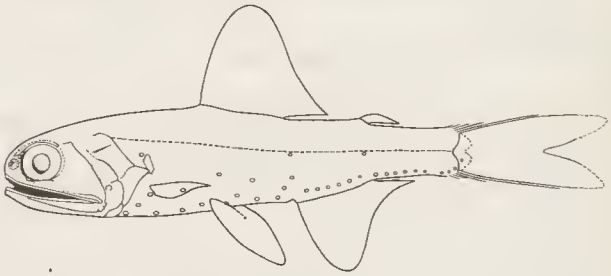
86.14 *Diaphus diadematus:* 3 cm SL.

86.15 *Diaphus dumerilii*
(Bleeker, 1856)

Scopelus dumerilii Bleeker, 1856: 67 (off Manado, Celebes). *Diaphus dumerili:* Norman, 1930: 331; O'Toole, 1976: 29*; Nafpaktitis, 1978: 83. *Diaphus dumerilii:* Wisner, 1976: 102*; Nafpaktitis et al., 1977: 113*; Hulley, 1981: 125*.

D 14-15; A 14-15; P 11-12; GR (7-9)+(16-18); AO (6-7)+(4-6).

Attains 65 mm. High-oceanic, mesopelagic population: 225 - 750 m (day); from the surface to 125 m at night; pseudoceanic, pelagic population: upper 50 m (night). Occurs off west coast as a pseudoceanic, pelagic species southwards to 23°S. A high-oceanic species in Atlantic (51°N-25°S); pseudoceanic in western South Atlantic (28°-40°S).

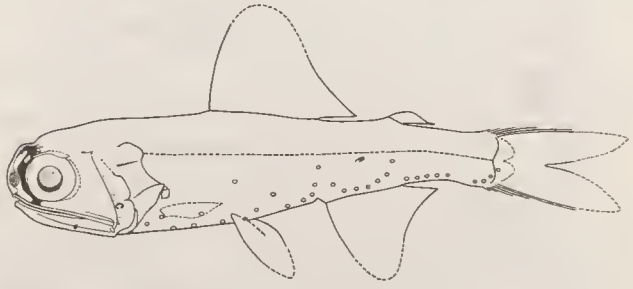


86.15 *Diaphus dumerilii*: 5.5 cm SL.

86.16 *Diaphus effulgens*
(Goode & Bean, 1896)

Aethoprora effulgens Goode & Bean, 1896: 87, Pl. 27, Fig. 103 (off Boston, U.S.A.). *Myctophum (Diaphus) aelochrus* Barnard, 1927: 1021 (60 miles WSW Table Bay, stomach of stockfish). *Diaphus elucens* (*non* Brauer): Smith, **SFSA No. 201***(in part). *Diaphus effulgens:* Grindley & Penrith, 1965: 283; Hulley, 1972: 240; 1981: 128*; 1984: 70; Nafpaktitis, 1978: 53*.

D 15-17; A 15-16; P 11-13; GR: South Atlantic (5-7)+(13-14); GR: Indian Ocean (5-6)+(12-14); AO (5-7)+(4-6).



86.16 *Diaphus effulgens:* 4 cm SL.

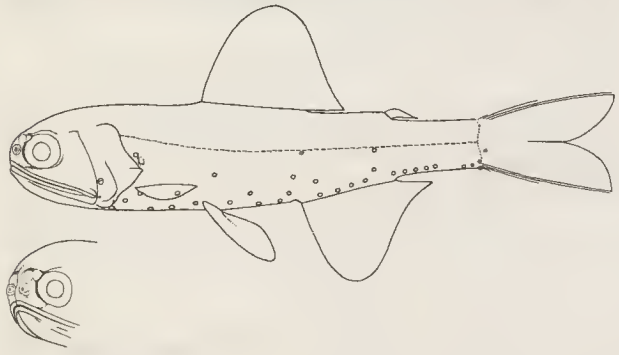
Attains more than 150 mm. High-oceanic, mesopelagic; 325 - 600 m (day); 40 - 175 m (night); adults probably non-migratory. Off all our coasts. In Atlantic (50°-17°N and 19° S to Subtropical Convergence) and Indo-Pacific.

86.17 *Diaphus fragilis*
Tåning, 1928

Diaphus fragilis Tåning, 1928: 61 (12°11′N, 35°49′W); Nafpaktitis, 1978: 46*; Kawaguchi & Shimizu, 1978: 72*; Hulley, 1981: 131*.

D 17-19; A 16-18; P 11-12; GR (4-5)+(12-13); AO (5-7)+(4-6).

Attains 99 mm. High-oceanic, mesopelagic; 520 - 600 m (day); 15 - 125 m (night). Not yet recorded from our area. Atlantic (39°N-26°S, but absent in Benguela Upwelling Region) and tropical Indo-Pacific (with extensions to 35°N in Kuroshio Current and to 34°S in East Australian Current).



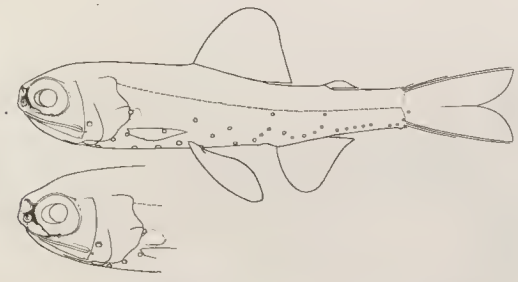
86.17 *Diaphus fragilis:* 7 cm SL female (after Nafpaktitis, 1978).

86.18 *Diaphus fulgens*
(Brauer, 1904)

Myctophum (Nyctophus) fulgens Brauer, 1904: 402, Fig. 4 (04°05′08″S, 70°01′09″E). *Diaphus fulgens:* Nafpaktitis, 1978: 69*.

D 13-14; A 12-13; P 9-10; GR (5-6)+(12-14); AO (4-6)+(4-6).

Attains 45 mm. High-oceanic, mesopelagic. Not yet recorded from our area. Indian Ocean (08°N-10°S) and Mozambique Channel (southwards to 18°S), southeast Asian seas and tropical Pacific.



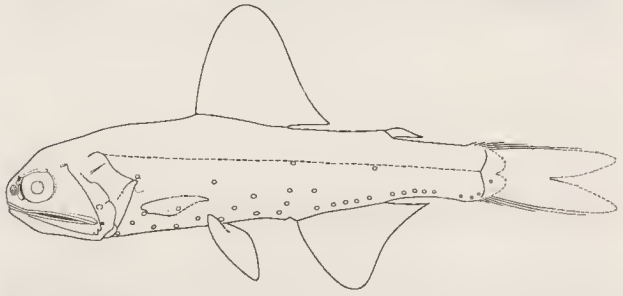
86.18 *Diaphus fulgens:* 3.5 cm SL female (after Nafpaktitis, 1978)

86.19 *Diaphus garmani*
Gilbert, 1906

Diaphus garmani Gilbert, 1906: 258, Pl. 2 (Cuba); Nafpaktitis, 1978: 14*; Kotthaus, 1979: 51*; Hulley, 1981: 133*; 1984: 70; Gjøsaeter, 1981: 220; Gjøsaeter & Beck, 1981: 257.

D 15-16; A 16-17; P 11-12; GR (6-8)+(12-14); AO (6-8)+(4-6).

Attains 60 mm. Pseudoceanic, pelagic: 325 - 750 m (day); from surface to 125 m at night. Occurs over the east coast continental shelf/slope southwards to about 26°S. Atlantic (36°N-07°S), Indo-Pacific to Mexico.



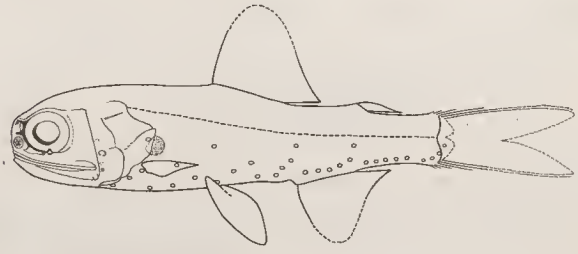
86.19 *Diaphus garmani:* 3 cm SL.

86.20 *Diaphus hudsoni*
Zubrigg & Scott, 1976

Diaphus theta: Grindley & Penrith, 1965: 283 (in part). *Diaphus* c.f. *theta:* Hulley, 1972: 227 (in part); Karrer, 1975: 69; O'Toole, 1976: 28. *Diaphus hudsoni* Zubrigg & Scott, 1976: 1539, Figs. 1-2 (44°14′S, 42°43′W); Nafpaktitis, 1978: 62*; Hulley, 1981: 139*; 1984: 70.

D 13-15; A 12-14; P 10-12; GR (7-9)+(15-19); AO (4-6)+(4-6).

Attains 84 mm. High-oceanic, mesopelagic; mainly below 250 m (night). From 18°S off our west coast to 27°S off our east coast. Circumglobally between Subtropical Convergence and about 50°S (with northern extensions in eastern boundary currents).



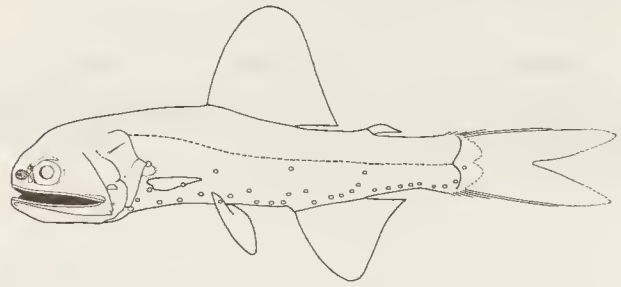
86.20 *Diaphus hudsoni:* 7 cm SL.

86.21 *Diaphus jenseni*
Tåning, 1932

Diaphus jenseni Tåning, 1932: 141, Fig. 14 (03°18′N, 129°02′E); Nafpaktitis, 1978: 21*; Kawaguchi & Shimizu, 1978: 110*; Kotthaus, 1979: 51*; Hulley, 1984: 70*.

D 14-15; A 13-15; P 9-10; GR 6+(13-15); AO (5-7)+(4-6).

Attains 50 mm. High-oceanic, mesopelagic; upper 85 m (night). Taken once in our area at 33°48.8′S, 27°47.9′E; Indo-Pacific.



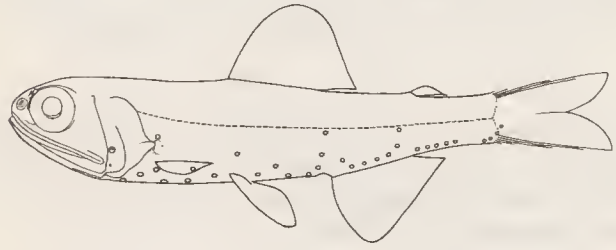
86.21 *Diaphus jenseni:* 2.5 cm SL.

86.22 *Diaphus knappi*
Nafpaktitis, 1978

?*Diaphus elucens* (*non* Brauer): Smith, **SFSA No. 201*** (in part). *Diaphus knappi* Nafpaktitis, 1978: 45, Figs. 43, 45 (23°36.4′S, 43°31′E).

D 15; A 15-16; P 11; GR 6+(12-15); AO (5-7)+ (4-6).

Attains 173 mm. Pseudoceanic, epibenthic: 122 - 664 m. Off southwest Madagascar, at Saya de Malha Bank (07°13′S, 60°05′E) and southeast of Zanzibar; South Pacific (19°14′S, 151°28′W).



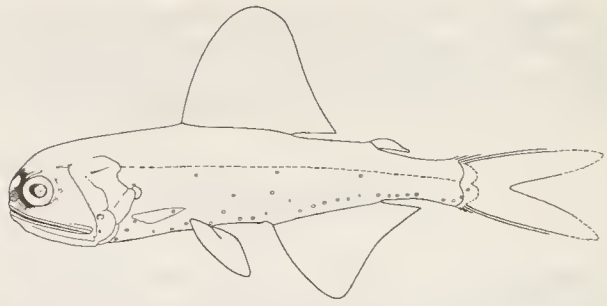
86.22 *Diaphus knappi:* 9 cm SL female holotype (after Nafpaktitis, 1978).

86.23 *Diaphus lucidus*
(Goode & Bean, 1896)

Aethoprora lucida Goode & Bean, 1896: 87, Pl. 27, Fig. 102 (19°45′N, 75°04′W). *Diaphus lucidus:* Norman, 1930: 335; Wisner, 1976: 115*; Nafpaktitis, 1978: 50*; Kawaguchi & Shimizu, 1978: 102*; Hulley, 1981: 145*; 1984: 58. *Diaphus fulgens* (*non* Brauer): Grindley & Penrith, 1965: 283 (in part).

D 16-18; A 17-19; P 10-12; GR (4-6)+(11-14); AO (6-8)+(4-6).

Attains 118 mm. High-oceanic, mesopelagic; 425 - 750 m (day); 40 - 550 m (night); size stratification with depth both day and night. In Agulhas Current and off west coast in Agulhas Water pockets. Atlantic (40°N-38°S, but absent in Benguela Upwelling Region); also Indo-Pacific.



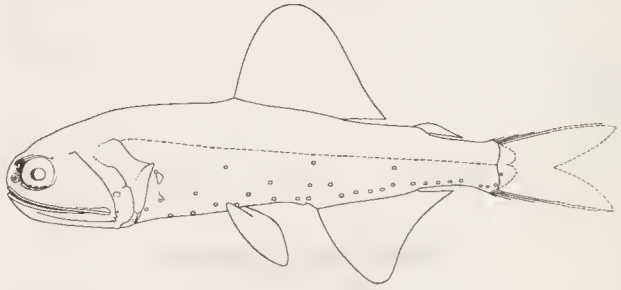
86.23 *Diaphus lucidus:* 4.5 cm SL

86.24 *Diaphus luetkeni*
(Brauer, 1904)

Myctophum (Nyctophus) lütkeni Brauer, 1904: 400 (Indian Ocean). *Diaphus lütkeni:* Norman, 1930: 333. *Diaphus lutkeni:* Grindley & Penrith, 1965: 283 (in part). *Diaphus luetkeni:* Nafpaktitis, 1978: 42*; Kawaguchi & Shimizu, 1978: 85*; Kotthaus, 1979: 52*; Hulley, 1981: 146*; 1984: 72; Gjøsaeter, 1981: 220.

D 15-17; A 14-16; P 11-12; GR (6-7)+(14-26); AO (5-7)+(4-6).

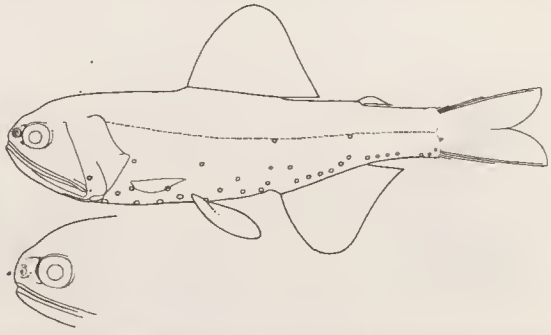
Attains 60 mm. High-oceanic, mesopelagic; 375 - 750 m (day); 40 - 325 m (night). In Agulhas Current to 37°S. Atlantic (42°N-11°S), also Indo-Pacific.



86.24 *Diaphus luetkeni:* 4 cm SL.

86.25 *Diaphus malayanus*
Weber, 1913

Diaphus malayanus Weber, 1913: 89, Fig. 30 (Halmahera and Banda Seas); Wisner, 1976: 113*; Nafpaktitis, 1978: 20*; Kawaguchi & Shimizu, 1978: 117*.



86.25 *Diaphus malayanus:* 4.5 cm SL female (after Nafpaktitis, 1978).

D 15-16; A 15-16; P 11-12; GR (6-7)+(13-15); AO (6-7)+(4-6).

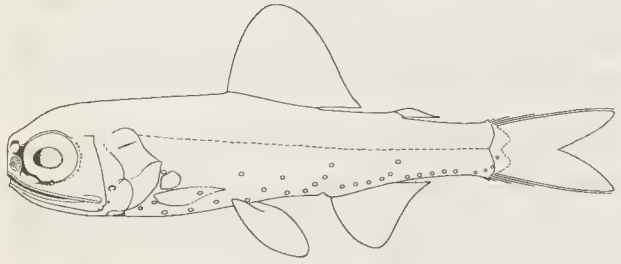
Attains 45 mm. High-oceanic, mesopelagic; upper 85 m (night). Indian Ocean (10°N-10°S and in Mozambique Channel to about 20°S); tropical Indo-Pacific (to at least 145°W).

86.26 *Diaphus meadi*
Nafpaktitis, 1978

Diaphus theta: Grindley & Penrith, 1965: 283 (in part). *Diaphus holti* (*non* Tåning): Nafpaktitis et al., 1977: 161* (in part). *Diaphus meadi* Nafpaktitis, 1978: 63, Figs. 62-64 (27°10′S, 08°59′E); Hulley, 1981: 142*.

D 13-15; A 12-14; P 10-12; GR (4-6)+(11-14); AO (4-6)+(4-6).

Attains 47 mm. High-oceanic, mesopelagic; upper 250 m (night). In upwelled waters off west coast northwards to at least 21°S. A circumglobal convergence species (32°-41°S), but a variant form between 150° and 120°W.



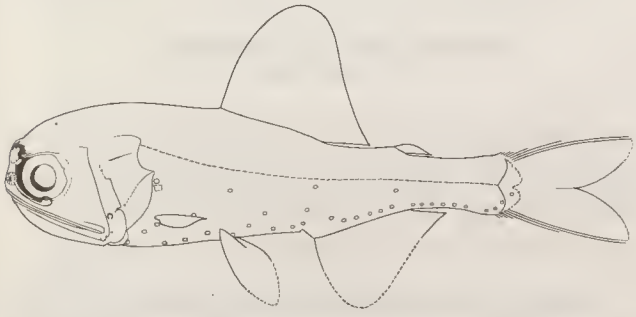
86.26 *Diaphus meadi:* 4 cm SL.

86.27 *Diaphus metopoclampus*
(Cocco, 1829)

Nyctophus metopoclampus Cocco, 1829: 144 (Messina, Italy). *Diaphus metopoclampus:* Krefft, 1974: 230*; Wisner, 1976: 124*; Nafpaktitis et al., 1977: 150*; Nafpaktitis, 1978: 56*; Hulley, 1981: 148*; 1984: 72.

D 14-16; A 14-16; P 10-11; GR (7-9)+(14-15); AO 6+(5-7).

Attains 75 mm. High-oceanic, mesopelagic; 375 - 850 m (day); 90 - 850 m (night). South of 29°S off west coast and 27°S off east coast. Mediterranean, Atlantic, Indo-West Pacific.



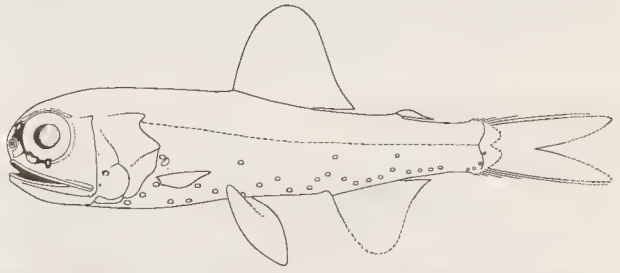
86.27 *Diaphus metopoclampus:* 3.5 cm SL.

86.28 *Diaphus mollis*
Tåning, 1928

Diaphus mollis Tåning, 1928: 60 (19°22′N, 24°06′W); Krefft, 1974: 220; McGinnis, 1974: 176*; Nafpaktitis, 1978: 76*; Kawaguchi & Shimizu, 1978: 34*; Hulley, 1981: 150*; 1984: 72. *Diaphus rafinesquei:* Norman, 1930: 334 (in part). *Diaphus fulgens:* Grindley & Penrith, 1965: 283 (in part).

D 12-14; A 12-14; P 10-11; GR (4-6)+(10-13); AO (4-6)+(3-5).

Attains 66 mm. High-oceanic, mesopelagic; 300 - 800 m (day); 33 - 350 m (night), with size stratification with depth. Off all our coasts. Broadly tropical distribution in all major oceans.



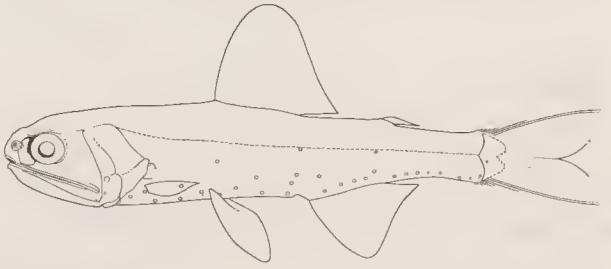
86.28 *Diaphus mollis:* 5.5 cm SL.

86.29 *Diaphus nielseni*
Nafpaktitis, 1978

Diaphus nielseni Nafpaktitis, 1978: 17, Figs. 12-13 (06°37′N, 122°24′E); Gjøsaeter & Beck, 1981: 257*; Hulley, 1984: 72*.

D 13-15; A 13-15; P 9-10; GR (6-7)+(14-16); AO (5-7)+(4-6).

Attains 40 mm. High-oceanic, mesopelagic. Taken once in the Agulhas Current (30°17′S, 31°25′E); off east coast of Madagascar, in Mozambique Channel (15°-21°S) and from southeast Asian seas northwards to southern Japan.



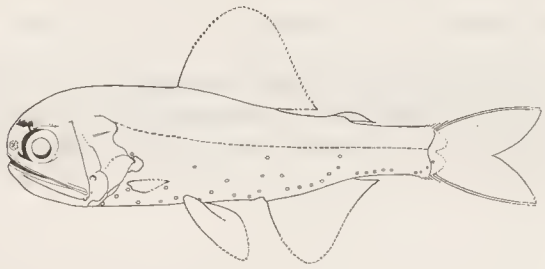
86.29 *Diaphus nielseni:* 3.5 cm SL.

86.30 *Diaphus ostenfeldi*
Tåning, 1932

Diaphus ostenfeldi Tåning, 1932: 142, Fig. 15 (35°36′S, 171°52′E); Trunov, 1968: 747*; Hulley, 1972: 227; 1981: 153*; Krefft, 1974: 232*; 1978: 446; McGinnis, 1974: 173*; Wisner, 1976: 123*; Nafpaktitis, 1978: 51*.

D 15-17; A 14-16; P 10-12; GR (8-10)+(15-18); AO (6-7)+(4-7).

Attains 110 mm. High-oceanic, mesopelagic; juveniles in upper 100 m (night); adults below 160 m (night). Off west coast northwards to about 23°S. A circumglobal convergence species (35°-48°S).



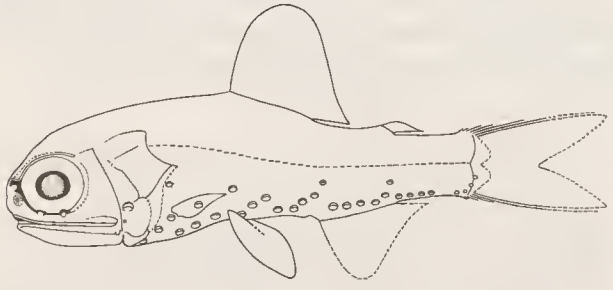
86.30 *Diaphus ostenfeldi:* 6.5 cm SL.

86.31 *Diaphus parri*
Tåning, 1932

Diaphus parri Tåning, 1932: 135, Fig. 7 (27°21′S, 175°11′E); McGinnis, 1974: 179*; Krefft, 1974: 232*; Nafpaktitis, 1978: 67*; Kawaguchi & Shimizu, 1978: 43*; Kotthaus, 1979: 52*; Gjøsaeter, 1981: 220; Hulley, 1981: 154*; 1984: 74.

D 12-14; A 12-13; P 10-11; GR (5-6)+(10-13); AO (4-6)+(3-5).

Attains 65 mm. High-oceanic, mesopelagic; upper 150 m (night). In Agulhas Current and off west coast in Agulhas Water pockets. Indian Ocean (10°N-12°S, with extension to 25°S in Mozambique Channel), southeast Asian seas and Pacific (tropical waters west of 95°W).



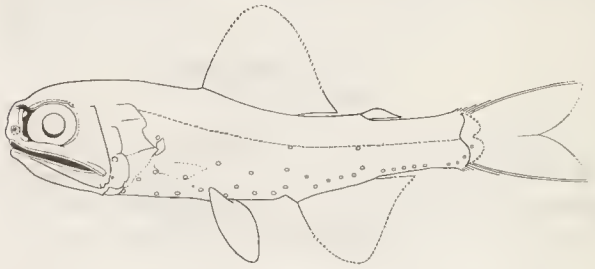
86.31 *Diaphus parri:* 2.5 cm SL.

86.32 *Diaphus perspicillatus*
(Ogilby, 1898)

Aethoprora perspicillata Ogilby, 1898: 36 (Lord Howe Id.). *Myctophum (Nyctophus) elucens* Brauer, 1904: 401, Fig. 8 (00°27′S, 42°47′E). *Diaphus perspicillatus:* Nafpaktitis et al., 1977: 143*; Nafpaktitis, 1978: 52*; Kawaguchi & Shimizu, 1978: 61*; Hulley, 1981: 155*; 1984: 74; Gjøsaeter & Beck, 1981: 257.

D 15-17; A 14-16; P 10-12; GR (8-10)+(16-19); AO (5-7)+(4-7).

Attains 71 mm. High-oceanic, mesopelagic; 315 - 1 500 m (day); from surface to 125 m at night. In Agulhas Current and off west coast in Agulhas Water pockets. Broadly tropical species in Atlantic (45°N-36°S, but absent in southeastern sector); Indo-Pacific.



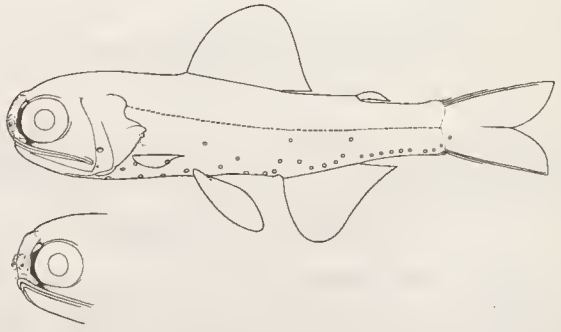
86.32 *Diaphus perspicillatus:* 3.5 cm SL.

86.33 *Diaphus phillipsi*
Fowler, 1934

Diaphus phillipsi Fowler, 1934: 287, Fig. 47 (10°18′30″N, 122°23′30″E); Nafpaktitis, 1978: 55*; Kawaguchi & Shimizu, 1978: 59*; Kotthaus, 1979: 52*.

D 15-16; A 14-15; P 11-12; GR (8-9)+(16-18); AO (5-7)+(4-6).

Attains 77 mm. High-oceanic, mesopelagic; 600 m (day); 50 - 200 m (night). Not yet recorded from our area. Indian Ocean (08°N-12°S, with extension to 16°S in Mozambique Channel); Indo-Pacific.



86.33 *Diaphus phillipsi:* 5 cm SL female (after Nafpaktitis, 1978).

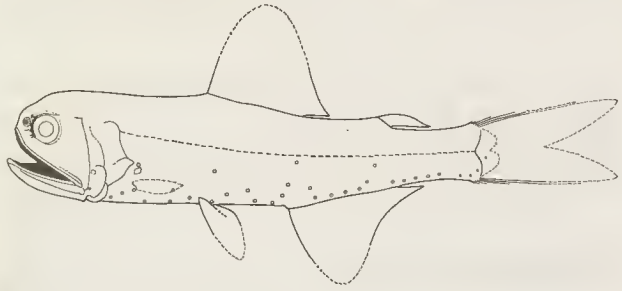
86.34 *Diaphus problematicus*
Parr, 1928

Myctophum (Diaphus) splendidum Brauer, 1906: 218* (in part). *Diaphus problematicus* Parr, 1928: 143, Fig. 32 (24°29′N, 77°29′W); Nafpaktitis et al., 1977: 119*; Nafpaktitis, 1978: 13*; Kawaguchi & Shimizu, 1978: 100*; Kotthaus, 1979: 50*; Hulley, 1981: 158*; 1984: 74.

D 15-17; A 16-18; P 11-12; GR 4+(9-11): AO (6-7)+(4-6).

Attains 105 mm. High-oceanic, mesopelagic; 375 - 750 m (day); 40 - 225 m (night). In Agulhas Current and off west

coast in Agulhas Water pockets. Atlantic (40°N-39°S, but absent south of 13°S in eastern sector) and tropical Indo-Pacific with extensions into higher latitudes in western boundary currents.



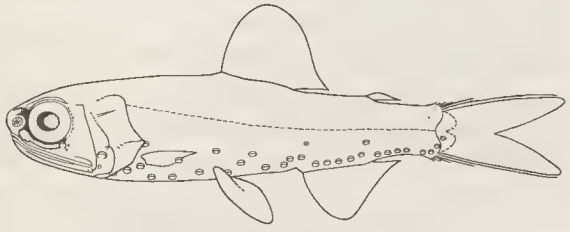
86.34 *Diaphus problematicus:* 5.5 cm SL.

86.35 *Diaphus richardsoni*
Tåning, 1932

Diaphus richardsoni Tåning, 1932: 136, Fig. 8 (02°10′N, 138°20′E); Krefft, 1974: 232*; Wisner, 1976: 143*; Nafpaktitis, 1978: 81*; Kawaguchi & Shimizu, 1978: 22*; Hulley, 1981: 160*; 1984: 59.

D 12-14; A 12-14; P 10-12; GR (6-7)+(13-15); AO (4-6)+(2-4).

Attains 60 mm. High-oceanic, mesopelagic; below 200 m (night). In Agulhas Current and off west coast in Agulhas Water pockets. Indo-Pacific.

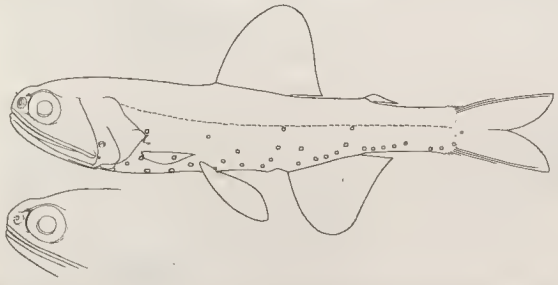


86.35 *Diaphus richardsoni:* 4.5 cm SL.

86.36 *Diaphus signatus*
Gilbert, 1908

Diaphus signatus Gilbert, 1908: 228, Pl. 3 (Nuku Hiva Ids., Marquesas Group); Nafpaktitis, 1978: 15*.

D 15-16; A 15; P 11-12; GR (5-7)+(14-16); AO (5-7)+(5-6).



86.36 *Diaphus signatus:* 4 cm SL female (after Nafpaktitis, 1978).

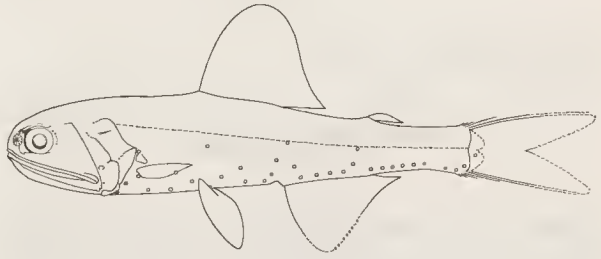
Maximum size unknown. Not yet recorded from our area. Indo-Pacific to 18°S in Mozambique Channel.

86.37 *Diaphus splendidus*
(Brauer, 1904)

Myctophum (Nyctophus) splendidum Brauer, 1904: 399, Fig. 7 (Atlantic and Indian oceans). *Diaphus splendidus:* Smith & Smith, 1963: 9*; Nafpaktitis, 1978: 23*; Kawaguchi & Shimizu, 1978: 105*; Hulley, 1981: 161*; 1984: 74.

D 14-15; A 16-17; P 11-12; GR 5+(12-14); AO (5-7)+(5-7).

Attains 90 mm. High-oceanic, mesopelagic; 375 - 750 m (day); 40 - 225 m (night). In Agulhas Current southwards to 31°S. Atlantic (40°N-28°S, but absent south of 10°S in eastern sector); Indo-Pacific.



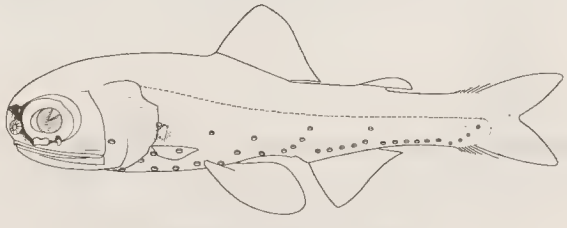
86.37 *Diaphus splendidus:* 6 cm SL.

86.38 *Diaphus subtilis*
Nafpaktitis, 1968

Diaphus subtilis Nafpaktitis, 1968: 92, Figs. 61-63 (13°47′N, 61°26′W); Nafpaktitis et al., 1977: 164*; Hulley, 1981: 163*.

D 12-14; A 13; P 10-12; GR (6-7)+(14-15); AO (5-6)+(6-7).

Attains 85 mm. High-oceanic, mesopelagic; 375 - 750 m (day); 40 - 550 m (night). Not yet recorded from our area. Atlantic (40°N-37°S, but (?) absent in eastern South Atlantic).



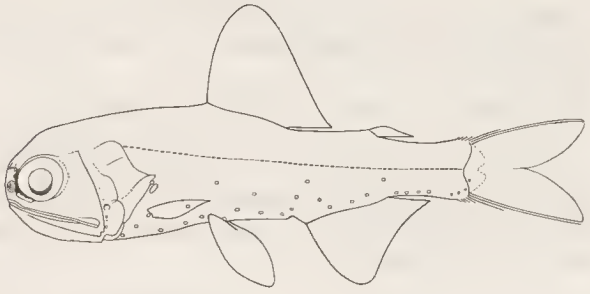
86.38 *Diaphus subtilis:* 8 cm SL female holotype (after Nafpaktitis, 1968).

86.39 *Diaphus taaningi*
Norman, 1930

Diaphus taaningi Norman, 1930: 332, Fig. 30 (00°36′S, 08°28′E); O'Toole, 1976: 28*; Nafpaktitis et al., 1977: 126*; Hulley, 1981: 274.

D 13-15; A 13-15; P 10-11; GR (6-8)+(13-15); AO (4-6)+(4-6).

Attains 70 mm. Pseudoceanic, pelagic; 325 - 475 m (day); 40 - 250 m (night). Over west coast continental shelf/slope southwards to 24°S. Amphitropical species in Atlantic (western sector: tropical waters to 42°N; eastern sector: southwards from Mauritanian Upwelling Region to our area).



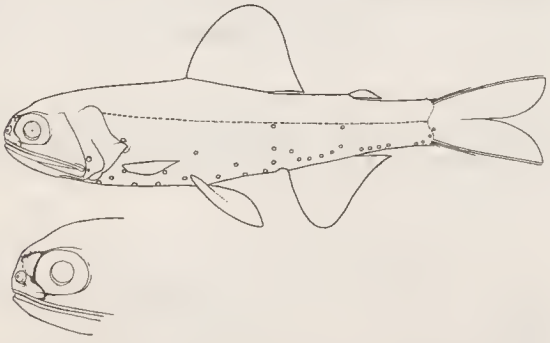
86.39 *Diaphus taaningi:* 4 cm SL.

86.40 *Diaphus thiollieri*
Fowler, 1934

Diaphus thiollieri Fowler, 1934: 289, Fig. 48 (09°31′50″N, 124°40′E); Nafpaktitis, 1978: 48*; Kawaguchi & Shimizu, 1978: 74*; Gjøsaeter, 1981: 220*; Gjøsaeter & Beck, 1981: 257.

D 15-17; A 14-16; P 10-12; GR (6-8)+(14-16); AO (5-7)+(3-5).

Attains 100 mm. High-oceanic, mesopelagic. Mozambique Channel southwards to about 26°S. Indian Ocean (Arabian Sea to 12°S and off Sumatra) and in southeast Asian seas.



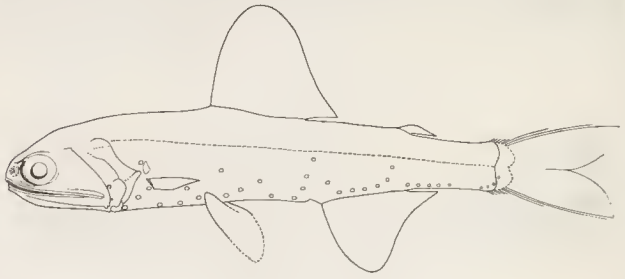
86.40 *Diaphus thiollieri:* 5 cm SL female (after Nafpaktitis, 1978).

86.41 *Diaphus watasei*
Jordan & Starks, 1904

Diaphus watasei Jordan & Starks, 1904: 580, Fig. (off Atami, Sagami Bay, Japan); Nafpaktitis, 1978: 29*; Gjøsaeter & Beck, 1981: 257*. ?*Diaphus elucens* (*non* Brauer): Smith, **SFSA No. 201*** (in part).

D 14-15; A 14-15; P 11; GR (4-6)+(13-15); AO (6-7)+(5-6).

Attains 170 mm. Pseudoceanic, epibenthic; 100 - 550 m. Over east coast continental shelf/slope southwards to about 30°S; on east African continental shelf south of about 02°S; west coast of Madagascar and off Japan.



86.41 *Diaphus watasei:* 10 cm SL.

Genus ***Diogenichthys*** Bolin, 1939

Maxilla expanded posteriorly, extending to or a little beyond rear margin of orbit; A base longer than D base. Dn present; Vn absent; 5 PO; 4 VO; AO series divided into AOa and AOp; one Pol. Mature males with large, supracaudal luminous gland; mature females with smaller, infracaudal luminous gland. Three species; 2 in our area.

KEY TO SPECIES

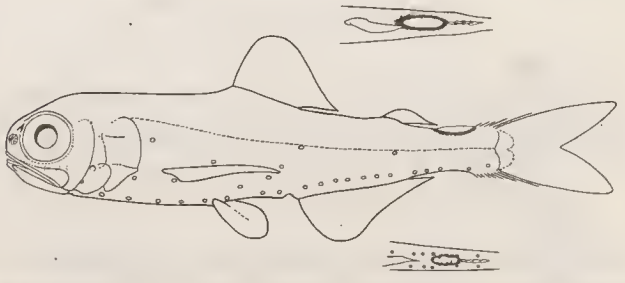
1a Prc_1-Prc_2 interspace equal to or longer than last AOp-Prc_1 interspace; SAO_1 above VO_3-VO_4 interspace; Dn poorly developed in mature males; GR 12-15 ..... *D. atlanticus*

1b Prc_1-Prc_2 interspace ½ or less than ½ as long as last AOp-Prc_1 interspace; SAO_1 directly over or slightly behind VO_4; Dn well developed in mature males; GR 11-12 ..... *D. panurgus*

86.42 *Diogenichthys atlanticus*
(Tåning, 1928)

Myctophum laternatum atlanticum Tåning, 1928: 56 (20°00′N, 21°55′W). *Myctophum laternatum* (*non* Garman): Norman, 1930: 324. *Diogenichthys atlanticus:* Nafpaktitis & Nafpaktitis, 1969: 13*; Hulley, 1972: 220; 1981: 55*; 1984: 74*.

D 10-12; A 15-18; P 12-14; GR 2+(10-13); AO (5-8)+(3-4). Mature males with single, large, supracaudal luminous gland, extending 75% (or less) of distance from procurrent C rays to base of adipose fin; mature females with 2-4 small, coalesced luminous patches infracaudally.



86.42 *Diogenichthys atlanticus:* 2 cm SL.

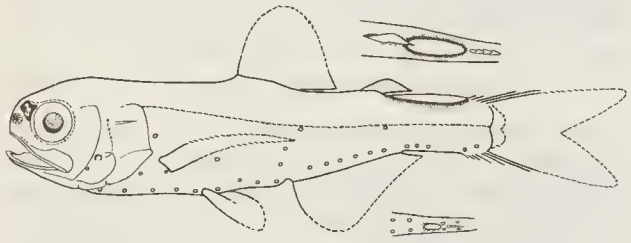
Attains 29 mm. High-oceanic, mesopelagic; 400 - 1 250 m (day); 10 - 1 050 m (night); light-coloured individuals non-migratory. Atlantic (50°N-48°S), Indian Ocean (22°-45°S) and Pacific (35°N- 35°S, but absent in equatorial waters west of 130°W, and near Hawaii).

86.43 *Diogenichthys panurgus*
Bolin, 1946

Diogenichthys panurgus Bolin, 1946: 140 (05°56′N, 76°22′W); Nafpaktitis & Nafpaktitis, 1969: 14*; Kotthaus, 1972: 15*; Hulley, 1984: 75*.

D 10-12; A 15-17; P 10-11; GR 2+(9-10); AO (5-7)+(2-3). Mature males with single, large, supracaudal luminous gland, extending from procurrent C rays almost to base of adipose fin; mature females with 1-2 coalesced luminous patches infracaudally.

Attains 23 mm. High-oceanic, mesopelagic. In Agulhas Current to about 38°S and in Indian Ocean (19°N-05°S).



86.43 *Diogenichthys panurgus:* 2 cm SL.

Genus ***Electrona*** Goode & Bean, 1896

Maxilla greatly expanded posteriorly, extending to or slightly beyond rear margin of orbit; A base longer than D base. Dn and Vn present; 5 PO; 4 VO; Pol absent, but AO series behind end of base of A may be depressed. Five species; probably all in our area.

KEY TO SPECIES

1a AO 10-12; body depth greater than or equal to ⅓ SL; SAO series slightly curved ..... *E. risso*
1b AO 13-19; body depth less than ⅓ SL; SAO series angulate 2

2a So on or slightly behind vertical through middle of orbit; SAO_3 nearer to SAO_2 than to LL ..... *E. carlsbergi*
2b So absent; SAO_3 nearer LL than to SAO_2 3

3a Total GR 16-20; PLO nearer to PVO_1 than to PVO_2; AO series level ..... *E. antarctica*
3b Total GR 21-31; PLO equidistant from PVO_1 and PVO_2; AO series with last 4-5 photophores depressed 4

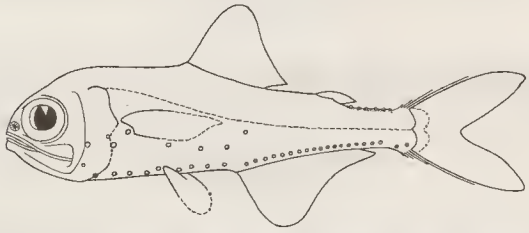
4a GR 27-31; Prc_1-Prc_2 interspace less than 1 photophore-diameter; PO_5 not elevated, level with outer base of V; VLO usually nearer V base than to LL ..... *E. subaspera*
4b GR 21-24; Prc_1-Prc_2 interspace equal to or greater than 1 photophore-diameter; PO_5 elevated, above level of outer base of V; VLO usually about midway between V base and LL ..... *E. paucirastra*

86.44 *Electrona antarctica*
(Günther, 1878)

Scopelus antarcticus Günther, 1878: 184 (Antarctic Ocean); 1887: 196*. *Myctophum antarcticum:* Norman, 1930: 322* (in part); Smith, **SFSA No. 193.** *Electrona antarctica:* Hulley, 1972: 219; 1981: 37*.

D 14-16; A 19-22; P 11-13; GR (3-5)+(12-16); AO 17-19. Mature males with 5-7 separate, supracaudal luminous glands; mature females with 4-6 separate, infracaudal luminous glands.

Attains 103 mm. High-oceanic, mesopelagic; upper 100 m south of Antarctic Polar Front, but deeper northwards. Off the Cape and at 43°17′S, 48°55′E. Circumpolar distribution south of Antarctic Polar Front, where it is one of the commonest myctophid species.



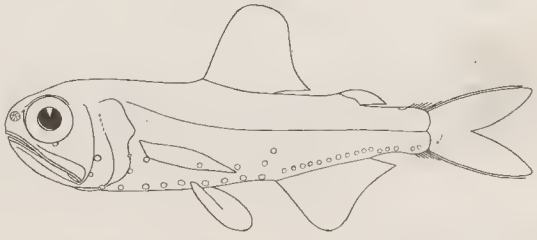
86.44 *Electrona antarctica:* 6 cm SL.

86.45 *Electrona carlsbergi*
(Tåning, 1932)

Myctophum carlsbergi Tåning, 1932: 126, Fig. 1 (44°40′S, 173°39′E). *Electrona carlsbergi:* Hulley, 1981: 40*.

D 13-15; A 18-20; P 12-13; GR (8-10)+(19-25); AO 13-15. Both sexes with single, small, supracaudal and single, small, infracaudal luminous gland.

Attains 95 mm. High-oceanic, mesopelagic; upper 100 m south of 50°S, but below 550 m in region of Subtropical Convergence. Not yet recorded in our area. Circumglobal in subantarctic waters (40°-60°S).



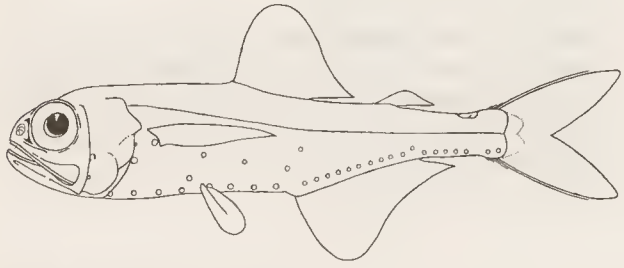
86.45 *Electrona carlsbergi:* 7.5 cm SL.

86.46 *Electrona paucirastra*
Bolin, 1962

Electrona paucirastra Bolin, *in* Andriashev, 1962: 280 (39°30′S, 71°16′E); Nafpaktitis & Nafpaktitis, 1969: 9*; Hulley, 1981: 43*.

D 13-15; A 20-21; P 14-16; GR (5-6)+(15-18); AO 14-16, in single series but noticeably depressed behind A base. Mature males with single, supracaudal luminous gland; mature females with single, small, supracaudal gland and 1-3 small, infracaudal luminous patches.

Attains 70 mm. High-oceanic, mesopelagic; from surface and to 100 m at night. Not yet recorded in our area. Southern oceans as a convergence species.



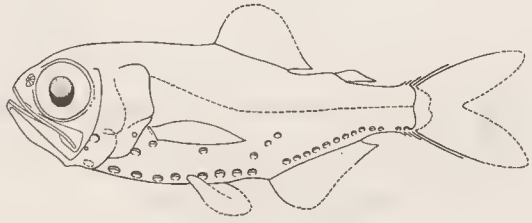
86.46 *Electrona paucirastra:* 7 cm SL.

86.47 *Electrona risso*
(Cocco, 1829)

Scopelus risso Cocco, 1829: 144 (Messina). *Myctophum rissoi:* Norman, 1930: 320. *Electrona rissoi:* Trunov, 1968: 745*; Nafpaktitis & Nafpaktitis, 1969: 10*; Hulley, 1972: 220; 1972: 240; Kotthaus, 1972: 13*; Wisner, 1976: 30*; Gjøsaeter, 1981: 220. *Electrona risso:* Hulley, 1981: 44*.

D 13-15; A 18-20; P 14-17; GR (7-8)+(16-20); AO 10-12, only slightly depressed behind A base. Males with supracaudal or infracaudal luminous gland or both; females with one supracaudal and one infracaudal luminous gland, occasionally with either supracaudal or infracaudal luminous gland.

Attains 82 mm. High-oceanic, mesopelagic; 225 - 750 m (day); 90 - 375 m and 450 - 550 m (night), exhibiting size stratification with depth. Off east and west coasts in our area. Widespread species in Atlantic (55°N-40°S), Mediterranean, Indian Ocean (0°-40°S), Tasman Sea and Cook Strait, and eastern Pacific (42°N-20°S).



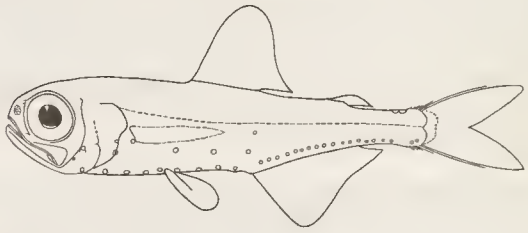
86.47 *Electrona risso:* 6.5 cm SL.

86.48 *Electrona subaspera*
(Günther, 1864)

Scopelus (Dasyscopelus) subasper Günther, 1864: 411 (43°00′S, 123°00′E). *Myctophum subasperum:* Norman, 1930: 323 (in part). *Electrona subaspera:* Andriashev, 1962: 245 (in part); Hulley, 1981: 47*.

D 13-15; A 20-22; P 13-16; GR (7-9)+(18-22); AO 16-18, moderately depressed posterior to A base. Mature males with 1-3 luminous scales supracaudally, forming gland; mature females with supracaudal and infracaudal luminous glands, variously arranged, occasionally with either supracaudal or infracaudal gland.

Attains 127 mm. High-oceanic, mesopelagic; from surface to 200 m at night. Taken once in our area (40°S, 10°E). Circumglobal between Subtropical Convergence and Antarctic Polar Front.



86.48 *Electrona subaspera:* 5 cm SL.

Genus ***Gonichthys*** Gistel, 1850

Anal fin base considerably longer than D base. Dn and Vn present; 5 PO; 4 VO; SAO series forming obtuse angle; AO series divided into AOa and AOp; 1 Pol. Mature males with supracaudal gland only, consisting of separate or slightly overlapping luminous structures bordered by black pigment; mature females with series of non-overlapping luminous patches infracaudally. Four species; probably 2 in our area.

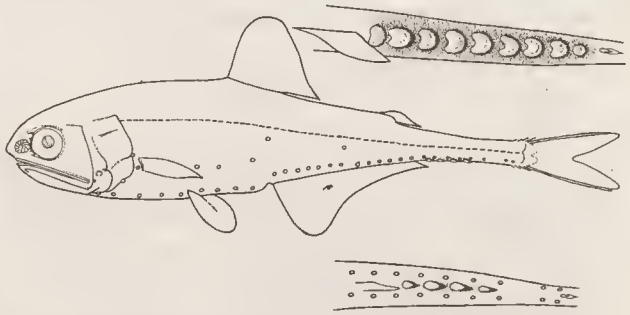
KEY TO SPECIES

1a LL incomplete, with last perforated scale below about origin of adipose fin; A origin behind vertical through base of last D ray ..... *G. cocco*

1b LL complete, all scales perforated; A origin slightly before vertical through base of last D ray ..... *G. barnesi*

86.49 *Gonichthys barnesi*
Whitley, 1943

Gonichthys barnesi Whitley, 1943: 174 (Lord Howe Id.); Hulley, 1981: 107*; 1984: 76. *Myctophum cocco* (*non* Cocco): Smith, **SFSA No. 196***.



86.49 *Gonichthys barnesi:* 4 cm SL.

D 11-13; A 21-24; P 13-17; GR (4-6)+(8-11); AO (5-8)+(10-14). Mature males with 6-9 supracaudal luminous structures; mature females with 4-5 infracaudal luminous patches.

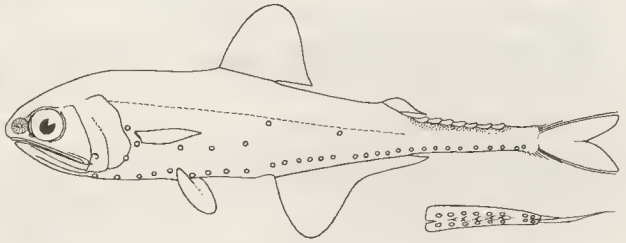
Attains 50 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. Off east and west coasts, south of 30°S. Convergence species in all 3 oceans (30°-40°S).

86.50 *Gonichthys cocco*
(Cocco, 1829)

Scopelus cocco Cocco, 1829: 143 (Messina, Italy). *Gonichthys cocco:* Nafpaktitis et al., 1977: 86*.

D 10-13; A 21-23; P 13-16; GR (4-5)+(7-9); AO (4-7)+(11-14). Mature males with 6-8 supracaudal luminous structures; mature females with 3-6 infracaudal luminous patches.

Attains 60 mm. High-oceanic, mesopelagic; 425 - 1 000 m (day); from surface to 175 m at night. Not yet recorded with certainty in our area. Mediterranean and Atlantic (50°N-30°S), but apparently outside the Benguela Upwelling Region.



86.50 *Gonichthys cocco:* 5 cm SL male (after Nafpaktitis et al., 1977).

Genus ***Gymnoscopelus*** Günther, 1873

Maxilla slightly expanded posteriorly, extending well past orbit; D base longer than A base. Dn and Vn well developed; 5-7 PO; 5-6 VO; AO series divided into AOa and AOp; 2 Pol; Prc series in 1 or 2 groups. Supracaudal and infracaudal luminous glands absent; some species with irregularly-shaped patches of luminous tissue on body, especially below D base. Two subgenera; probably both in our area.

KEY TO SUBGENERA

1a PVO_1 and PVO_2 below level of upper base of P .... *Gymnoscopelus*
1b PVO_2 noticeably above level of upper base of P ..... *Nasolychnus*

Subgenus ***Gymnoscopelus*** Günther, 1873

Four species; possibly all in our area.

KEY TO SPECIES

1a 6-9 Prc, the last never widely separated from rest of series; D 17-22, its origin in front of vertical at outer base of V 2
1b 4-5 Prc, the last usually widely separated from rest of series; D 14-17 (rarely 18), its origin a little behind vertical at outer base of V 3

2a Total GR 21-24; D 19-22; usually 5 PO; VLO about midway between LL and V base; CPL less than UJ ..... *G. (G.) bolini*
2b Total GR 30-36; D 17-19; usually 6 PO; VLO nearer V base than to LL; CPL greater than UJ ..... *G. (G.) nicholsi*

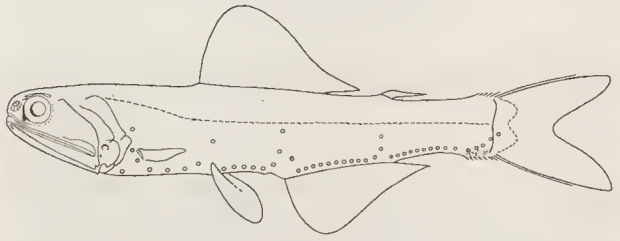
3a Total GR 21-25; 5 PO, with PO_3 elevated above rest of series; CPL greater than UJ; PreD 43-45% SL ..... *G. (G.) braueri*
3b Total GR 25-28; 6-7 PO, all level; CPL less than UJ; PreD 48-49% SL ..... *G. (G.) opisthopterus*

86.51 *Gymnoscopelus (Gymnoscopelus) bolini*
Andriashev, 1962

Gymnoscopelus (Gymnoscopelus) bolini Andriashev, 1962: 272, Fig. 34 (53°01'S, 109°30'W); McGinnis, 1974: 199*; Hulley, 1981: 250*. *Lampanyctus nicholsi:* Norman, 1930: 326 (in part).

D 19-22; A 19-22; P 12-14; GR (6-7)+(14-17); AO (10-12)+(7-9); Prc 5-6.

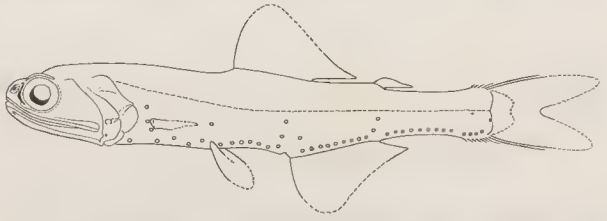
Attains 280 mm. High-oceanic, mesopelagic; upper 200 m in region of Antarctic Polar Front, but deeper northwards (night). Not yet recorded from our area. Circumglobal between Subtropical Convergence and Antarctic Polar Front.



86.51 *Gymnoscopelus (G.) bolini:* 15 cm SL.

86.52 *Gymnoscopelus (Gymnoscopelus) braueri*
(Lönnberg, 1905)

Myctophum (Lampanyctus) braueri Lönnberg, 1905: 764; 1905: 64, Fig. 1 (48°54'S, 51°40'W). *Myctophum braueri:* Norman, 1930: 327 (in part). *Gymnoscopelus (Gymnoscopelus) braueri:* Andriashev, 1962: 264*; McGinnis, 1974: 192*; Hulley, 1981: 253*.



86.52 *Gymnoscopelus (G.) braueri:* 9.5 cm SL.

D 14-17; A 16-20; P 12-15; GR (6-7)+(15-19); AO (8- 12)+(8-11); Prc (3-5)+1.

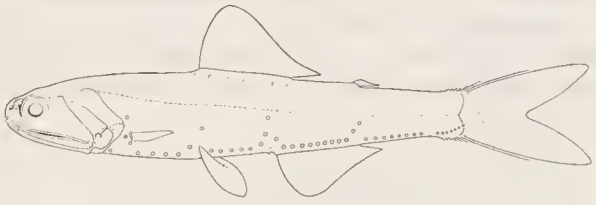
Attains 132 mm. High-oceanic, mesopelagic; upper 200 m (night), but deeper in region of Subtropical Convergence. Circumglobal species between Subtropical Convergence and Antarctic Continent.

86.53 *Gymnoscopelus (Gymnoscopelus) nicholsi*
(Gilbert, 1911)

Lampanyctus nicholsi Gilbert, 1911: 17, Fig. 1 (47°S, 60°W); Norman, 1930: 326 (in part). *Gymnoscopelus aphya* Günther, 1873: 91. *Gymnoscopelus (Gymnoscopelus) nicholsi:* Andriashev, 1962: 270*; Hulley, 1981: 255*. *Gymnoscopelus (Gymnoscopelus) aphya:* McGinnis, 1974: 199*.

D 17-19; A 19-21; P 13-15; GR (9-12)+(21-24); AO (9-12)+(6-9); Prc 5-8.

Attains 161 mm. High-oceanic, mesopelagic; upper 100 m (night), but deeper in region of Subtropical Convergence. Not yet recorded from our area. Circumglobal species between Subtropical Convergence and Antarctic Polar Front.



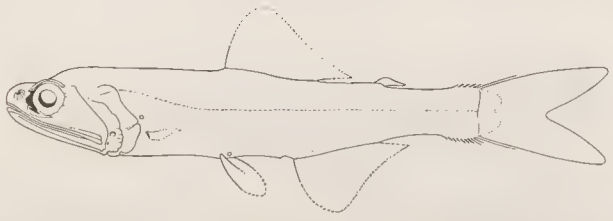
86.53 *Gymnoscopelus (G.) nicholsi:* 12.5 cm SL.

86.54 *Gymnoscopelus (Gymnoscopelus) opisthopterus*
Fraser-Brunner, 1949

Gymnoscopelus opisthopterus Fraser-Brunner, 1949: 1094, Fig., 1102, Fig. 13 (64°22.6′S, 106°33.3′E). *Lampanyctus braueri:* Norman, 1930: 327 (in part). *Gymnoscopelus (Gymnoscopelus) opisthopterus:* Andriashev, 1962: 268*; McGinnis, 1974: 196*; Hulley, 1981: 258*.

D 15-18; A 16-18; P 12-14; GR (7-9)+(16-20); AO (9-10)+(7-8); Prc 4+1.

Attains 162 mm. High-oceanic, bathypelagic; adults usually deeper than 500 m, but larvae and juveniles in 66 - 200 m. Not yet recorded from our area. Circumglobal species south of Antarctic Polar Front, but north to 40°S in western South Atlantic.



86.54 *Gymnoscopelus (G.) opisthopterus:* 13 cm SL.

Subgenus ***Nasolychnus*** Smith, 1933

More than 4 species; possibly 4 in our area.

KEY TO SPECIES

1a Antorbital luminous tissue confined to upper ½ of orbit, never extending to anteroventral margin of eye, although black pigmented skin may do so ..... *G. (N.) fraseri*

1b Antorbital luminous tissue extending below upper ½ of orbit to anteroventral margin of eye 2

2a Distance VO_5-SAO_1 about 2 times in distance SAO_1-SAO_2; total GR 25-31; eye well above upper lip, the vertical distance from upper lip to lower margin of eye at middle of orbit greater than length of P base ..... *G. (N.) hintonoides*

2b Distance VO_5-SAO_1 about equal to distance SAO_1-SAO_2; GR 30-36; vertical distance above upper lip at middle of orbit equal to or less than length of P base 3

3a CPL greater than UJ; adipose fin base narrow, about equal to 1 photophore-diameter; LL narrow, about equal to 1 photophore-diameter; V tips heavily pigmented ..... *G. (N.) piabilis*

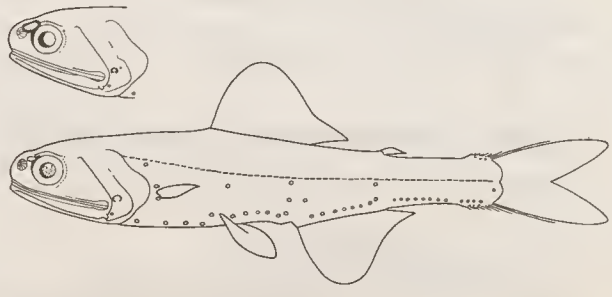
3b CPL equal to or less than UJ; adipose fin base broad, about equal to 2 photophore-diameters; LL about equal to 2 photophore-diameters; V tips not pigmented ..... *G. (N.) microlampas*

86.55 *Gymnoscopelus (Nasolychnus) fraseri*
(Fraser-Brunner, 1931)

Lampanyctus fraseri Fraser-Brunner, 1931: 224, Fig. 4 (03°18′S, 05°17′E; type-locality is erroneous). *Gymnoscopelus (Nasolychnus) fraseri:* McGinnis, 1974: 205*; Hulley, 1981: 260*.

D 16-18; A 17-20; P 12-15; GR (7-9)+(17-20); AO (9-11)+(7-10); Prc (3-5)+1.

Attains 88 mm. High-oceanic, mesopelagic. Not yet recorded from our area, but has been taken at 43°17′S, 48°55′E. Circumglobal between Subtropical Convergence and Antarctic Polar Front.



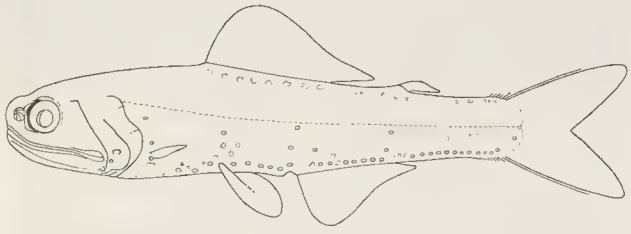
86.55 *Gymnoscopelus (N.) fraseri:* 7.5 cm SL.

86.56 *Gymnoscopelus (Nasolychnus) hintonoides*
Hulley, 1981

Gymnoscopelus (Nasolychnus) hintonoides Hulley, 1981: 262, Figs. 125-126 (42°57.9′S, 39°53.2′W).

D 17-19; A 17-20; P 12-15; GR (7-10)+(18-21); AO (8-11)+(6-10); Prc (3-4)+1.

Attains 140 mm. High-oceanic, mesopelagic; below 328 m (night). Not yet recorded from our area. Atlantic Ocean between Subtropical Convergence and Antarctic Polar Front; probably circumglobally distributed in this region.



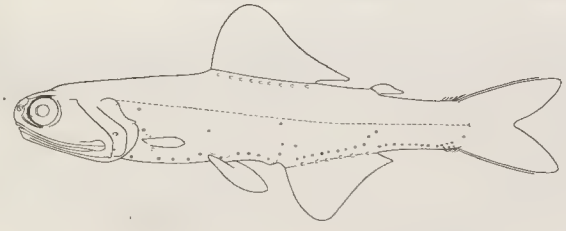
86.56 *Gymnoscopelus (N.) hintonoides:* 11 cm SL.

86.57 *Gymnoscopelus (Nasolychnus) microlampas*
Hulley, 1981

Gymnoscopelus (Nasolychnus) microlampas Hulley, 1981: 266, Figs. 125, 127 (41°46.6′S, 39°58.4′W). *Gymnoscopelus (N.)* sp.: Nafpaktitis & Nafpaktitis, 1969: 66*.

D 18-20; A 18-20; P 13-15; GR (9-11)+(21-24); AO (9-10)+(6-8); Prc (3-4)+1.

Attains 117 mm. High-oceanic, mesopelagic; below 210 m (night). Not yet recorded from our area, but has been taken at 40°53′S, 60°01′E. Circumglobal between Subtropical Convergence and Antarctic Polar Front.



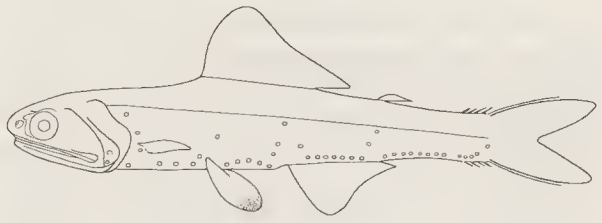
86.57 *Gymnoscopelus (N.) microlampas:* 11 cm SL.

86.58 *Gymnoscopelus (Nasolychnus) piabilis*
(Whitley, 1931)

Lampanyctus piabilis Whitley, 1931: 103, Fig. 1 (Macquarie Id.). *Myctophum (Nasolychnus) florentii* Smith, 1933: 126, Pl. 9 (Port Alfred). *Nasolychnus florentiae:* Smith, **SFSA No. 202***. *Gymnoscopelus (Nasolychnus) piabilis:* McGinnis, 1974: 213*; Hulley, 1981: 269*.

D 18-20; A 16-19; P 12-14; GR (9-12)+(20-25); AO (7-10)+(7-10); Prc (3-5)+1.

Attains 146 mm. High-oceanic, mesopelagic; below 100 m (night). Off west coast in Benguela Upwelling Region and on east coast as beach-washed specimen (Port Alfred). Circumglobal between Subtropical Convergence and Antarctic Polar Front.



86.58 *Gymnoscopelus (N.) piabilis:* 10.5 cm SL.

Genus ***Hintonia*** Fraser-Brunner, 1949

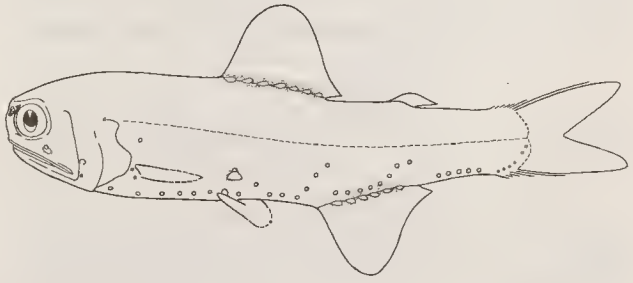
Maxilla extending beyond orbit; D base slightly longer than A base. Dn and Vn present; 1 CP; 6 PO; 5 VO; AO series divided into AOa and AOp; 2 Pol; Prc in 2 groups; luminous tissue at CP, VLO and at bases of D, A and V. One species; probably occurs in our area.

86.59 *Hintonia candens*
Fraser-Brunner, 1949

Hintonia candens Fraser-Brunner, 1949: 1098, Fig., 1104, Pl. 1B (41°50′S, 00°01.7′E - 41°54.3′S, 00°03.0′E); McGinnis, 1974: 182*; Hulley, 1981: 238*.

D 14-16; A 12-14; P 13-15; GR (6-7)+(12-14); AO (5-7)+(5-6); Prc (3-4)+2.

Attains 130 mm. High-oceanic, mesopelagic; upper 100 m (night). Not yet recorded from our area; circumglobal convergence species (39°-48°S).



86.59 *Hintonia candens:* 12.5 cm SL.

Genus ***Hygophum*** Bolin, 1939

Maxilla broadly expanded posteriorly, extending to or a little behind vertical through rear margin of orbit; A base

longer than D base; P base equidistant from dorsal and ventral margins of trunk. Dn smaller than Vn; 5 PO; 4 VO; SAO series angulate; AO series divided into AOa and AOp; males with supracaudal luminous gland; females with infracaudal luminous gland. Nine species; 3 (probably 4) in our area.

KEY TO SPECIES

1a PO_5 elevated above level of rest of series, well above level of outer base of V; AOa series arched, with AOa^2-AOa^4 elevated ..... *H. hanseni*
1b PO_5 level with rest of series, at outer base of V; AOa series level 2

2a VLO at LL; SAO_1 on or in front of vertical through VO_2 ..... *H. hygomii*
2b VLO about midway between LL and outer base of V; SAO_1 well behind vertical through VO_2 3

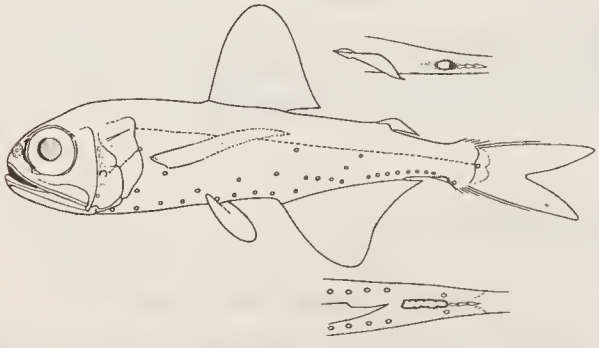
3a A 21-25; C peduncle long and slender; distance between Prc_2 and rear end of D base greater than distance from tip of snout to V base ..... *H. reinhardtii*
3b A 18-21; C peduncle normal; distance between Prc_2 and rear end of D base less than distance from tip of snout to V base ..... *H. proximum*

86.60 *Hygophum hanseni*
(Tåning, 1932)

Scopelus hygomii Lütken, 1892: 256 (in part). *Myctophum hanseni* Tåning, 1932: 132, Fig. 4 (42°32′S, 174°50′E). ? *Myctophum reinhardti:* Smith, **SFSA No. 199** (in part). *Hygophum hanseni:* Bekker, 1965: 95*; Nafpaktitis & Nafpaktitis, 1969: 19*; Hulley, 1972: 222; 1981: 60*; 1984: 76; McGinnis, 1974: 100*.

D 13-15; A 19-22; P 14-16; GR (4-5)+(12-15); AO (5-6)+(6-9). Mature males with single, supracaudal luminous gland only; mature females with 1-3 separate or partially-coalesced luminous patches infracaudally.

Attains 67 mm. High-oceanic, mesopelagic; 608 - 728 m (day); 57 - 110 m (night). From 30°S on west coast to 33°S on east coast. Convergence species (30°-43°S) in all 3 oceans.



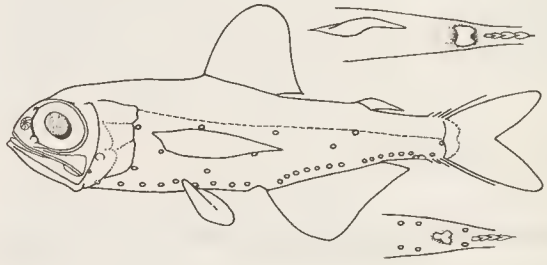
86.60 *Hygophum hanseni:* 3.5 cm SL.

86.61 *Hygophum hygomii*
(Lütken, 1892)

Scopelus hygomii Lütken, 1892: 256, Fig. 15 (in part) (38°00′N, 22°20′W). *Hygophum hygomi:* Bekker, 1965: 69*; Grindley & Penrith, 1965: 282; Nafpaktitis & Nafpaktitis, 1969: 19*; Hulley, 1972: 221; Krefft, 1974: 230*; Pertseva-Ostroumova, 1974: 78*; Gjøsaeter & Beck, 1981: 257. *Hygophum hygomii:* Hulley, 1981: 63*; 1984: 76.

D 13-15; A 21-23; P 14-17; GR (5-6)+(14-17); AO (6-8)+(5-7). Mature males with single, supracaudal luminous gland; mature females with 1-3 luminous patches infracaudally, sometimes coalesced.

Attains 68 mm. High-oceanic, mesopelagic; 600 - 800 m (day); from surface to 300 m at night. Occurs west of Cape Peninsula and off east coast (25°-37°S). In Mediterranean, Atlantic (38°-20°N and 13°-40°S), Indian Ocean (24°-40°S) and Pacific (15°-20°S).



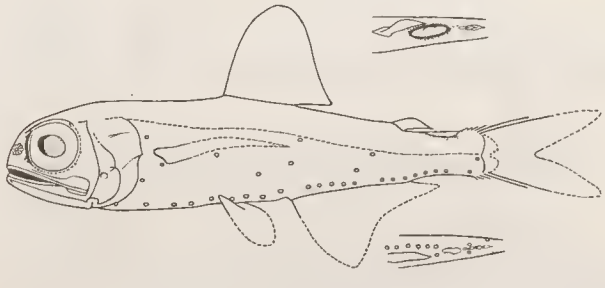
86.61 *Hygophum hygomii:* 5.5 cm SL.

86.62 *Hygophum proximum*
Bekker, 1965

Hygophum reinhardti (*non* Lütken): Grindley & Penrith, 1965: 282. *Hygophum proximum* Bekker, 1965: 81, Figs. 6-9 (00°58′S, 82°53′E); Nafpaktitis & Nafpaktitis, 1969: 17*; Kotthaus, 1972: 16*; Hulley, 1972: 221; Gjøsaeter, 1981: 220; Hulley, 1984: 77*.

D 12-14; A 18-21; P 13-14; GR (3-5)+(12-14); AO (3-6)+(5-8). Mature males with single, black-edged, supracaudal luminous gland; mature females with single, infracaudal luminous gland.

Attains 50 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. Occurs south to about 37°S in Agulhas Current; Indian Ocean (25°N-10°S) and eastern Pacific (24°N-24°S).



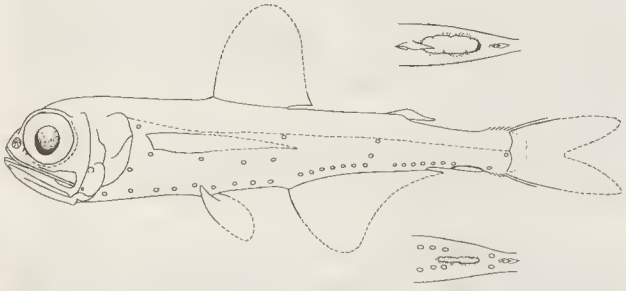
86.62 *Hygophum proximum:* 3.5 cm SL.

86.63 *Hygophum reinhardtii*
(Lütken, 1892)

Scopelus reinhardtii Lütken, 1892: 256, Fig. 16 (in part) (34°22′N, 18°10′W). ?*Myctophum reinhardti:* Smith, **SFSA No. 199** (in part). *Hygophum reinhardti:* Bekker, 1965: 89*. *Hygophum reinhardtii:* Hulley, 1981: 72*.

D 13-15; A 21-25; P 13-16; GR (3-5)+(12-16); AO (5-9)+(6-8). Mature males with single, supracaudal luminous gland; mature females with 3-4 coalesced, luminous patches infracaudally, sometimes separate.

Attains 61 mm. High-oceanic, mesopelagic; 600 - 850 m (day); from surface to 200 m at night. Has not yet been recorded in our area with certainty. Atlantic (40°-02°N and 05°N-Subtropical Convergence, but west of Benguela Upwelling Region), southern Indian Ocean and North and South Pacific (but absent in equatorial waters).



86.63 *Hygophum reinhardtii:* 3.5 cm SL.

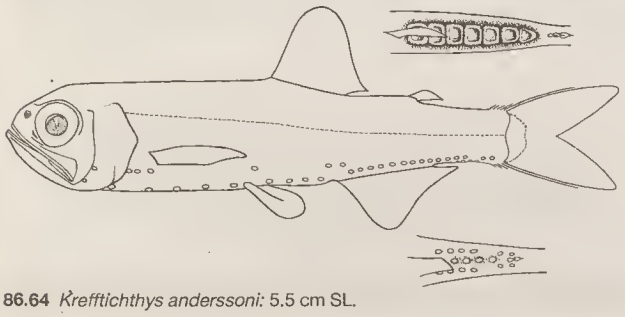
Genus ***Krefftichthys*** Hulley, 1981

Maxilla greatly expanded posteriorly, extending to or a little behind vertical through rear margin of orbit; A base longer than base of D. Dn absent; Vn poorly developed; 5 PO; 4 VO; 2 SAO, almost horizontal. One species; probably in our area.

86.64 *Krefftichthys anderssoni*
(Lönnberg, 1905)

Myctophum anderssoni Lönnberg, 1905: 763 (48°54′S, 51°40′W); 1905: 61; Norman, 1930: 320. *Protomyctophum (Protomyctophum) anderssoni:* Andriashev, 1962: 226*; Hulley, 1972: 217; Krefft, 1974: 232. *Krefftichthys anderssoni:* Hulley, 1981: 10*.

D 12-14; A 17-20; P 14-16; GR (6-8)+(19-22); AO 12-13. Mature males with 5-8 separate, individually-complex, supracaudal luminous glands; mature females with 2-4 separate, luminous glands infracaudally.



86.64 *Krefftichthys anderssoni:* 5.5 cm SL.

Attains 71 mm. High-oceanic, mesopelagic; upper 100 m (night) south of Antarctic Polar Front, but deeper than 1 000 m at Subtropical Convergence. Taken at 43°17′S, 48°55′E, but not yet recorded from our area. Circumglobal between Subtropical Convergence and Antarctic Divergence.

Genus ***Lampadena*** Goode & Bean, 1896

Maxilla not or slightly expanded posteriorly, extending well behind orbit; A base subequal in length to or slightly shorter than D base. Dn absent; Vn present; 5 or 6 PO; 3-6 VO; SAO series weakly angulate; AO series divided into AOa and AOp; 1 Pol; 2+1 Prc. Both sexes with single supracaudal and single infracaudal luminous glands. Eight species; 4 (possibly 7) in our area.

KEY TO SPECIES

1a PO_4 abruptly and highly elevated, about over PO_3 ..... *L. luminosa*
1b None of PO series abruptly and highly elevated 2

2a VO plus SAO 5-6; 3-4 AOa; Pol more than its diameter below LL ..... *L. anomala*
2b VO plus SAO 7-9; 5-7 AOa; Pol its diameter or less below LL 3

3a Prc_1-Prc_2 interspace equal to or greater than 3 times the diameter of a photophore of this series 4
3b Prc_1-Prc_2 interspace much shorter than 3 times diameter of a photophore of this series 5

4a Last 2 or 3 AOa entirely behind A base; 2 AOp; infracaudal gland length at least 1.5 times CPD; pterotic spine directed posteriorly; crescent of whitish tissue on dorsal ½ of iris ..... *L. chavesi*
4b No AOa behind A base; 4-5 (rarely 3) AOp; infracaudal gland less than 1.5 times CPD; pterotic spine directed downward and forward; no crescent of whitish tissue on dorsal ½ of iris ..... *L. dea*

5a Distance between vertical at rear margin of orbit and end of maxilla subequal to or longer than horizontal diameter of eye ..... *L. pontifex*
5b Distance between vertical at rear margin of orbit and end of maxilla about ½ eye diameter 6

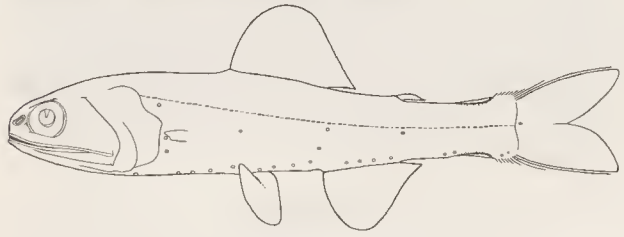
6a Distance between A base and anterior margin of infracaudal gland equal to or slightly greater than length of infracaudal gland; photophores small; AOp^1 (and usually AOp^2) in front of infracaudal gland; AOa level; GR 19-23 ..... *L. speculigera*
6b Distance between A base and anterior margin of infracaudal gland about equal to ¼ length of infracaudal gland; photophores large; all AOp well over infracaudal gland; last AOa usually distinctly raised or elevated above level of rest of AOa series; GR 24-26 ..... *L. notialis*

86.65 *Lampadena anomala*
Parr, 1928

Lampadena anomala Parr, 1928: 150, Fig. 35 (32°24′N, 64°29′W); Nafpaktitis & Nafpaktitis, 1969: 38*; Krefft, 1970: 280*; Hulley, 1981: 170*.

D 14-16; A 13-14; P 16-18; GR 5+(11-13); AO (3-4)+2. Supracaudal luminous gland equal to or shorter than infracaudal luminous gland; distance from A base to infracaudal gland slightly shorter to somewhat longer than length of gland.

Attains 180 mm. High-oceanic, bathypelagic; 800 - 2 000 m (day); below 1 000 m, but juveniles to 380 m (night). Not yet recorded from our area, but one record from Indian Ocean (06°01′N, 64°59′E); also in Atlantic (32°N-39°S), and 3 specimens from near Hawaii.



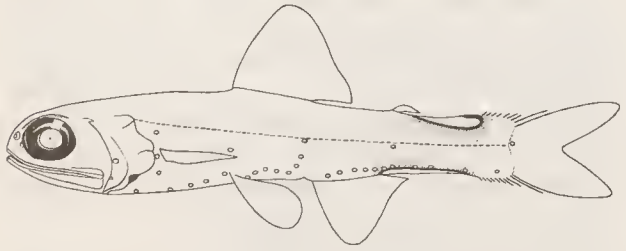
86.65 *Lampadena anomala:* 12.5 cm SL male (after Nafpaktitis et al., 1977).

86.66 *Lampadena chavesi*
Collett, 1905

Lampadena chavesi Collett, 1905: 728 (off the Azores); Nafpaktitis & Nafpaktitis, 1969: 37*; Krefft, 1970: 274*; 1974: 230*; Hulley, 1981: 172*. *? Lampadena chavesi:* Smith, **SFSA No. 200***.

D 13-15; A 12-14; P 15-17; GR (6-7)+(13-15); AO (6-8)+(1-3).

Attains 80 mm. High-oceanic, mesopelagic; 600 - 800 m (day); 40 - 175 m (night). Previous record (Smith, **SFSA No. 200**) not substantiated from our area. Atlantic (41°-26°N and 13°-33°S), Indian (25°-40°S) and Pacific (30°-40°S) oceans.



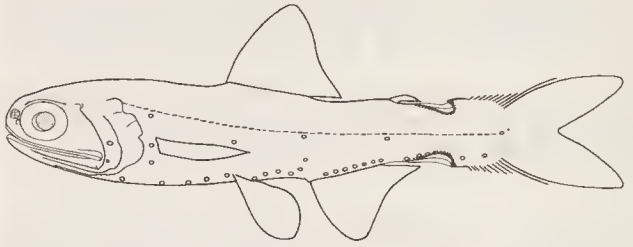
86.66 *Lampadena chavesi:* 5.5 cm SL young (after Nafpaktitis et al., 1977).

86.67 *Lampadena dea*
Fraser-Brunner, 1949

Lampadena (Lampadena) dea Fraser-Brunner, 1949: 1097, Fig., 1101, Pl. 1A (48°26′45″S, 22°10′W - 48°26′30″S, 22°06′50″W). *Lampadena dea:* Nafpaktitis & Nafpaktitis, 1969: 37*; Krefft, 1974: 232; 1978: 446; Hulley, 1981: 173*.

D 13-15; A 13-15; P 13-16; GR (5-6)+(14-16); AO (5-7)+(3-6).

Attains 89 mm. High-oceanic, mesopelagic; 350 - 2 390 m (day); upper 150 m (night). Not yet recorded from our area. Circumglobal convergence species (25°-49°S); appears to have an exclusively oceanic distribution pattern.



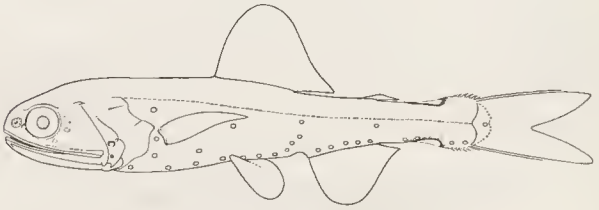
86.67 *Lampadena dea:* 6 cm SL (after Nafpaktitis & Nafpaktitis, 1969).

86.68 *Lampadena luminosa*
(Garman, 1899)

Myctophum luminosum Garman, 1899: 263, Pl. 55, Fig. 2 (00°57′30″S, 89°03′30″W). *Lampadena nitida:* Norman, 1930: 336*. *Lampadena luminosa:* Nafpaktitis & Nafpaktitis, 1969: 33*; Krefft, 1970: 276*; Hulley, 1981: 175*; 1984: 78.

D 14-15; A 13-15; P 15-17; GR 4+(9-10); AO (5-7)+2. Supracaudal gland about equal to length of infracaudal luminous gland; distance from A base to infracaudal gland not longer than length of gland.

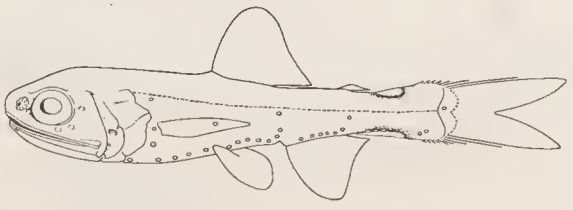
Attains 200 mm. High-oceanic, mesopelagic; 425 - 850 m (day); upper 100 m (night). In Agulhas Current. In all 3 oceans (20°N-20°S), but with extensions into higher latitudes in western boundary currents.



86.68 *Lampadena luminosa:* 2.5 cm SL.

86.69 *Lampadena notialis*
Nafpaktitis & Paxton, 1968

Lampadena chavesi (*non* Collett): Barnard, 1948: 349; Smith, **SFSA No. 200** (in part, not Fig. which is *L. chavesi*). *Lampadena notialis* Nafpaktitis & Paxton, 1968: 13, Fig. 5 (42°00′S,160°11′E - 42°08′S,160°05′E): Nafpaktitis & Nafpaktitis, 1969: 34*; Krefft, 1970: 282; Hulley, 1972: 223; 1981: 177*; 1984: 61; Wisner, 1976: 154*.



86.69 *Lampadena notialis:* 2.5 cm SL.

D 13-14; A 13-14; P 14-15; GR (7-8)+(17-20); AO (5-7)+(2-3).

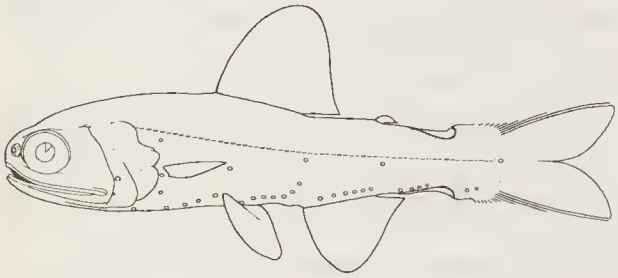
Attains 139 mm. High-oceanic, mesopelagic; about 700 m (day); below 60 m (night). Off east coast and Cape Peninsula; convergence species in all 3 oceans (30°-47°S).

86.70 *Lampadena pontifex*
Krefft, 1970

Lampadena pontifex Krefft, 1970: 277, Figs. 1-3 (14°31'N, 17°39'W); Karrer, 1975: 69; Hulley, 1981: 178*.

D 14; A 14-15; P 13-15; GR 7+(15-16); AO (6-7)+(3-4). Supracaudal gland subequal to length of infracaudal gland; distance from A base to infracaudal gland less than ½ length of gland.

Attains 110 mm. Pseudoceanic, pelagic; 275 - 750 m (day); 90 - 275 m (night). Recorded from west coast continental shelf at about 25°S, the Mauritanian Upwelling Region and near St. Helena.



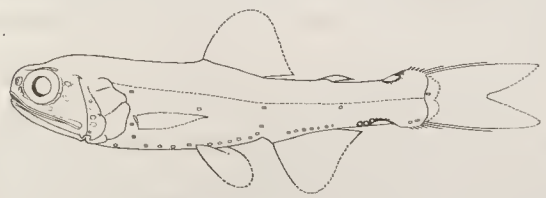
86.70 *Lampadena pontifex:* 7.5 cm SL female (after Nafpaktitis et al., 1977).

86.71 *Lampadena speculigera*
Goode & Bean, 1896

Lampadena speculigera Goode & Bean, 1896: 85, Pl. 26, Fig. 99 (39°48'N, 70°36'W); Nafpaktitis & Nafpaktitis, 1969: 34*; Krefft, 1970: 285; 1978: 444; Wisner, 1976: 153*; Hulley, 1981: 179*; 1984: 61.

D 13-15; A 13-15; P 13-16; GR (6-7)+(12-16); AO (5-9)+(2-5).

Attains 153 mm. High-oceanic, mesopelagic; 475 - 950 m (day); 60 - 750 m (night). Off west and southeast coasts. Atlantic (66°-35°N and 35°-48°S), Indian (30°-45°S) and Pacific (30°-45°S) oceans.



86.71 *Lampadena speculigera:* 4 cm SL.

Genus ***Lampanyctodes*** Fraser-Brunner, 1949

Maxilla slightly expanded posteriorly, extending well beyond orbit; A base longer than D base. Dn absent; Vn present; 5 PO; 5 VO; SAO series straight; AO series divided into AOa and AOp; 1 Pol; Prc in a single group. Supracaudal and infracaudal luminous scales present in both sexes; luminous tissue on nape, below PVO and at bases of D and A. Monotypic.

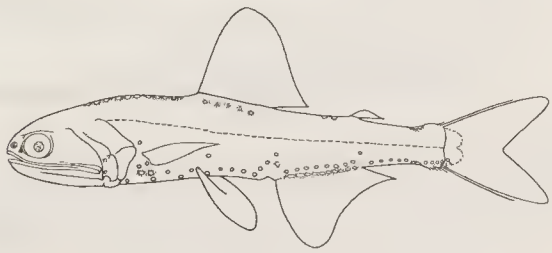
86.72 *Lampanyctodes hectoris*
(Günther, 1876)
PLATE 10

Onderbaadjie Onderbaadjie

Scopelus hectoris Günther, 1876: 399 (Cook Strait, New Zealand). *Scopelus argenteus* Gilchrist, 1904: 15, Pl. 36 (off Cape Peninsula). *Lampanyctus argenteus:* Parr, 1928: 23. *Lampanyctus hectoris:* Norman, 1930: 328; Smith, **SFSA No. 208.** *Lampanyctodes hectoris:* Grindley & Penrith, 1965: 283; McGinnis, 1974: 185*; Centurier-Harris, 1974: 45*; Wisner, 1976: 158*; O'Toole, 1976: 28*; Ahlstrom et al., 1976: 138*; Crawford, 1980: 111*; Hulley, 1981: 274.

D 13-15; A 15-17; P 12-13; GR (9-11)+(19-22); AO (7-9)+(4-6); Prc 4-5.

Attains 61 mm. Pseudoceanic, pelagic; nyctoepipelagic at surface. A commercially important species used in the production of fish meal. Commonest myctophid in Benguela Upwelling Region; also off southern Australia, New Zealand and Chile.



86.72 *Lampanyctodes hectoris:* 6 cm SL.

Genus ***Lampanyctus*** Bonaparte, 1840

Maxilla slightly expanded posteriorly, extending well behind orbit; A base longer than D base. Dn absent; Vn small; 5 PO; 4 (rarely 5) VO; SAO usually angulate; AO series divided into AOa and AOp; 2 Pol, oblique; 4 Prc. Both sexes with supracaudal and infracaudal luminous glands, consisting of numerous, overlapping, scale-like structures; luminous scale(s) at adipose origin present or absent; CP and "secondary" photophores in some species. More than 35 species; 14 (possibly 17) in our area.

KEY TO SPECIES

1a VO_2 elevated and anteriorly displaced to lie in front of, above or slightly behind VO_1 ..... *L. turneri*

1b VO_2 level or elevated, but not anteriorly displaced to above VO_1 2

2a Branchiostegal membrane with small serial photophores between branchiostegal rays 3
2b Branchiostegal membrane without serial photophores 5

3a Adipose fin without luminous gland; VLO midway between LL and V base; GR 3+(9-10), total 12-13; SL < 43 mm ..... *L. pusillus*
3b Adipose fin with luminous gland at origin; VLO at or about 1 photophore diameter below LL; total GR 12-23 4

4a GR (2-4)+(8-10), total 12-14; AO (5-7)+(5-8), total 11-13; P 11-13; A origin under penultimate D ray ..... *L. alatus*
4b GR (5-7)+(13-16), total 20-23; AO (6-9)+(6-9), total 14-16; P 13-15; A origin under 3rd or 4th last D ray ..... *L. australis*

5a One or more photophores on cheek 6
5b No photophores on cheek 9

6a Luminous gland at origin of adipose fin absent; PO_4 midway between PO_3-PO_5 and level with VLO ..... *L. photonotus*
6b Luminous gland at origin of adipose fin present; PO_4 nearer to PO_3 than to PO_5 and below level of VLO 7

7a Total GR 24-30; AOa series level or only slightly arched ..... *L. macdonaldi*
7b Total GR 13-16; AOa^1 and/or AOa^2 depressed 8

8a P reaching A origin; vertical distance between margin of orbit and upper lip, taken at middle of eye, 2 or more times in length of P base; CPD less than "head depth" (taken on vertical through middle of orbit) ..... *L. intricarius*
8b P not reaching A origin; vertical distance between margin of orbit and upper lip, taken at middle of eye, about equal to length of P base; CPD equal to or greater than "head depth" . *L. lepidolychnus*

9a P extending to at least A origin 10
9b P absent or weakly developed, not extending beyond vertical at outer base of V 13

10a VLO about 1 photophore-diameter below LL ..... *L. steinbecki*
10b VLO more than 3 photophore-diameters below LL 11

11a Prc_2-Prc_4 forming a straight, oblique line or an arc with concavity directed posteriorly and ventrally ..... *L. nobilis*
11b Prc_2-Prc_4 forming an arc with concavity directed anteriorly and dorsally 12

12a VO series level; infracaudal gland not extending entire distance from procurrent C rays to A base; Prc_3 at level of Prc_1; P 13-14; AO 12-13 ..... *L. tenuiformis*
12b VO series arched; infracaudal gland extending from procurrent C rays to A base; Prc_3 above level of Prc_1; P 15-17; AO 15-16 ..... *L. festivus*

13a Prc_2-Prc_4 forming a straight, oblique line; SAO_1 midway between VO_3-VO_4 or nearer VO_4; supracaudal and infracaudal glands with black cap on rear margin ..... *L. lineatus*
13b Prc_2-Prc_4 forming a right angle, with Prc_3 almost directly below Prc_4; SAO_1 usually midway between VO_2-VO_3 or nearer VO_2 or nearer VO_3; supracaudal and infracaudal glands without black cap on rear margin 14

14a Pol on or slightly before vertical at origin of adipose fin; origin of adipose fin well in advance of vertical at base of last A ray 15
14b Pol well in front of vertical at origin of adipose fin; origin of adipose fin on or slightly behind vertical at base of last A ray 16

15a LL 36-39; total GR 16-18; AO (6-8)+(6-9), total 12-15; SAO_2 closer to VO_4 than to AOa^1 ..... *L. ater*
15b LL 29-32; total GR 14-17; AO (4-6)+ (5-7), total 9-12; SAO_2 midway between VO_4 and AOa^1 or closer to VO_4 ..... *L.* sp. A

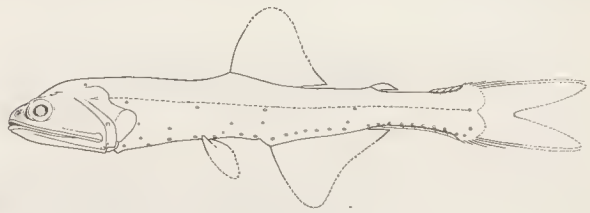
16a GR (5-6)+(12-14), total 17-20; distance from tip of snout to origin of D less than 50% SL; size at sexual maturity 150 mm ..... *L. achirus*
16b GR (4-5)+(11-12), total 15-17; distance tip of snout to D origin greater than 50% SL; size at sexual maturity 90 mm ..... *L.* sp. B

86.73 *Lampanyctus achirus*
Andriashev, 1962

Lampanyctus ater (*non* Tåning): Norman, 1930: 331. *Lampanyctus achirus* Andriashev, 1962: 256, Fig. 27 (64°36′S, 108°52′W); Nafpaktitis & Nafpaktitis, 1969: 45* (in part); McGinnis, 1974: 143*; Wisner, 1976: 176* (in part); Hulley, 1981: 182*; 1984: 78*.

D 14-16; A 16-20; GR (5-6)+(12-14); AO (6-8)+(7-9).

Attains 162 mm. High-oceanic, bathypelagic; usually below 500 m, but shallower in upwelling regions. In southern Benguela Upwelling Region and off south and east coasts, north to about 31°S. Circumglobal from about Subtropical Convergence to south of Antarctic Polar Front, with northern extensions to 21°S in eastern boundary currents.



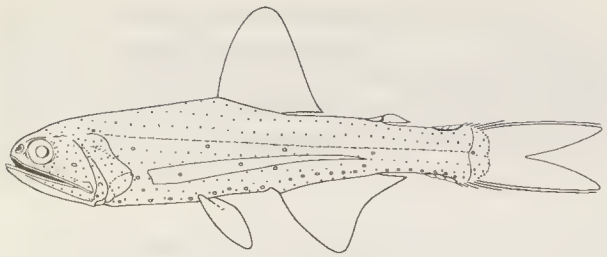
86.73 *Lampanyctus achirus:* 7 cm SL.

86.74 *Lampanyctus alatus*
Goode & Bean, 1896

Lampanyctus alatus Goode & Bean, 1896: 79 (28°43′S, 87°14′W); Norman, 1930: 330; Grindley & Penrith, 1965: 283 (in part); Hulley, 1972: 223 (in part); 1981: 185*; 1984: 61; Kotthaus, 1972: 32*; O'Toole, 1976: 27*; Nafpaktitis et al., 1977: 223*. *Lampanyctus pusillus:* Smith, **SFSA No. 204** (in part).

D 11-13; A 16-18; P 11-13; GR (2-4)+(8-10); AO (5-7)+(5-7).

Attains 61 mm. High-oceanic, mesopelagic; 275 - 1 000 m (day); 40 - 275 m (night). Off all our coasts; Atlantic (46°N-38°S), Indian Ocean (0°-39°S), southeast Asian seas (20°N-10°S) and east coast of Australia (to 34°S).



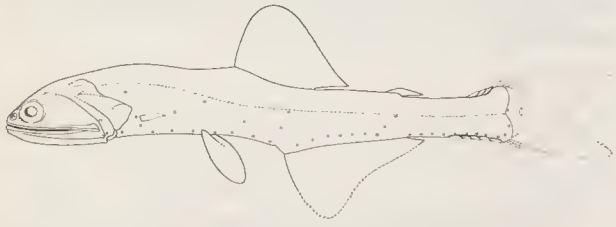
86.74 *Lampanyctus alatus:* 5 cm SL.

86.75 *Lampanyctus ater*
Tåning, 1928

Lampanyctus ater Tåning, 1928: 68 (24°30′N, 80°00′W); Hulley, 1972: 225; 1981: 188*; 1984: 79*; Wisner, 1976: 175*; Nafpaktitis et al., 1977: 203*. *Lampanyctus niger (non* Günther): Norman, 1930: 331 (in part). ?*Lampanyctus niger (non* Günther): Smith, **SFSA No. 203*.**

D 14-16; A 16-20; P 11-12; GR (4-5)+(11-13); LL 36-39; AO (6-8)+(6-9).

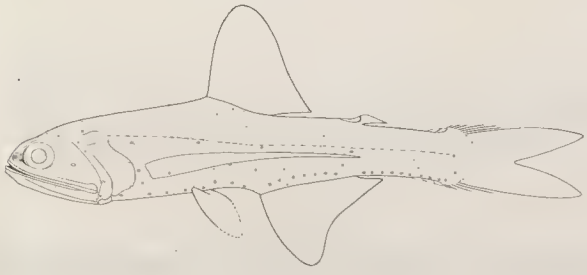
Attains 129 mm. High-oceanic, mesopelagic; 680 - 1 200 m (day); 51 - 925 m (night); size stratification with depth during day, non-migrants at all sizes. Off all our coasts. Atlantic (58°-17°N and 15°-40°S) and Indian Ocean (12°-44°S).



86.75 *Lampanyctus ater:* 10.5 cm SL.

86.76 *Lampanyctus australis*
Tåning, 1932

Myctophum (Lampanyctus) alatum: Barnard, 1925: 240 (in part). *Lampanyctus alatus:* Norman, 1930: 330 (in part); Grindley & Penrith, 1965: 283 (in part). *Lampanyctus alatus australis* Tåning, 1932: 145 (41°47′S, 176°55′E). *Lampanyctus australis:* Nafpaktitis & Nafpaktitis, 1969: 54*; Hulley, 1972: 224; 1972: 240; 1981: 190*; 1984: 82; Karrer, 1975: 70; O'Toole, 1976: 27*. *Scopelopsis multipunctatus:* Grindley & Penrith, 1965: 283 (in part).



86.76 *Lampanyctus australis:* 9 cm SL.

D 12-14; A 17-19; P 13-15; GR (5-7)+(13-16); AO (6-9)+(6-9).

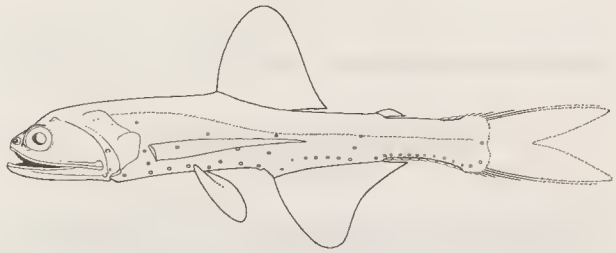
Attains 131 mm. High-oceanic, mesopelagic; generally deeper than 500 m (night), but juveniles (less than 80 mm) in upper 100 m (night). Off all our coasts. Circumglobal convergence species (33°-43°S, but with northern extension to about 27°S in eastern boundary currents).

86.77 *Lampanyctus festivus*
Tåning, 1928

Lampanyctus festivus Tåning, 1928: 67 (35°44′N, 29°33′W); Norman, 1930: 330 (in part); Nafpaktitis et al., 1977: 216*; Hulley, 1981: 197*, 1984: 82

D 13-16: A 19-22; P 15-17; GR 4+(9-11); AO (6-9)+(8-11).

Attains 138 mm. High-oceanic, mesopelagic; 700 - 950 m (day); 100 - 350 m (night). Off all our coasts. Atlantic (53°-18°N and 28°-40°S, but with northern extension to 12°S in Benguela Current) and Indo-West Pacific.



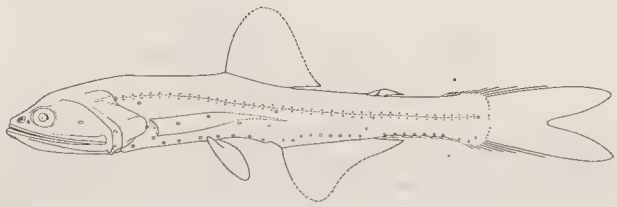
86.77 *Lampanyctus festivus:* 7 cm SL.

86.78 *Lampanyctus intricarius*
Tåning, 1928

Lampanyctus intricarius Tåning, 1928: 67 (38°10′N, 09°20′W); Norman, 1930: 330 (in part); Wisner, 1976: 197*; Nafpaktitis et al., 1977: 209*; Hulley, 1981: 201*. ?*Lampanyctus niger* (*non* Günther): Smith, **SFSA No. 203*.**

D 14-16; A 17-20; P 13-15; GR 4+(10-12); AO (8-10)+(7-9).

Attains 200 mm. High-oceanic, mesopelagic; 550 - 750 m (day); 40 - 550 m (night). In southern Benguela Upwelling Region. Atlantic (65°-32°N and in region of Subtropical Convergence) and Indo-Pacific (in region of Subtropical Convergence, but with northern extensions to 18°S in eastern boundary currents).



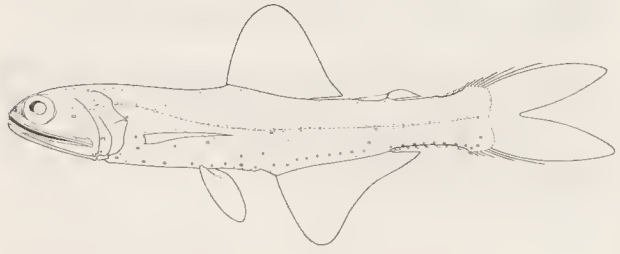
86.78 *Lampanyctus intricarius:* 4 cm SL.

86.79 *Lampanyctus lepidolychnus*
Bekker, 1967

Lampanyctus intricarius: Norman, 1930: 330 (in part); Nafpaktitis & Nafpaktitis, 1969: 50 (in part). *Lampanyctus alatus:* Grindley & Penrith, 1965: 283 (in part); Hulley, 1972: 223 (in part). *Scopelopsis multipunctatus:* Grindley & Penrith, 1965: 283 (in part). *Lampanyctus lepidolychnus* Bekker, 1967: 112, Fig. 9 (42°17′S, 39°00′W); McGinnis, 1974: 163*; Hulley, 1981: 202*; 1984: 82.

D 14-16; A 18-20; P 11-14; GR (3-4)+(9-12); AO (7-10)+(6-9).

Attains 119 mm. High-oceanic, mesopelagic; deeper than 100 m (night); size stratification with depth. Occurs off all our coasts; circumglobal convergence species (23°-48°S).



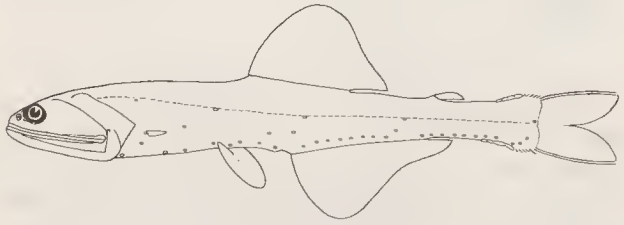
86.79 *Lampanyctus lepidolychnus:* 9.5 cm SL.

86.80 *Lampanyctus lineatus*
Tåning, 1928

Lampanyctus lineatus Tåning, 1928: 68 (17°54′N, 64°54′W); Nafpaktitis & Nafpaktitis, 1969: 41*; Hulley, 1981: 206*.

D 15-19; A 18-22; P 12-13; GR (4-6)+(11-13); AO (8-9)+(7-8).

Attains 235 mm. High-oceanic, mesopelagic; 650 - 1 000 m (day); 60 - 225 m (night). Taken once in our area at 34°12′S, 16°35′E. Atlantic (42°N-27°S, but absent south of 10°S in western sector), Indian Ocean (0°-08°N) and around Philippines.



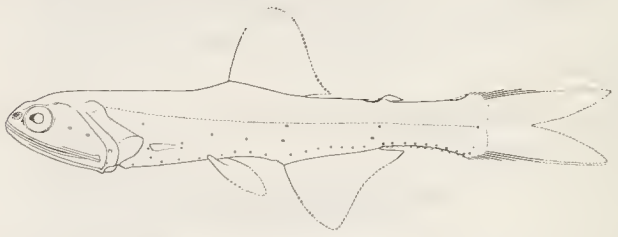
86.80 *Lampanyctus lineatus:* 12 cm SL male lectotype (after Nafpaktitis et al., 1977).

86.81 *Lampanyctus macdonaldi*
(Goode & Bean, 1896)

Nanobrachium macdonaldi Goode & Bean, 1896: 94, Pl. 29, Fig. 110 (39°48′N, 70°36′W). *Lampanyctus intricarius* (*non* Tåning): Norman, 1930: 330 (in part). *Lampanyctus macdonaldi:* McGinnis, 1974: 155*; Hulley, 1981: 208*.

D 14-16; A 16-19; P 12-14; GR (8-10)+(16-21); AO (6-8)+(6-8).

Attains 160 mm. High-oceanic, mesopelagic; 550 - 1 000 m (day); 60 - 175 m (juveniles) and deeper than 250 m (adults) (night). Occurs west of Cape Peninsula. Atlantic (65°-47°N) and circumglobal between Subtropical Convergence and Antarctic Polar Front.



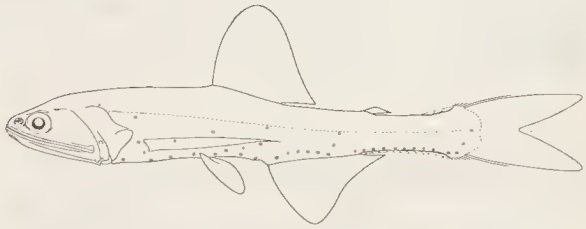
86.81 *Lampanyctus macdonaldi:* 10 cm SL.

86.82 *Lampanyctus nobilis*
Tåning, 1928

Lampanyctus nobilis Tåning, 1928: 66 (17°41′N, 60°58′W); Nafpaktitis & Nafpaktitis, 1969: 47*; Kotthaus, 1972: 31*; Wisner, 1976: 186*; Hulley, 1981: 210*; 1984: 82; Gjøsaeter, 1981: 220.

D 15-16; A 18-19; P 13-15; GR (3-4)+(9-11); AO (5-7)+(8-10).

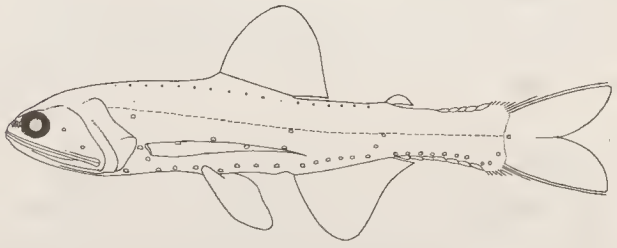
Attains 124 mm. High-oceanic, mesopelagic; 475 m to deeper than 900 m (day); 100 - 500 m (night). In Agulhas Current and off west coast in Agulhas Water pockets. Atlantic (40°N-21°S), Indo-Pacific.



86.82 *Lampanyctus nobilis:* 4.5 cm SL.

86.83 *Lampanyctus photonotus*
Parr, 1928

Lampanyctus photonotus Parr, 1928: 102, Fig. 16 (22°43′N, 74°23′W); Nafpaktitis et al., 1977: 211*; Hulley, 1981: 212*.



86.83 *Lampanyctus photonotus:* 5.5 cm SL female (after Nafpaktitis et al., 1977).

D 12-15; A 16-18; P 11-14; GR (3-4)+(9-11); AO (5-6)+(6-8).

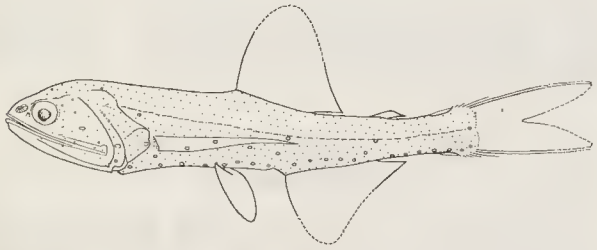
Attains 85 mm. High-oceanic, mesopelagic; 500 - 1 000 m (day); 40 - 250 m (night). Not yet recorded from our area. In Atlantic (55°N- 30°S, but absent in Benguela Upwelling Region) and off New Caledonia.

86.84 *Lampanyctus pusillus*
(Johnson, 1890)

Scopelus pusillus Johnson, 1890: 457 (Madeira). *Lampanyctus pusillus:* Norman, 1930: 330; Smith, **SFSA No. 204*** (in part); Hulley, 1972: 224 (in part); 1981: 214*; 1984: 83; Krefft, 1974: 220; McGinnis, 1974: 149*; Wisner, 1976: 194*; Nafpaktitis et al., 1977: 221*.

D 11-13; A 13-15; P 13-14; GR (3)+(8-10); AO (4-5)+(5-6).

Attains 43 mm. High-oceanic, mesopelagic; 483 - 1 000 m (day); 25 - 200 m (night); size stratification with depth both day and night. Off all our coasts. Bisubtropical species in all major oceans.



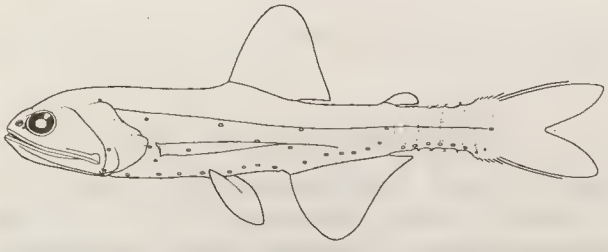
86.84 *Lampanyctus pusillus:* 2.5 cm SL.

86.85 *Lampanyctus steinbecki*
Bolin, 1939

Lampanyctus steinbecki Bolin, 1939: 140, Fig. 28 (off Santa Catalina Id., California); Nafpaktitis & Nafpaktitis, 1969: 46*; Kotthaus, 1972: 31*.

D 12; A 15-17; P 13-14; GR 3+(8-9); AO (4-6)+(5-7).

Attains 38 mm. High-oceanic, mesopelagic: upper 300 m (night). Not yet recorded from our area. Indian Ocean (0°-14°S) and eastern Pacific (37°N-30°S).



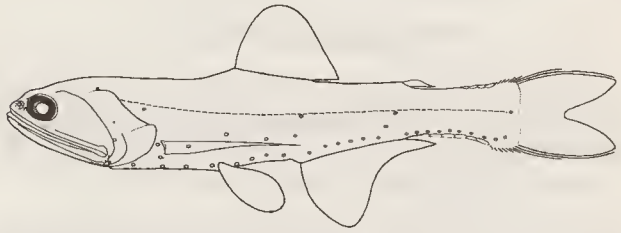
86.85 *Lampanyctus steinbecki:* 3 cm SL (after Nafpaktitis & Nafpaktitis, 1969).

86.86 *Lampanyctus tenuiformis*
Brauer, 1906

Myctophum (Lampanyctus) tenuiformis Brauer, 1906: 243, Fig. 160 (04°34′08″S, 53°42′08″E). *Lampanyctus tenuiformis:* Nafpaktitis & Nafpaktitis, 1969: 46*; Wisner, 1976: 183*; Hulley, 1981: 199*. *Lampanyctus? tenuiformis:* Kotthaus, 1972: 30*. *Lampanyctus tenuiformes:* Gjøsaeter, 1981: 220.

D 14-15; A 17-19; P 12-15; GR 4+(9-11); AO (6-7)+(6-8).

Attains 153 mm. High-oceanic; 300 - 700 m (day); 40 - 325 m (night). Not yet recorded from our area. Atlantic (17° N-10°S, including Gulf of Mexico), Indian Ocean (07°N-04°S) and tropical Pacific.



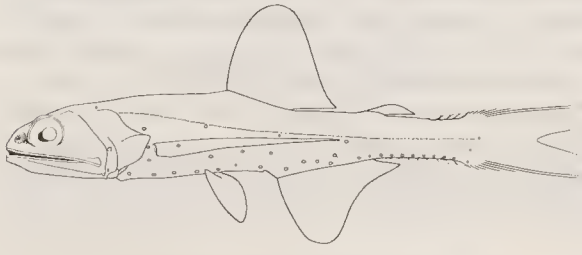
86.86 *Lampanyctus tenuiformis:* 5 cm SL young (after Nafpaktitis et al., 1977).

86.87 *Lampanyctus turneri*
(Fowler, 1934)

Serpa turneri Fowler, 1934: 285 (Leyte-Mindanao, Philippines). *Lampanyctus* sp. B: Nafpaktitis & Nafpaktitis, 1969: 50*. *Lampanyctus basili* Wisner, 1974: 11, Figs. 5-6 (06°32′N, 114°16′E). *Lampanyctus turneri:* Hulley, 1981: 216*; 1984: 83.

D 12-14; A 17-19; P 12-13; GR 3+(8-10); AO (3-5)+(8-9).

Attains 70 mm. High-oceanic, mesopelagic: upper 212 m (night). In Agulhas Current and off west coast in Agulhas Water pockets; also in tropical and subtropical waters between South China Sea and western Indian Ocean.



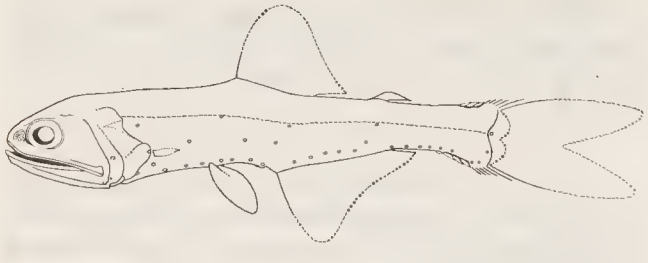
86.87 *Lampanyctus turneri:* 5 cm SL.

86.88 *Lampanyctus* sp. A

Lampanyctus sp. I: Nafpaktitis & Nafpaktitis, 1969: 42*. *Lampanyctus* sp. II: Nafpaktitis & Nafpaktitis, 1969: 43*. *Lampanyctus* sp. A: Hulley, 1984: 83*.

D 14; A 18; GR 4+11; AO 5+6.

Attains 77 mm. High-oceanic, mesopelagic. Data from 2 specimens taken in the Agulhas Current (30°32′S, 30°58′E; 33°25′S, 27°55′E).



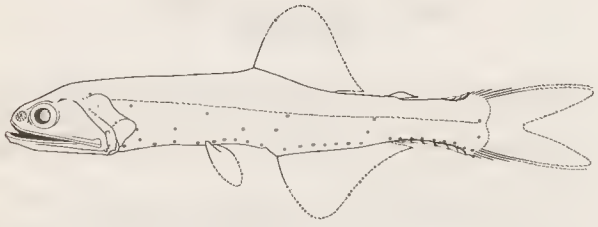
86.88 *Lampanyctus* sp. A: 6.5 cm SL.

86.89 *Lampanyctus* sp. B

Lampanyctus niger: Norman, 1930: 331 (in part). *Lampanyctus ater:* Norman, 1930: 331 (in part). *Lampanyctus achirus:* Nafpaktitis & Nafpaktitis, 1969: 45* (in part). *Lampanyctus* cf. *achirus:* Hulley, 1972: 225.

D 13-14; A 16-19; GR (4-5)+(11-12); AO (5-8)+(7-9).

Attains 90 mm. High-oceanic, mesopelagic. Taken once in our area at 29°03′S, 10°03′E; circumglobal convergence species, but apparently absent south and east of Australia.



86.89 *Lampanyctus* sp. B: 6 cm SL.

Genus ***Lampichthys*** Fraser-Brunner, 1949

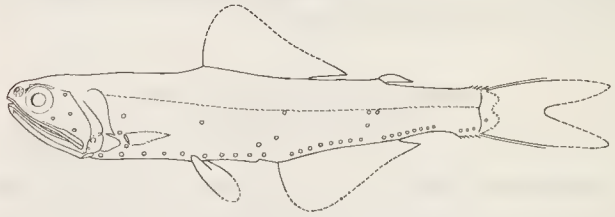
Maxilla slightly expanded posteriorly, extending well behind orbit; A base slightly longer than D base. Dn and Vn present; 3- 6 CP; 5 PO; 5 VO; SAO series markedly angulate; AO series divided into AOa and AOp; 3 Pol, forming right angle; secondary photophores on head and trunk; patches of luminous tissue of various shapes and sizes on body and one patch supracaudally. One species present in our area.

86.90 *Lampichthys procerus*
(Brauer, 1904)

Myctophum (Lampanyctus) procerus Brauer, 1904: 402, Fig. 9 (35°32′08″S, 18°20′01″E). *Lampanyctus procerus:* Smith, **SFSA No. 206*.** *Lampichthys rectangularis* Fraser-Brunner, 1949: 1096, Fig., 1103, Fig. 14 (44°42′S, 53°32.2′W). *Lampichthys procerus:* Krefft, 1974: 232; McGinnis, 1974: 189*; Wisner, 1976: 214*; Hulley, 1981: 242.

D 16-18; A 21-23; P 13-15; GR (4-6)+(13-16); AO 8+8.

Attains 95 mm. High-oceanic, mesopelagic; 100 - 700 m (night). Off Cape Peninsula; circumglobal convergence species (32°-48°S), but with extensions into lower latitudes in eastern boundary currents.



86.90 *Lampichthys procerus:* 8.5 cm SL.

Genus ***Lepidophanes*** Fraser-Brunner, 1949

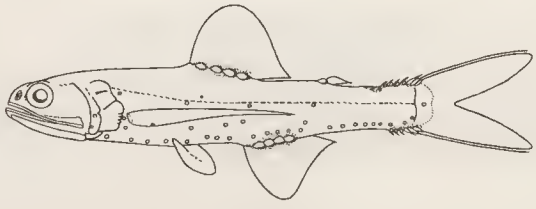
Maxilla slightly expanded posteriorly, extending well behind orbit; A base slightly longer than D base; P reach beyond A origin. Dn absent; Vn present; 5 PO; 5 or 6 VO; SAO series obtusely angulate; AO series divided into AOa and AOp; 2 Pol; patches or scale-like structures of luminous tissue supracaudally and infracaudally, and at bases of D and A. Two species; probably 1 in our area.

86.91 *Lepidophanes guentheri*
(Goode & Bean, 1896)

Lampanyctus guentheri Goode & Bean, 1896: 78, Pl. 24, Fig. 90 (Newfoundland Bank); Norman, 1930: 329. *Lepidophanes guentheri:* Nafpaktitis et al., 1977: 226*; Hulley, 1981: 222*.

D 13-15; A 13-16; P 11-14; GR 4+(9-11); AO (5-7)+(4-7).

Attains 78 mm. High-oceanic, mesopelagic; 425 - 750 m (day); 40 - 125 m (night). Not yet recorded from our area. Atlantic (45°N-50°S), but apparently absent from Benguela Upwelling Region and seasonally absent from off northeast Brazil.



86.91 *Lepidophanes guentheri:* 2 cm SL male.

Genus ***Lobianchia*** Gatti, 1903

Maxilla slightly expanded posteriorly, extending well beyond orbit. D base slightly longer than A base. Dn small and poorly developed; Vn absent, no darkly pigmented tissue at anteroventral or ventral margin of orbit; 5 PO; 5 VO; AO series divided into AOa and AOp; AOa^1 not elevated;

1 Pol; 4 Prc, in a single group; males with supracaudal luminous gland; females with infracaudal luminous gland; no other luminous tissue on head or body. Two species; both in our area.

KEY TO SPECIES

1a Distance between Pol and A base or ventral contour of C peduncle 2-2.5 times as great as that between Pol and LL; SAO forming gentle arc, convexity directed posteroventrally; Prc_4 greatly displaced posterodorsally, Prc_3-Prc_4 interspace greater than or equal to Prc_1-Prc_3 interspace ..... *L. dofleini*

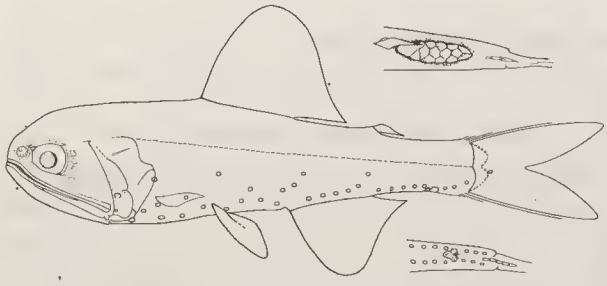
1b Pol midway between LL and A base or lower; SAO on a straight or slightly curved line, convexity directed anterodorsally; Prc evenly spaced, with Prc_3-Prc_4 interspace less than Prc_1-Prc_3 interspace ..... *L. gemellarii*

86.92 *Lobianchia dofleini*
(Zugmayer, 1911)

Myctophum (Lampanyctus) dofleini Zugmayer, 1911: 3 (Mediterranean). *Diaphus dofleini:* Norman, 1930: 332 (in part); Grindley & Penrith, 1965: 283. *Lobianchia dofleini:* Hulley, 1972: 226; 1981: 112*; 1984: 84; Wisner, 1976: 96*; Nafpaktitis et al., 1977: 96*; Krefft, 1978: 444.

D 15-17; A 13-15; P 10-13; GR (5-6)+(13-15); AO (4-6)+(4-6). Mature males with supracaudal luminous gland only of 7-8 scale-like structures, flanked by smaller triangular luminous scales; mature females with infracaudal luminous gland of about 3 scale-like structures, flanked by smaller triangular luminous scales.

Attains 50 mm. High-oceanic, mesopelagic; 300 - 750 m (day); 25 - 400 m (night); size stratification with depth both day and night. Off all our coasts. Mediterranean, Atlantic (50°N-40°S), Indian Ocean (23°-38°S), Tasman Sea and South Pacific (region of Subtropical Convergence).



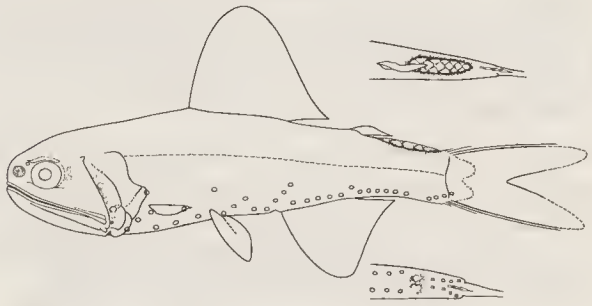
86.92 *Lobianchia dofleini:* 2.5 cm SL.

86.93 *Lobianchia gemellarii*
(Cocco, 1838)

Nyctophus gemellarii Cocco, 1838: 186, Pl. VII, Fig. 9 (Messina, Italy). *Lobianchia gemellari:* Nafpaktitis, 1968: 18*. *Lobianchia gemellarii:* Nafpaktitis et al., 1977: 99*; Nafpaktitis, 1978: 5*; Hulley, 1981: 114*; 1984: 84.

D 16-18; A 13-15; P 11-13; GR (4-5)+(11-13); AO (4-6)+(5-7). Mature males with supracaudal luminous gland of 6 scale-like structures, flanked by smaller, triangular luminous scales; mature females with infracaudal luminous gland of 2 heart-shaped scales, flanked by smaller, triangular luminous scales.

Attains 60 mm (breeding population); greater than 100 mm (expatriates). High-oceanic, mesopelagic; 300 - 800 m (day); 25 - 350 m (night); size stratification with depth both day and night. Occurs off all our coasts. Worldwide in tropical/subtropical waters.



86.93 *Lobianchia gemellarii:* 4 cm SL.

Genus ***Loweina*** Fowler, 1925

Maxilla slightly expanded posteriorly, extending well past orbit; A base longer than D base. Dn and Vn present; 5 or 6 PO; 2-4 VO; 2 or 3 SAO; AO series divided into AOa and AOp; 1 Pol; males with single supracaudal luminous gland; infracaudal luminous gland absent in females. Three species; 1 (possibly 2) in our area.

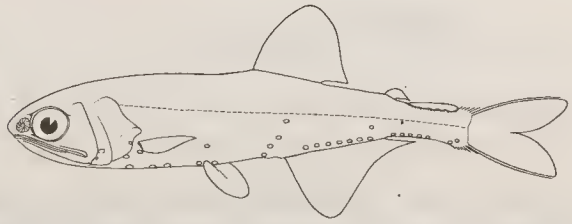
KEY TO SPECIES

1a 2 SAO; 4 VO; GR 8-9; PVO_1 behind vertical through PO_2 ..... *L. rara*

1b 3 SAO; 2 VO, at positions corresponding to VO_1 and VO_4; GR 12-13; PVO_1 in front of vertical through PO_2 ..... *L. interrupta*

86.94 *Loweina interrupta*
(Tåning, 1928)

Scopelus (Rhinoscopelus) rarus Lütken, 1892: 246* (in part). *Myctophum interruptum* Tåning, 1928: 55 (37°40′S, 120°00′E); Norman, 1930: 324; Smith, SFSA **No. 194.** *Loweina interrupta:* Wisner, 1976: 79*; Nafpaktitis et al., 1977: 83*.



86.94 *Loweina interrupta:* 3 cm SL male "paralectotype" (after Nafpaktitis et al. (1977).

D 11-12; A 15-16; P 11-12; GR 3+(9-11); AO (5-8)+(5-7).

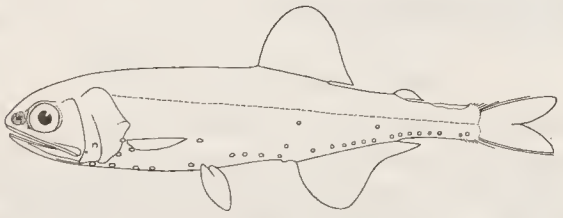
Attains 39 mm. High-oceanic, mesopelagic; 60 - 175 m and 800 m (night). Rare species, taken once in our area at 35°01′S, 10°18′E; bitemperate in Atlantic and in southern Indian and Pacific oceans.

86.95 *Loweina rara*
(Lütken, 1892)

Scopelus (Rhinoscopelus) rarus Lütken, 1892: 246 (in part; 20°N, 48°-50°W). *Myctophum (Myctophum) rarum:* Brauer, 1906: 204*. *Loweina rara:* Bekker, 1964: 24*; Pertseva-Ostroumova, 1974: 130*; Wisner, 1976: 78*; Nafpaktitis et al., 1977: 81*.

D 11-12; A 15-16; P 10-11; GR 2+(6-7); AO 6+(5-7).

Attains 45 mm. High-oceanic, mesopelagic; 550 m to greater than 1 000 m (day); found in upper few metres (not at surface) to 200 m (night). Not yet recorded from our area. An uncommon species in Atlantic (46°N-26°S), Indian (10°-22°S) and Pacific (central water masses) oceans.



86.95 *Loweina rara:* 4 cm SL male (after Nafpaktitis et al., 1977).

Genus ***Metelectrona*** Wisner, 1963

Maxilla greatly expanded posteriorly, extending to or only slightly behind vertical at posterior margin of orbit; A base longer than D base. Dn and Vn present; 5 PO; 4 VO; SAO angulate; Pol absent, but AO series behind A base markedly depressed, forming "Pol grouping". Both sexes with single, luminous patch supracaudally and infracaudally. Two species; both present in our area.

KEY TO SPECIES

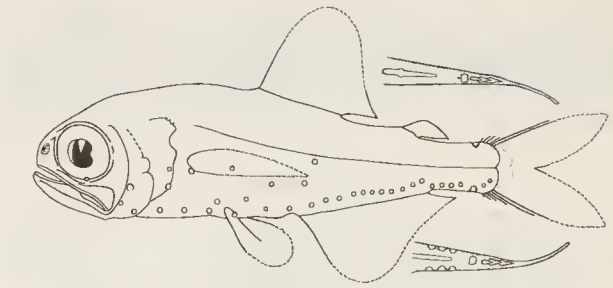
1a So present; total GR 21-23 ..... *M. herwigi*
1b So absent; total GR 23-27 ..... *M. ventralis*

86.96 *Metelectrona herwigi*
Hulley, 1981

Metelectrona herwigi Hulley, 1981: 50, Figs. 25-26 (40°35′S, 09°57′W).

D 14; A 20; P 14-15; GR (4-5)+(16-18); AO 15-16.

Attains 55 mm. High-oceanic: upper 100 m (night). Taken once in region of mixed water "south of South Africa"; circumglobal convergence species (35°-41°S).



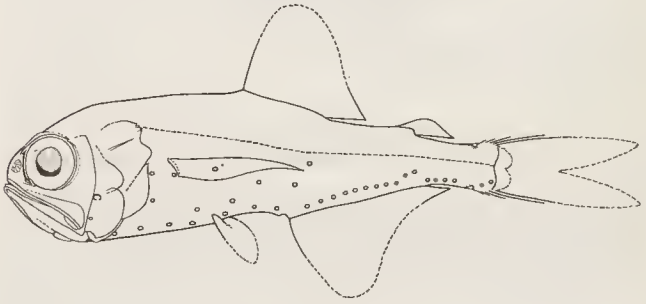
86.96 *Metelectrona herwigi:* 4.5 cm SL.

86.97 *Metelectrona ventralis*
(Bekker, 1963)

Myctophum antarcticum: Norman, 1930: 322 (in part). *Electrona ventralis* Bekker, 1963: 26, Fig. 5 (42°40′S, 39°07′W); McGinnis, 1974: 85*. *Metelectrona ahlstromi* Wisner, 1963: 25, Fig. 1 (46°53′S, 179°48′W). *Metelectrona ventralis:* Hulley, 1981: 52*.

D 13-15; A 20-22; P 14-16; GR (6-7)+(17-20); AO 13-17.

Attains 107 mm. High-oceanic, mesopelagic; from surface to 350 m (night). West of Cape Peninsula in southern Benguela Upwelling Region; circumglobal subantarctic species (36°-51°S).



86.97 *Metelectrona ventralis:* 4 cm SL.

Genus ***Myctophum*** Rafinesque, 1810

Maxilla slightly to markedly expanded posteriorly, extending past orbit; A base longer than D base. Dn and Vn present; 5 PO; 4 VO; 3 SAO, straight or slightly angulate; AO series divided into AOa and AOp; 1 Pol; males and females with supracaudal and infracaudal luminous glands respectively (*Myctophum selenops* with supracaudal luminous gland in both sexes). Thirteen species; 7 (possibly 8) in our area.

KEY TO SPECIES

1a Body short and deep, BD about 3.0-3.3 times in SL ..... *M. selenops*
1b Body elongate, BD about 4 times in SL 2

2a Prc_2 less than 1 photophore-diameter below LL; Prc_1-Prc_2 interspace about equal to AOp-Prc_1 interspace ..... *M. phengodes*
2b Prc_2 more than 1 photophore-diameter below LL; Prc_1-Prc_2 interspace about ½ AOp-Prc_1 interspace 3

3a Body scales cycloid or feebly crenulate 4
3b Body scales ctenoid 6

4a Posterodorsal margin of operculum sharply angulate and without serrations ..... *M. nitidulum*
4b Posterodorsal margin of operculum evenly rounded, with or without serrations 5

5a Pol well in advance of vertical at origin of adipose fin; AO (10-11)+(6-7), total 17-18 ..... *M. aurolaternatum*
5b Pol on or slightly behind vertical at origin of adipose fin; AO (7-8)+(2-5), total 10-12 ..... *M. obtusirostre*

6a Total GR 13-17; SAO series noticeably angulate ..... *M. asperum*
6b Total GR 18-25; SAO series straight or only slightly curved 7

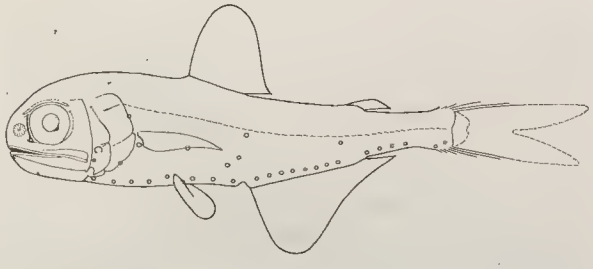
7a Ctenoid scales along A base with 1-3 strong, posteriorly directed spines; Pol well in advance of vertical at origin of adipose fin; posterodorsal margin of operculum serrate GR (5-6)+(13-15), total 18-21 ..... *M. spinosum*
7b Ctenoid scales along A base without strong spines; Pol on vertical at origin of adipose fin; operculum margin not serrate; GR 7+(17-18) ..... *M. fissunovi*

86.98 *Myctophum asperum*
Richardson, 1845

Myctophum asperum Richardson, 1845: 41 (no type-locality given); Norman, 1930: 325; Nafpaktitis et al., 1977: 68*; Gjøsaeter & Beck, 1981: 257; Hulley, 1981: 79*; 1984: 84.

D 12-14; A 17-20; P 12-16; GR (3-5)+(10-12); AO (6-8)+(4-7). Mature males with supracaudal luminous gland, consisting of 5-7 overlapping, scale-like structures; mature females with infracaudal luminous gland, consisting of 1-3 heart-shaped patches.

Attains 72 mm. High-oceanic, mesopelagic; 425 - 750 m (day); from surface to 125 m (night). Off east coast and in Agulhas Water pockets off west coast. Atlantic (20°N-08°S), and in Indian and Pacific oceans (North and South Equatorial Currents and Equatorial Countercurrents, with northern and southern extensions in western boundary currents).



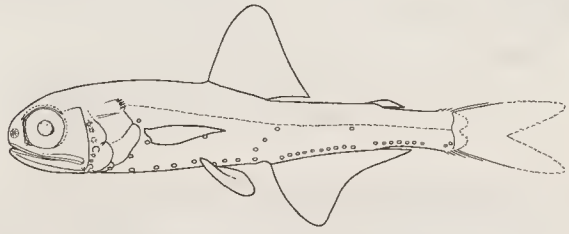
86.98 *Myctophum asperum:* 2.5 cm SL.

86.99 *Myctophum aurolaternatum*
Garman, 1899

Myctophum aurolaternatum Garman, 1899: 264, Pl. 55, Fig. 3 (06°21'N, 80°41'W); Nafpaktitis & Nafpaktitis, 1969: 28*; Kotthaus, 1972: 23*; Kawaguchi & Aioi, 1972: 37*; Kawaguchi et al., 1972: 28*; Gjøsaeter, 1981: 220; Gjøsaeter & Beck, 1981: 257; Hulley, 1984: 85*.

D 13-14; A 23-24; P 13-15; GR (4-5)+(12-13); AO (10-11)+(6-7). Males with supracaudal luminous gland of about 9 partially overlapping scale-like structures; females with infracaudal luminous gland, of 2-3 luminous patches, sometimes partially coalesced.

Attains 105 mm. High-oceanic, mesopelagic; from surface to 300 m (night). In Agulhas Current south to about 31°S; from Sofala Bank to Gulf of Aden and in eastern Indian Ocean (05°-18°S), southeast Asian seas, and equatorial Pacific.



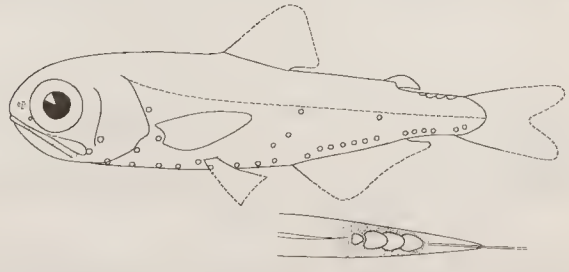
86.99 *Myctophum aurolaternatum:* 3.5 cm SL.

86.100 *Myctophum fissunovi*
Bekker & Borodulina, 1971

Myctophum fissunovi Bekker & Borodulina, 1971: 420, Fig. 2 (06°58'S, 39°37'E).

D 13; A 18-19; P 17-19; GR 7+(17-18); AO 7+ (3-4). Males with supracaudal luminous gland of 4 partially overlapping, scale-like structures; females with infracaudal luminous gland of 2 luminous patches.

Attains 70 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. Not yet recorded from our area. South of Zanzibar and southeast of Mauritius (07°-23°S).



86.100 *Myctophum fissunovi:* adult male holotype (after Bekker & Borodulina, 1971).

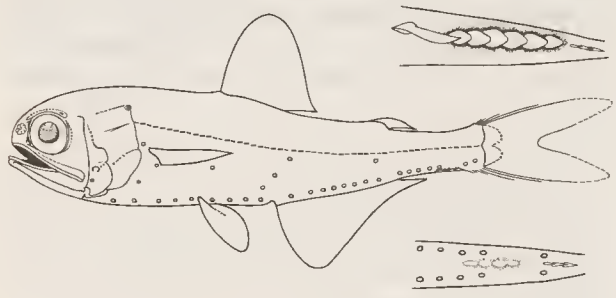
86.101 *Myctophum nitidulum*
Garman, 1899

Myctophum nitidulum Garman, 1899: 266, Pl. 56, Fig. 2 (27°50'N, 145°45'W); Kawaguchi & Aioi, 1972: 36*; Pertseva- Ostroumova, 1974:

113*; Nafpaktitis et al., 1977: 65*; Gjøsaeter, 1981: 220; Hulley, 1981: 81*; 1984: 63.

D 13-14; A 19-21; P 12-14; GR (5-6)+(13-16); AO (8-10)+(4-6). Mature males with supracaudal luminous gland of 6-7 overlapping, scale-like structures; mature females with infracaudal luminous gland, of 3-5 partially overlapping patches.

Attains 83 mm. High-oceanic, mesopelagic; 475 - 850 m (day); from surface to 200 m (night). In Agulhas Current and off west coast in pockets of Agulhas Water. Atlantic (45°N-40°S), Indian Ocean (07°N-24°S) and Pacific (32°N-30°S, with extension to 40°N in Kuroshio Current).



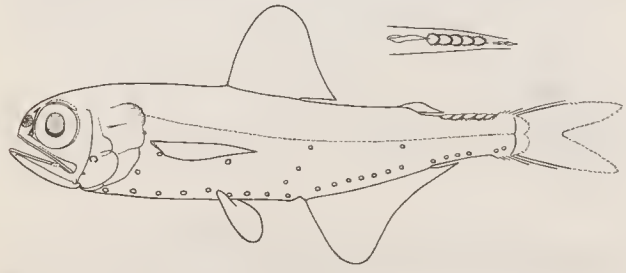
86.101 *Myctophum nitidulum:* 5.5 cm SL.

86.102 *Myctophum obtusirostre*
Tåning, 1928

Myctophum pristilepis obtusirostre Tåning, 1928: 53 (17°54′N, 64°54′W). *Myctophum obtusirostrum:* Kawaguchi et al., 1972: 28*; Gjøsaeter, 1981: 220; Gjøsaeter & Beck, 1981: 257. *Myctophum obtusirostre:* Nafpaktitis et al., 1977: 70*; Hulley, 1981: 84*; 1984: 64*.

D 12-14; A 18-19; P 17-20; GR (6-7)+(16-19); AO (7-8)+(2-5). Supracaudal luminous gland: males with 5-6 black-edged, overlapping scale-like structures; females with 4 overlapping scale-like structures.

Attains 85 mm. High-oceanic, mesopelagic; 325 - 700 m (day); from surface to 125 m (night). In Agulhas Current and off west coast in pockets of Agulhas Water. Tropical waters of all oceans.



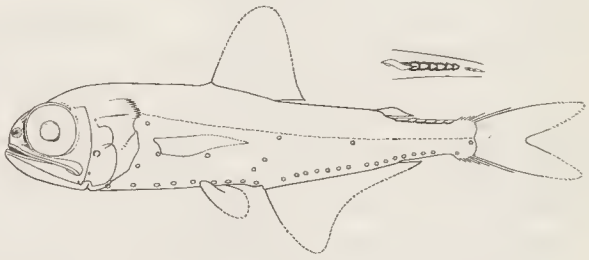
86.102 *Myctophum obtusirostre:* 7 cm SL.

86.103 *Myctophum phengodes*
(Lütken, 1892)

Scopelus phengodes Lütken, 1892: 253 (25°30′S, 102°50′E). *Ctenoscopelus phengodes* Fraser-Brunner, 1949: 1059*. *Myctophum phengodes:* Smith, **SFSA No. 198***; Nafpaktitis & Nafpaktitis, 1969: 26*; Kawaguchi & Aioi, 1972: 174*; Kawaguchi et al., 1972: 28*; Krefft, 1974: 220; McGinnis, 1974: 56*; Wisner, 1976: 56*; Hulley, 1981: 86*; 1984: 86.

D 12-14; A 20-22; P 15-17; GR (7-8)+(17-19); AO (6-8)+(7-9). Males with supracaudal luminous gland of 6-7 overlapping scale-like structures; females with infracaudal luminous gland of about 3 separate or partially coalesced patches.

Attains 93 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. Off all our coasts. Southern subtropical waters of all three oceans.



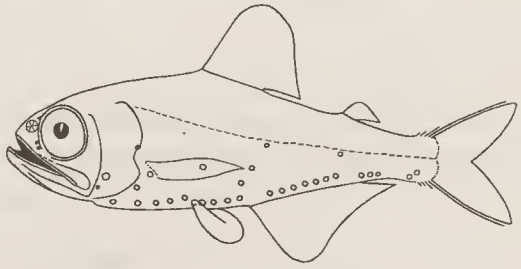
86.103 *Myctophum phengodes:* 5 cm SL.

86.104 *Myctophum selenops*
Tåning, 1928

Myctophum selenops Tåning, 1928: 54 (23°13′N, 82°21′W); Kotthaus, 1972: 25*; Pertseva-Ostroumova, 1974: 126*; Wisner, 1976: 69*; Nafpaktitis et al., 1977: 72*; Hulley, 1981: 89*. *Myctophum selenoides* Wisner, 1971: 43, Fig. 3 (west of Key Hole Point, Hawaii).

D 12-14; A 17-19; P 15-18; GR (6-7)+(15-17); AO (6-8)+(2-4). Supracaudal luminous gland: males with 5-7 overlapping, scale-like structures; females with 2-4 smaller, overlapping, scale-like structures.

Attains 72 mm. High-oceanic, mesopelagic; 225 - 450 m (day); 40 - 225 m (night). West of Cape Peninsula in Agulhas Water pockets. In Atlantic (42°N-38°S) and in equatorial waters of Indian and Pacific oceans.



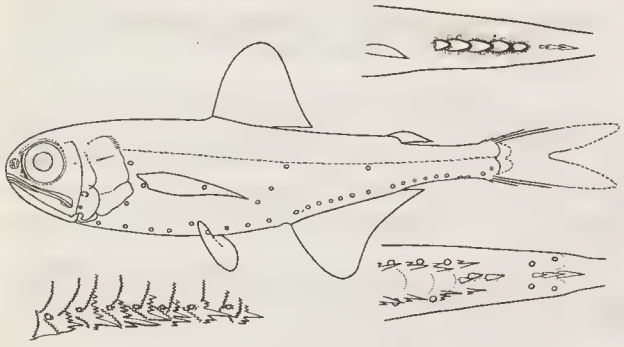
86.104 *Myctophum selenops:* 5 cm SL.

86.105 *Myctophum spinosum*
(Steindachner, 1867)

Scopelus spinosus Steindachner, 1867: 711, Pl. 3, Fig. 4 (China). *Myctophum (Myctophum) spinosum:* Brauer, 1906: 196*. *Myctophum spinosum:* Nafpaktitis & Nafpaktitis, 1969: 24*; Kawaguchi & Aioi, 1972: 38*; Wisner, 1976: 59*; Hulley, 1981: 91*; 1984: 86; Gjøsaeter, 1981: 220; Gjøsaeter & Beck, 1981: 257.

D 13-14; A 18-19; P 14-15; GR (5-6)+(13-15); AO (6-8)+(5-7). Males with supracaudal luminous gland of 4-7 black-edged, overlapping, scale-like structures; females with infracaudal luminous gland of 3-4 partially-overlapping, heart-shaped structures.

Attains 90 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. In Agulhas Current and off west coast in Agulhas Water pockets; also in tropical/subtropical waters of Indo-Pacific.



86.105 *Myctophum spinosum:* 5.5 cm SL.

Genus ***Notolychnus*** Fraser-Brunner, 1949

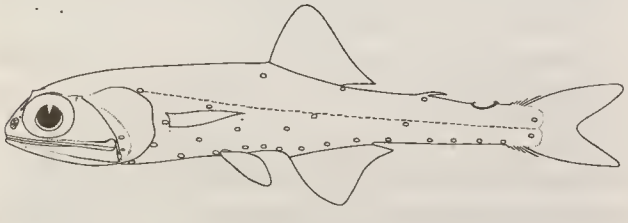
Maxilla abruptly expanded posteriorly, extending well past orbit; A base slightly longer than D base. Dn present; Vn absent; 5 PO; 4 VO; SAO series obtusely angulate; AO series divided into AOa and AOp; 2 Pol; 2 Prc; both sexes with single, supracaudal luminous gland. One species.

86.106 *Notolychnus valdiviae*
(Brauer, 1904)

Myctophum valdiviae Brauer, 1904: 398, Fig. 4 (Atlantic and Indian oceans). *Notolychnus valdiviae:* Hulley, 1972: 222; 1981: 111*; 1984: 86; Wisner, 1976: 144*; Nafpaktitis et al., 1977: 92*.

D 10-12; A 12-14; P 11-14; GR 2+(8-9); AO 4+(3-4).

Attains 25 mm. High-oceanic, mesopelagic; 400 - 700 m (day); 25 - 350 m (night). Off all our coasts. Atlantic (56°N-40°S), Indian Ocean (09°-32°S) and Pacific (32°N-30°S, but to 20°S in Peruvian Transitional Zone).



86.106 *Notolychnus valdiviae:* 2 cm SL male (after Nafpaktitis et al., 1977).

Genus ***Notoscopelus*** Günther, 1864

Maxilla slightly expanded posteriorly, extending well past orbit; D base longer than A base; P short. Dn well developed; Vn small; 5 PO; 5 VO; SAO series obtusely angulate; AO series divided into AOa and AOp; 2 or 3 Pol, horizontally arranged; 2+1 Prc; large supracaudal luminous gland only in males; numerous patches of luminous tissue on trunk and at bases of procurrent C rays. Two subgenera; 1 subgenus in our area.

Subgenus ***Notoscopelus*** Günther, 1864

Adult males with large supracaudal luminous gland but without luminous tissue on cheek and above eye. Five species; 2 in our area.

KEY TO SPECIES

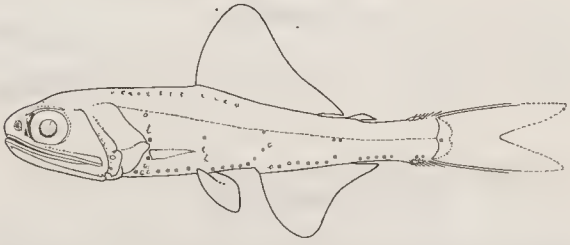
1a Total GR 13-15; D 24-27; AO 11-12; enlarged teeth on rear ½ of dentary ..... *N. (N.) caudispinosus*
1b GR 19-23; D 21-24; AO 12-14; no enlarged teeth on rear ½ of dentary ..... *N. (N.) resplendens*

86.107 *Notoscopelus (Notoscopelus) caudispinosus*
(Johnson, 1863)

Scopelus caudispinosus Johnson, 1863: 42 (off Madeira). *Notoscopelus elongatus:* Grindley & Penrith, 1965: 283 (in part). *Notoscopelus (Notoscopelus) caudispinosus:* Nafpaktitis, 1975: 76*; Hulley, 1981: 243*; 1984: 86*.

D 24-27; A 19-21; P 11-13; GR 4+(9-11); AO (7-8)+(4-5).

Attains 140 mm. High-oceanic, mesopelagic; deeper than 1 000 m (day); from surface to 175 m (night). In Agulhas Current south to 34°S. Broadly tropical species in Atlantic (42°N-37°S) and Indian (once at 07°56′S, 65°14′E) oceans, southeast Asian seas and off Hawaii.



86.107 *Notoscopelus (N.) caudispinosus:* 2 cm SL.

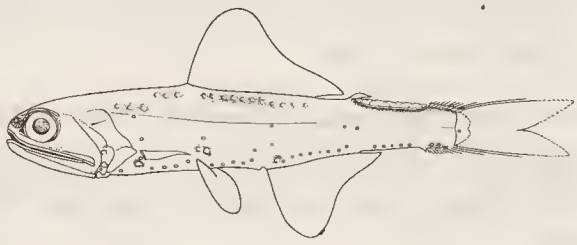
86.108 *Notoscopelus (Notoscopelus) resplendens*
(Richardson, 1845)

Lampanyctus resplendens Richardson, 1845: 42, Pl. 27, Figs. 16-18 (no type-locality). *Lampanyctus elongatus* (*non* Costa): Norman, 1930: 329; Smith, **SFSA No. 207.** *Notoscopelus elongatus:* Grindley & Penrith, 1965: 283 (in part). *Notoscopelus (Notoscopelus) resplendens:* Nafpaktitis et al., 1977: 250*; Hulley, 1981: 246*; 1984: 87.

D 21-24; A 18-20; P 11-13; GR (5-7)+(13-16); AO (7-9)+(4-7).

Attains 95 mm. High-oceanic, mesopelagic; 651 - 2 000 m (day); 50 - 300 m (night), but nyctoepipelagic at surface in

cooler waters. Occurs off all our coasts. In Atlantic (47°N-Subtropical Convergence), Indian (24°-30°S) and Pacific (35°N-34°S) oceans.



86.108 *Notoscopelus (N.) resplendens:* 6 cm SL.

Genus ***Protomyctophum*** Fraser-Brunner, 1949

Maxilla greatly expanded posteriorly, extending to or only somewhat behind vertical at rear margin of orbit; A base longer than D base. Dn minute; Vn small; 5 PO; 4 VO; SAO series straight or weakly angulate; supracaudal and infracaudal glands present. Two subgenera; both in our area.

KEY TO SUBGENERA

1a Eyes semi-telescopic; interorbital width less than expanded posterior end of maxilla ..... *Hierops*
1b Eyes normal; interorbital width greater than expanded posterior end of maxilla ..... *Protomyctophum*

Subgenus ***Hierops*** Fraser-Brunner, 1949

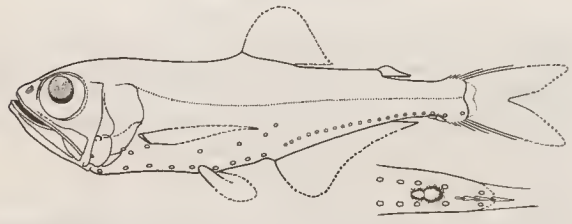
Seven species; 2 in our area.

KEY TO SPECIES

1a AO 14-15; AO-Prc_1 interspace greater than Prc_1-Prc_2 interspace ..... *P. (H.) subparallelum*
1b AO 17-19; AO-Prc_1 interspace less than Prc_1-Prc_2 interspace ..... *P. (H.) parallelum*

86.109 *Protomyctophum (Hierops) parallelum*
(Lönnberg, 1905)

Myctophum parallelum Lönnberg, 1905: 764 (48°27′S, 44°36′W); 1905: 62. *Protomyctophum (Hierops) parallelum:* Andriashev, 1962: 238*; Nafpaktitis & Nafpaktitis, 1969: 8*; Hulley, 1972: 219; 1981: 34*; McGinnis, 1974: 65*.



86.109 *Protomyctophum (H.) parallelum:* 4 cm SL.

D 10-13; A 23-27; P 14-15; GR (3-4)+(13-15); AO 17-19. Males with single, large, supracaudal luminous gland, outlined in black pigment; females with 1-3 infracaudal luminous scales.

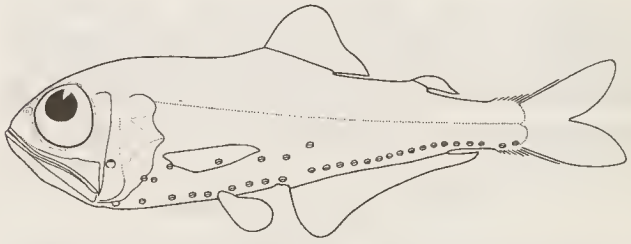
Attains 50 mm. High-oceanic, mesopelagic; 150 - 450 m (night). Occurs between 38°-40°S, 15°E and at 45°S, 36°E. Circumglobal between Subtropical Convergence and Antarctic Polar Front.

86.110 *Protomyctophum (Hierops) subparallelum*
(Tåning, 1932)

Myctophum parallelum (*non* Lönnberg): Norman, 1930: 320; Smith, **SFSA No. 192.** *Myctophum articum subparallelum* Tåning, 1932: 128 (41°47′S, 176°55′E). *Hierops subparallela:* Bolin, 1959: 5. *Protomyctophum (Hierops) subparallelum:* Andriashev, 1962: 234*; Nafpaktitis & Nafpaktitis, 1969: 8*; Hulley, 1972: 219; 1972: 239; 1981: 36*; McGinnis, 1974: 68*.

D 11-12; A 20-24; P 14-16; GR 4+(14-15); AO 14-15. Males with single, large, supracaudal luminous gland, outlined in black pigment; females with 1-3 infracaudal luminous scales, sometimes coalesced.

Attains 36 mm. Off west coast and at Vema Seamount. Circumglobal in region of Subtropical Convergence, with northern extension to 30°S in eastern boundary currents.



86.110 *Protomyctophum (H.) subparallelum:* 2.5 cm SL (after Nafpaktitis & Nafpaktitis, 1969).

Subgenus ***Protomyctophum*** Fraser-Brunner, 1949

More than 7 species; 2 (possibly 7) in our area.

KEY TO SPECIES

1a Distance Prc_1-Prc_2 greater than 1 photophore-diameter; males with single, medially-constricted, black-edged supracaudal gland; females with 3-6 individual luminous scales infracaudally, or a single, coalesced infracaudal gland ..... *P. (P.) bolini*
1b Distance Prc_1-Prc_2 about ½ photophore-diameter or less 2

2a Body depth less than 25% SL (usually 21-23% SL) 3
2b Body depth greater than 25% SL (usually 26-30% SL) 4

3a Palatine teeth in anterior group only; length of posterior ventral expansion of maxilla about equal to length of distal margin of maxilla; males with supracaudal gland only, comprising 6-8 partially coalesced luminous scales; females with infracaudal gland only, comprising 4-6 separate, luminous patches ..... *P. (P.) tenisoni*

3b Teeth evenly spaced along entire length of palatine; length of posterior ventral expansion of maxilla greater than length of distal margin of maxilla; males with supracaudal gland only, comprising 5 or 6 black-edged, diamond-shaped partially coalesced scales; females with infracaudal gland only, comprising 5-7 well-separated luminous patches ..... *P. (P.) choriodon*

4a Total GR 18-21; males with single, large, supracaudal gland, extending from procurrent C rays to adipose base, and small infracaudal gland; females with single, minute, supracaudal gland only ..... *P. (P.) andriashevi*

4b Total GR 22-28; males with supracaudal and infracaudal glands; females with or without supracaudal and infracaudal glands or with infracaudal gland only 5

5a P rays 16-18; males with single supracaudal gland, extending about 70% of distance between procurrent C rays and adipose base, and single (sometimes bifid) infracaudal gland; females with single small supracaudal gland and minute infracaudal gland ..... *P. (P.) gemmatum*

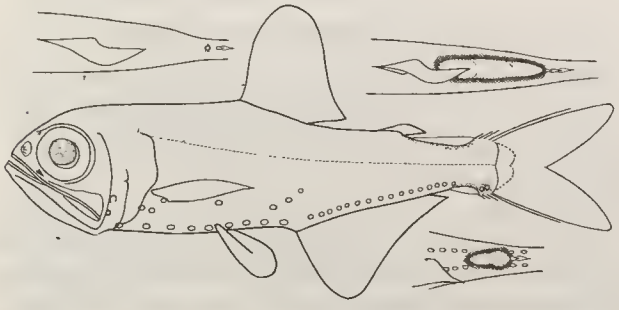
5b P rays 13-15; males with supracaudal and infracaudal glands; females with well-developed infracaudal gland only or with well-developed supracaudal and infracaudal glands 6

6a Males with single supracaudal gland, extending about 60% of distance from procurrent C rays to adipose base; infracaudal gland of 2-4 separate, indistinct, luminous scales, posteriormost being the best developed; females with infracaudal gland only, of 2-4 separate, luminous scales; total GR 25-28 (rarely 24) ..... *P. (P.) normani*

6b Males with single supracaudal gland, extending about 50% of distance from procurrent C rays to adipose base, and single, coalesced infracaudal gland extending from procurrent C rays to A base; females with single, globular supracaudal gland and single, minute, black-edged infracaudal gland; total GR 22-24 (rarely 25) ..... *P. (P.) luciferum*

86.111 *Protomyctophum (Protomyctophum) andriashevi*
Bekker, 1963

Electrona (Protomyctophum) bolini Fraser-Brunner, 1949: 1099 (in part). *Protomyctophum andriashevi* Bekker, 1963: 19, Fig. 2 (42°16′S, 39°00′W). *Protomyctophum (Protomyctophum) ? andriashevi:* Hulley, 1972: 218. *Protomyctophum (Protomyctophum) andriashevi:* McGinnis, 1974: 53*; Hulley, 1981: 16*.



86.111 *Protomyctophum (P.) andriashevi:* 5.5 cm SL.

D 13-14; A 22-25; P 15-17; GR (4-5)+(14-17); AO 15-17.

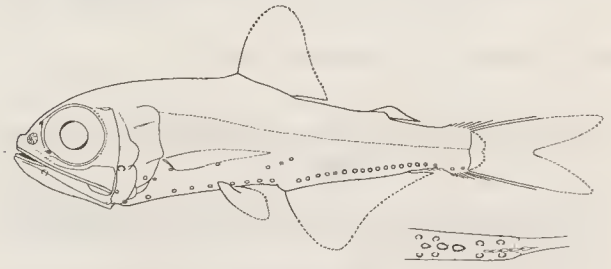
Attains 60 mm. High-oceanic, mesopelagic; 100 - 200 m (night). Taken once in our area at 29°30′S, 10°03′E. Circumglobal between Subtropical Convergence and Antarctic Polar Front.

86.112 *Protomyctophum (Protomyctophum) bolini*
(Fraser-Brunner, 1949)

Myctophum tenisoni Norman, 1930: 321 (in part). *Electrona (Protomyctophum) bolini* Fraser-Brunner, 1949: 1045, 1099, Fig. 12 (in part; 45°18′S, 18°58′E). *Protomyctophum (Protomyctophum) bolini:* Andriashev, 1962: 232*; Hulley, 1972: 218; 1981: 17*; McGinnis, 1974: 62*.

D 12-14; A 23-26; P 14-16; GR (4-6)+(15-18); AO 17-18.

Attains 67 mm. High-oceanic, mesopelagic; 608 - 728 m (day); 364 - 426 m (night). Recorded from near our area (41°40′-45°25′S, 17°17′- 36°32′E). Circumglobal between Subtropical Convergence and Antarctic Divergence.



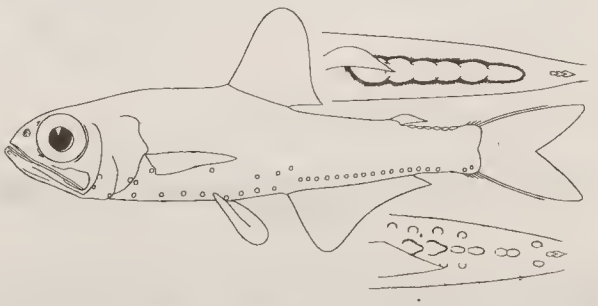
86.112 *Protomyctophum (P.) bolini:* 4.5 cm SL.

86.113 *Protomyctophum (Protomyctophum) choriodon*
Hulley, 1981

Protomyctophum (Protomyctophum) choriodon Hulley, 1981: 20, Figs. 10, 12 (35°47′S, 52°52′W).

D 12-14; A 22-25; P 14-16; GR (6-7)+(18-21); AO 15-17.

Attains 95 mm. High-oceanic, mesopelagic; upper 100 m (night). Not yet recorded from our area. Western Atlantic (36°- 51°S); probably circumglobally distributed in these latitudes.



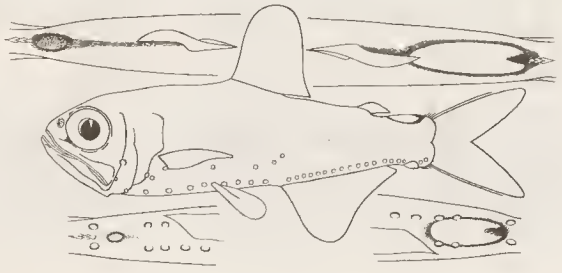
86.113 *Protomyctophum (P.) choriodon:* 8 cm SL.

86.114 *Protomyctophum (Protomyctophum) gemmatum*
Hulley, 1981

Protomyctophum (Protomyctophum) gemmatum Hulley, 1981: 23, Figs. 13-14 (40°18′S, 35°07′W).

D 12-14; A 22-25; P 16-18; GR (5-7)+(17-20); AO 15-17.

Attains 86 mm. High-oceanic, mesopelagic; 500 m (night). Not yet recorded from our area. Western Atlantic between Subtropical Convergence and Antarctic Polar Front; probably circumglobally distributed in these latitudes.



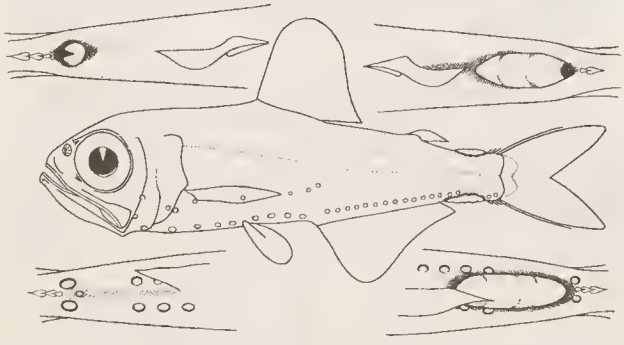
86.114 *Protomyctophum (P.) gemmatum:* 7 cm SL.

86.115 *Protomyctophum (Protomyctophum) luciferum*
Hulley, 1981

Protomyctophum (Protomyctophum) luciferum Hulley, 1981: 27, Figs. 13, 15 (34°01′S, 47°39′W).

D 12-14; A 21-24; P 13-15; GR (5-6)+(16-19); AO 15-17.

Attains 61 mm. High-oceanic, mesopelagic; below 140 m (night). Not yet recorded from our area. In western Atlantic (34°-48°S); probably circumglobally distributed in these latitudes.



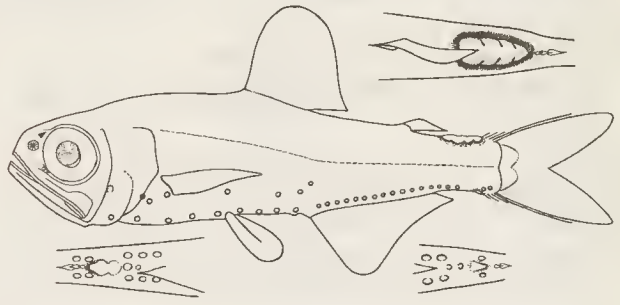
86.115 *Protomyctophum (P.) luciferum:* 5.5 cm SL.

86.116 *Protomyctophum (Protomyctophum) normani*
(Tåning, 1932)

Myctophum normani Tåning, 1932: 127, Fig. 2 (41°47′S, 176°55′E). *Protomyctophum (Protomyctophum) normani:* Andriashev, 1962: 231* (in part); Hulley, 1972: 217; 1981: 28*.

D 12-13; A 21-24; P 13-15; GR (5-7)+(18-21); AO 15-17.

Attains 56 mm. High-oceanic, mesopelagic; upper 104 m (night). Taken once in our area (west of Slangkop Lighthouse). Circumglobal convergence species (36°-43°S).



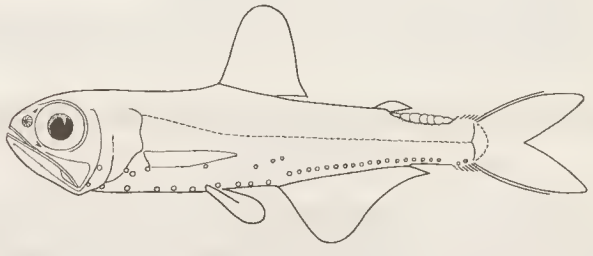
86.116 *Protomyctophum (P.) normani:* 5 cm SL.

86.117 *Protomyctophum (Protomyctophum) tenisoni*
(Norman, 1930)

Myctophum tenisoni Norman, 1930: 321, Fig. 27 (in part; 46°25′S, 15°30′E). *Protomyctophum (Protomyctophum) tenisoni:* Andriashev, 1962: 229*; McGinnis, 1974: 46*; Hulley, 1981: 32*.

D 11-13; A 22-25; P 14-16; GR (5-7)+(16-19); AO 16-19.

Attains 54 mm. High-oceanic, mesopelagic; upper 100 m (night). Not yet recorded from our area. Circumglobal between Subtropical Convergence and Antarctic Polar Front.



86.117 *Protomyctophum (P.) tenisoni:* 5.5 cm SL.

Genus ***Scopelopsis*** Brauer, 1906

Maxilla slightly expanded posteriorly, extending well behind orbit; A base equal to or slightly longer than D base. Dn and Vn present; "primary" photophores absent; "secondary" photophores on head, trunk and C membrane; males with large, supracaudal luminous gland, comprising about 7 arrow-shaped, overlapping scales; supracaudal and infracaudal luminous glands absent in females; luminous patches sometimes below P and at lower procurrent C rays. One species.

86.118 *Scopelopsis multipunctatus*
Brauer, 1906

Scopelopsis multipunctatus Brauer, 1906: 146, Fig. 7 (33°23′04″S, 16°19′04″E); Smith, **SFSA No. 191*;** Grindley & Penrith, 1965: 283 (in part); Nafpaktitis & Nafpaktitis, 1969: 67*; Hulley, 1972: 227; 1981: 240*; 1984: 65.

D 20-25; A 23-27; P 10-12; GR (7-9)+(15-18).

Attains 81 mm. High-oceanic, mesopelagic; 74 - 400 m (night); size stratification with depth. Off all our coasts. In Atlantic and Indo-Pacific (25°S to Subtropical Convergence, but to 09°S in eastern boundary currents).

86.118 *Scopelopsis multipunctatus:* 5 cm SL.

Genus ***Symbolophorus*** Bolin & Wisner, 1959

Maxilla moderately expanded posteriorly, extending well past orbit; A base longer than D base. Dn small; Vn larger; 5 PO; 4 VO; SAO series strongly angulate; AO series divided into AOa and AOp; 1 Pol. Supracaudal and/or infracaudal luminous glands present. About 10 species; 3 (possibly 4) in our area.

KEY TO SPECIES

1a Pol on or behind vertical at origin of adipose fin; PLO nearer LL than to upper base of P; palatines and dentaries with numerous rows of minute subequal teeth; GR slender and lath-like 2

1b Pol well in advance of vertical at origin of adipose fin; PLO midway between LL and upper base of P or nearer latter; outer row of teeth on palatines and inner row of teeth on dentaries enlarged; GR spatulate 3

2a SAO_1 on, or slightly in advance of, vertical through VO_3 and nearer to SAO_2 than to VLO; P extending little beyond VLO; VLO about above outer base of V and below line connecting PLO and SAO_1 ..... *S. rufinus*

2b SAO_1 on, or slightly behind, vertical through VO_2 and about equidistant between VLO and SAO_2; P extending to about SAO_1; VLO slightly in advance of vertical at outer base of V and on or slightly above line connecting PLO and SAO_1 ..... *S. evermanni*

3a P pigmented (specimens > than 60 mm); distance last AOa-1st AOp greater than (sometimes equal to) distance last AOa-Pol; total GR 22-26; males with supracaudal gland only; females with infracaudal gland only ..... *S. boops*

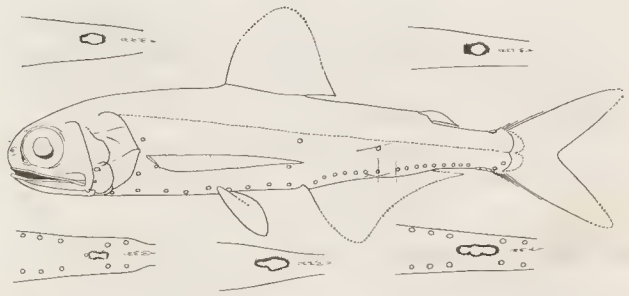
3b P unpigmented; distance last AOa-1st AOp less than or equal to distance last AOa-Pol; total GR 17-20; males with supracaudal gland only or with supracaudal and infracaudal glands; females with both supracaudal and infracaudal glands ..... *S. barnardi*

86.119 *Symbolophorus barnardi*
(Tåning, 1932)

Myctophum (Myctophum) humboldti: Brauer, 1906: 192 (in part); Barnard, 1925: 243* (in part). *Myctophum humboldti barnardi* Tåning, 1932: 128 (Cape Point NE 1/2E, 36 miles). *Myctophum humboldti* (*non* Risso): Norman, 1930: 325; Smith, **SFSA No. 195** (in part); Grindley & Penrith, 1965: 283 (in part). *Symbolophorus boops* (*non* Richardson): Nafpaktitis & Nafpaktitis, 1969: 27*; Hulley, 1972: 222; O'Toole, 1976: 27* (in part). *Symbolophorus barnardi:* Hulley, 1981: 94*; 1984: 65.

D 13-15; A 21-23; P 12-14; GR (4-6)+(12-14); AO (7- 9)+(7-9).

Attains 116 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. Occurs off all our coasts. Atlantic (30°-40°S) and Indo-Pacific (30°S to Subtropical Convergence).

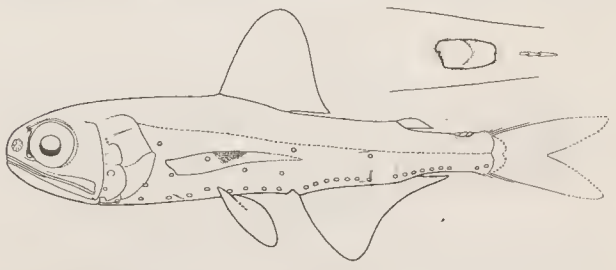


86.119 *Symbolophorus barnardi:* 9 cm SL.

86.120 *Symbolophorus boops*
(Richardson, 1845)

Myctophum boops Richardson, 1845: 39, Pl. 27, Figs. 6-12 (type-locality erroneous - probably eastern South Atlantic). *Myctophum humboldti:* Norman, 1930: 325 (in part); Smith, **SFSA No. 195** (in part); Grindley & Penrith, 1965: 283 (in part). *Symbolophorus boops:* Andriashev, 1962: 252* (in part); Wisner, 1976: 51* (in part); O'Toole, 1976: 27* (in part); Hulley, 1981: 96*.

D 13-15; A 20-23; P 12-14; GR (6-7)+(15-19); AO (7-9)+(6-8).



86.120 *Symbolophorus boops:* 5 cm SL.

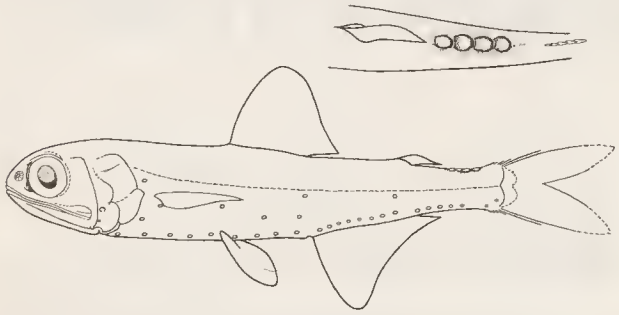
Attains 157 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. In southern Benguela Upwelling Region north to 25°S. Circumglobal in and south of Subtropical Convergence.

86.121 *Symbolophorus evermanni*
(Gilbert, 1905)

Myctophum evermanni Gilbert, 1905: 597 (south of Oahu, Hawaii). *Symbolophorus evermanni:* Nafpaktitis & Nafpaktitis, 1969: 29*; Kotthaus, 1972: 26*; Wisner, 1976: 50*; Gjøsaeter, 1981: 220*; Gjøsaeter & Beck, 1981: 257; Hulley, 1984: 88*.

D 13-16; A 19-21; P 14-16; GR (5-6)+(14-15); AO (7-9)+(4-6). Mature males with supracaudal luminous gland, comprising 4-6 non-overlapping, scale-like structures; mature females with infracaudal luminous gland of about 5 oval-shaped, non-overlapping patches.

Attains 80 mm. High-oceanic, mesopelagic; nycto-epipelagic at surface. In Agulhas Current south to about 33°S; tropical waters of Indo-Pacific.



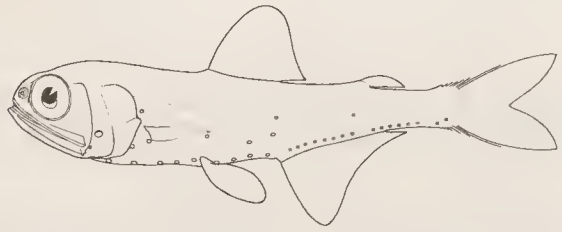
86.121 *Symbolophorus evermanni:* 6 cm SL.

86.122 *Symbolophorus rufinus*
(Tåning, 1928)

Myctophum rufinum Tåning, 1928: 54 (15°50′N, 26°32′W). *Symbolophorus rufinus:* Nafpaktitis & Nafpaktitis, 1969: 29*; Kotthaus, 1972: 26*; Hulley, 1981: 100*.

D 14-16; A 20-22; P 15-17; GR (5-6)+(14-17); AO (7-9)+(5-7). Mature males with supracaudal luminous gland of 5-6 non-overlapping, scale-like structures; mature females with infracaudal luminous gland of 3-4 non-overlapping patches.

Attains 94 mm. High-oceanic, mesopelagic; 425 - 850 m (day); from surface to 125 m (night). Not yet recorded from our area. Atlantic (40°N-28°S) and equatorial Indian Ocean.



86.122 *Symbolophorus rufinus:* 6.5 cm SL female (after Nafpaktitis et al., 1977).

Genus ***Taaningichthys*** Bolin, 1959

Maxilla slightly expanded posteriorly, extending well past orbit; A base equal to or slightly longer than D base. Dn absent; Vn present; body photophores present or absent; when present: 5-7 PO; 3-10 VO; 1 SAO, at or slightly below horizontal septum; AO series divided into AOa and AOp; 1 Pol; 2+1 Prc. Both sexes with large, undivided supracaudal and infracaudal luminous gland. Three species, 2 in our area.

KEY TO SPECIES

1a VO 8-10; AO 9-13; Pol directly below or anterior to base of adipose fin; Prc_1-Prc_2 interspace equal to or greater than 2 photophore-diameters; broad-based, hook-like teeth on dentary near symphysis ..... *T. minimus*

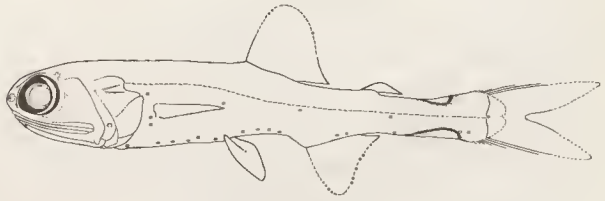
1b VO 3-5; AO 3-4; Pol behind base of adipose fin; Prc_1-Prc_2 interspace equal to or less than 1 photophore-diameter; no hook-like teeth on dentary near symphysis ..... *T. bathyphilus*

86.123 *Taaningichthys bathyphilus*
(Tåning, 1928)

Lampadena bathyphila Tåning, 1928: 63 (25°11′N, 20°57′W). *Taaningichthys bathyphilus:* Davy, 1972: 70*; Wisner, 1976: 145*; Nafpaktitis et al., 1977: 189*; Hulley, 1981: 168*; 1984: 89*.

D 11-14; A 12-14; P 12-13; GR (3-4)+(8-10); AO (2-3)+1.

Attains 80 mm. High-oceanic, bathypelagic; generally below 675 m (night), shallowest depth of capture 400 m. Off east coast (30°-33°S); widespread species in all 3 oceans (43°N-68°S).



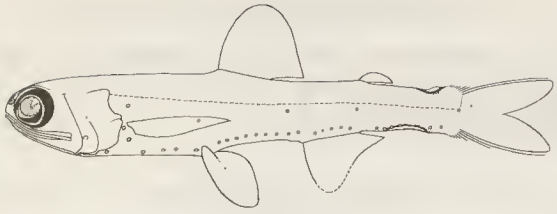
86.123 *Taaningichthys bathyphilus:* 5 cm SL.

86.124 *Taaningichthys minimus*
(Tåning, 1928)

Lampadena minima Tåning, 1928: 63 (15°50′N, 26°32′W); Norman, 1930: 336. *Taaningichthys minimus:* Nafpaktitis & Nafpaktitis, 1969: 39*; Davy, 1972: 69*; Wisner, 1976: 147*; Hulley, 1981: 168*.

D 11-13; A 12-13; P 15-17; GR (4-5)+(10-13); AO (4-7)+(4-6).

Attains 65 mm. High-oceanic, mesopelagic; 600 - 800 m (day); 90 - 600 m (night). In our area at 34°05′15″S, 16°00′45″E. Atlantic (40°-20°N and 08°-38°S), Indian Ocean (20°-30°S), and central and eastern North Pacific (35°-12°N).



86.124 *Taaningichthys minimus:* 5.5 cm SL female lectotype (after Nafpaktitis et al., 1977).

Genus ***Triphoturus*** Fraser-Brunner, 1949

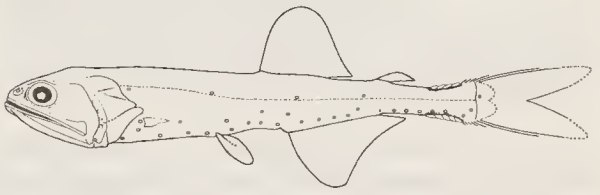
Maxilla abruptly enlarged posteriorly, extending well past orbit; A base longer than D base. Dn absent; Vn present; 5 PO; 5 VO; SAO series angulate; AO series divided into AOa and AOp; 2 Pol; 3 Prc; series of overlapping, luminous scales supracaudally and infracaudally in both sexes, immediately in front of procurrent C rays. Two species; 1 in our area.

86.125 *Triphoturus nigrescens*
(Brauer, 1904)

Myctophum (Lampanyctus) nigrescens Brauer, 1904: 403 (03°24′06″S,58°38′01″E); 1906: 241*. *Triphoturus microchir:* Nafpaktitis & Nafpaktitis, 1969: 55*; Kotthaus, 1972: 29*; Hulley, 1981: 205. *Triphoturus nigrescens:* Wisner, 1976: 165*; Hulley, 1984: 90*.

D 13-15; A 15-18; P 8; GR 3+(8-9); AO (4-5)+(5-6).

Attains 40 mm. High-oceanic, mesopelagic; upper 24 m (night). In Agulhas Current south to about 40°S. Indian (08°N-15°S) and Pacific (30°N-30°S) oceans.



86.125 *Triphoturus nigrescens:* 3.5 cm SL.

Family No. 87: NEOSCOPELIDAE

by P.A. Hulley

Blackchins **Swartkenne**

Body elongate; head and body compressed. Mouth terminal; jaws extending to or beyond rear margin of orbit. Maxilla greatly expanded posteriorly and truncate; supramaxilla present. Teeth small, present on jaws, vomer and palatines. Pectoral fins well developed, reaching to about anus. Origin of ventral fins well behind vertical through pectoral fin base. Origin of dorsal fin above ventral base; anal fin posterior to dorsal fin. Adipose fin present. Luminous organs on head absent. Photophores on body present or absent.

Benthopelagic over continental and island slope regions or oceanic, bathypelagic in tropical and subtropical waters off all three oceans. Three genera; *Solivomer* Miller, 1947 is not represented in our area.

KEY TO GENERA

1a Photophores on body present; eyes large, their diameter not more than 5 times in head length; maxilla extending to, or less than 1 eye diameter beyond, vertical at rear margin of orbit ..... *Neoscopelus*

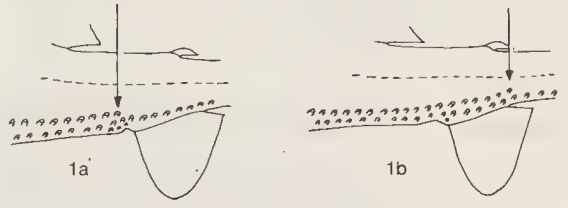
1b Photophores on body absent; eyes small, their diameter more than 7 times in head length; maxilla reaches at least 1 eye diameter past orbit ..... *Scopelengys*

Genus ***Neoscopelus*** Johnson, 1863

Scales deciduous. Swimbladder well developed. Luminous organs in a single series on tongue; midventral and bilateral rows of photophores on body. Three species; 2 in our area. *N. porosus* Arai, 1969 is known from Japan.

KEY TO SPECIES

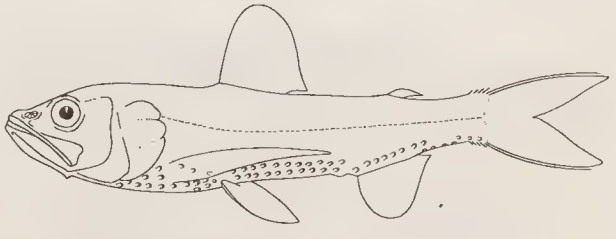
1a LO photophores not reaching vertical through A origin; total GR 10-12 ..... *N. macrolepidotus*



1b LO photophores reaching to about end of A base; total GR 14-16 ..... *N. microchir*

87.1 *Neoscopelus macrolepidotus*
Johnson, 1863

Neoscopelus macrolepidotus Johnson, 1863: 44, Pl. 7 (off Madeira); Barnard, 1925: 246; Smith, **SFSA No. 190***; Nielsen, 1973: 170; Nafpaktitis, 1977: 6*.



87.1 *Neoscopelus macrolepidotus:* 14 cm SL.

D 12-13; A 11-13; P 18-19; V 8; GR 2+(8-10). Depth 3.9- 4.4, head 2.7-3.0 in SL. Eye 4.5-5.0 in head. LO 12-14.

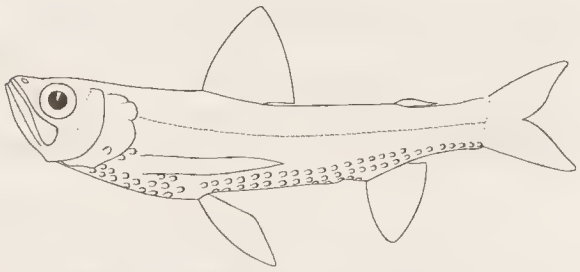
Generally dark red on sides of head and body, silvery white below; fins pink. Attains 25 cm; sexually mature from about 15 cm. Benthopelagic over slope regions in 300 - 800 m. Off Natal between 27° and 30°S. Both sides of Atlantic and off Japan, Hawaii and in Great Australian Bight.

87.2 *Neoscopelus microchir*
Matsubara, 1943

Neoscopelus microchir Matsubara, 1943: 59, Fig. 13 (off Heta, Japan); Maul, 1951: 57*; Nielsen, 1973: 170; Nafpaktitis, 1977: 9*.

D 12-13; A 10-12; P 16-17; V 8; GR (3-4)+(11-12). Depth 3.9-4.5, head 2.9-3.1 in SL. Eye 3.9-4.3 in head. LO 20-22.

Generally dark red on head and sides of body, silvery white below; fins pink. Attains 30 cm; sexually mature from about 12 cm. Benthopelagic over slope regions in 250 - 700 m. One record off Natal (27°45′S, 32°44′E); both sides of Atlantic and from western Pacific.



87.2 *Neoscopelus microchir:* 9 cm SL.

Genus ***Scopelengys*** Alcock, 1890

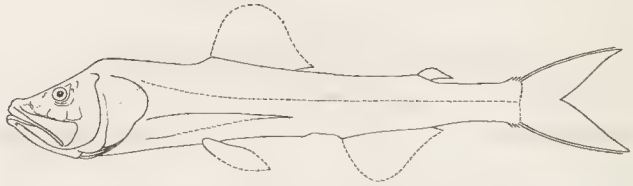
Scales deciduous. Swimbladder absent. Photophores absent. Two species; *S. clarkei* Butler & Ahlstrom, 1976 occurs in the central North Pacific.

87.3 *Scopelengys tristis*
Alcock, 1890

Scopelengys tristis Alcock, 1890: 303 (11°12′47″N, 74°25′30″E); Nielsen, 1973: 170; Nafpaktitis, 1977: 4*.

D 11-13; A 12-14; P 14-16; V 8; GR (1-2)+(7-9). Depth about 5, head 3.4-3.7 in SL. Eye 7.6-9.2 in head.

Generally uniform brown, with belly and mouth darker. Attains 20 cm; sexually mature from about 15 cm. Oceanic, bathypelagic, with adults deeper than 1 000 m, but juveniles in 500 - 800 m. No evidence of vertical migration. One record in our area (33°25′S, 27°54′E); also in all 3 major oceans.



87.3 *Scopelengys tristis:* 16 cm SL.

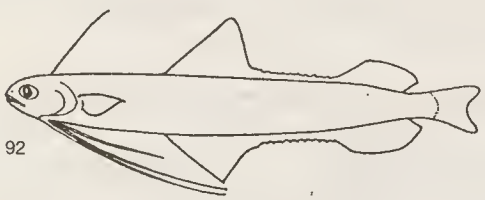
Order GADIFORMES

Pelvic fins jugular to thoracic (absent in *Macrouroides*, which is not yet reported from our area); fin spines absent (except for macrourids, in which the first 2 dorsal fin rays are usually spinous); pectoral fins lateral; caudal fin reduced or absent in some species; dorsal and anal fin bases elongate, extending along most of the back and ventral part of the tail; dorsal and anal fin rays (and pterygiophores) more numerous than adjacent vertebrae; no adipose fin. Scales cycloid, but covered with spinules in most macrourids. Gills 4, with a slit behind the 4th gill. Swimbladder euphysoclistous, generally well developed (but reduced in a few genera). Two nostrils on each side of the head.

Gadiforms are primarily marine benthopelagic or bathypelagic fishes of worldwide distribution. The families Gadidae and Merlucciidae include species of great economic importance (e.g. cod, haddock, pollock, ling, hake, etc.). Eight families, of which 6 are represented in our area.

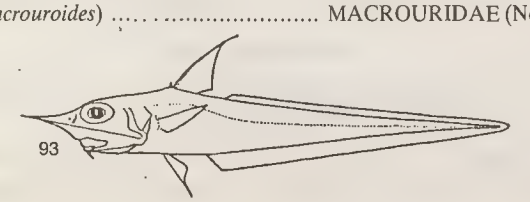
KEY TO FAMILIES

1a A single elongate dorsal fin ray inserted on top of head; pelvic fins with 5-7 rays, the outer 3 elongated free filaments; pelvic fin origin under middle of head ..... BREGMACEROTIDAE (No. 92)


92

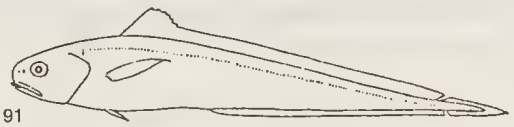
1b No separate dorsal fin ray inserted on top of head; pelvic fin origin well behind middle of head 2

2a Caudal fin absent (rudimentary in *Trachyrinchus*); trunk shorter than head, followed by a long, strap-like tail tapering to a fine point; scales with spinules in most species; first dorsal fin with rudimentary spinous first ray and elongate spinous second ray (not spinous in *Trachyrinchus* and *Macrouroides*) ..... MACROURIDAE (No. 93)


93

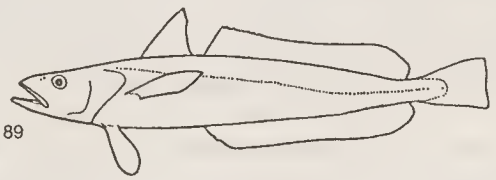
2b Caudal fin usually obvious (reduced or absent in *Melanonus* and some merlucciids); trunk usually longer than head; scales without spinules; no spinous rays in dorsal fin 3

3a Head with numerous small, dark, longitudinal, fleshy ridges; a single, long dorsal fin (sometimes appearing as 2 separate fins) ..... MELANONIDAE (No. 91)


91

3b Head without numerous fleshy ridges; 2 or 3 dorsal fins (1 in some merlucciids) 4

4a A V-shaped bony ridge on top of head; swimbladder not attached to rear of skull; no chin barbel ..... MERLUCCIIDAE (No. 89)


89

4b No V-shaped ridge on top of head; chin barbel present in most species 5

5a Body tapering to a narrow caudal peduncle; dorsal and anal fins completely separate from caudal fin; no barbels on snout; swimbladder connected to rear of skull on each side ..... MORIDAE (No. 90)

90

5b Caudal peduncle not narrow; 2 barbels on snout (not true of extralimital gadids); swimbladder not connected to skull ..... GADIDAE (No. 88)

88

Family No. 88: GADIDAE

by D.M. Cohen

Cods **Kliplinge**

Body elongate to fusiform. One, 2, or 3 dorsal fins; 1 or 2 anal fins. No fin spines. Caudal peduncle not very narrow. Scales generally small, cycloid. No V-shaped ridge on top of head. First neural spine fused to skull. Last vertebra supporting a single hypural bone. Swimbladder not attached to rear of skull.

This diverse family is one of the most important of commercially exploited fishes. The main work on the taxonomy of the family is Svetovidov (1948). Of the approximately 20 genera and 60 species, most are found in cold waters of the northern hemisphere where the highest catches occur. A single genus known from our area.

Genus *Gaidropsarus* Rafinesque, 1810

Two barbels on snout (from anterior nostrils) and one on chin. A single, variously developed ray on the nape, followed by a sunken row of small, soft filaments in front of the long-based 2nd D. Teeth in bands on jaws and vomer. Ventral fins with 7 rays. Perhaps a dozen or more species placed in 1-3 genera; I recognise one (Cohen & Russo, 1979). Two species in our area (Penrith, 1967).

KEY TO SPECIES

1a A 37-43 ..... *G. capensis*
1b A 50-54 ..... *G. insularum*

88.1 *Gaidropsarus capensis*

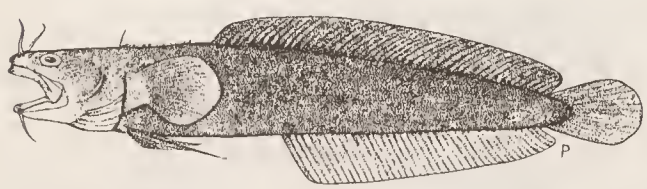
(Kaup, 1858)

Cape rockling Kaapse klipling

Motella capensis Kaup, 1858: 90 (no type-locality given). *Gaidropsarus capensis:* Barnard, 1925: 323 (in part); Smith, SFSA **No. 252***; Penrith, 1967: 527; Brownell, 1979: 7*.

D2 43-52; A 37-43; P 18-21; vertebrae 44-45. Depth 5.7- 6.1; head 4.5-4.7.

Reaches at least 16 cm. Known only from Cape Town to East London; from tidepools to 50 m.



88.1 *Gaidropsarus capensis:* 17.5 cm (off East London).

88.2 *Gaidropsarus insularum*

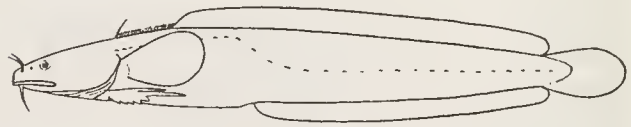
Sivertsen, 1945

Comb rockling Kam-klipling

Gaidropsarus capensis (*non* Kaup): Barnard, 1925: 323 (in part). *Gaidropsarus insularum* Sivertsen, 1945: 8* (Tristan da Cunha); Penrith, 1967: 527.

D2 62-64; A 50-54; P 20-21. Depth 6.5-7; head 4.8-5.3.

Attains 16 cm. Known from tidepools of the Cape Peninsula and west coast; also at Tristan da Cunha, St. Paul and Amsterdam Ids. (Hureau, 1969) and at Gough Id. (P.C. Heemstra, personal communication).



88.2 *Gaidropsarus insularum:* 15.5 cm (after Sivertsen, 1945).

Family No. 89: MERLUCCIIDAE

by D.M. Cohen

Hakes **Stokvisse**

Body fusiform or tapering, generally elongate. One or two dorsal fins; one anal fin. Caudal fin prominent and separate from dorsal and anal, or small and connected to dorsal and anal, or absent. Pectoral fins midlateral. Scales cycloid. V-shaped ridge on top of head. First neural spine fused to skull. Last vertebra supporting a single hypural bone (in species with a tail fin). Swimbladder not attached to rear of skull.

Merlucciidae: showing V-shaped ridge on top of head.

Benthopelagic or mesopelagic. Reaching a metre or more in length. Four or five genera with 15 to 20 species. Often included in Gadidae. *Merluccius* and *Macruronus* contain important commercial species in many parts of the world. Classification has been treated by Marshall (1966).

KEY TO GENERA

1a C large and prominent, separate from D and A ..... *Merluccius*
1b C lacking or very tiny and connected to D and A 2

2a Two D ..... *Macruronus*
2b One D 3

3a Gill membranes separate ..... *Lyconus*
3b Gill membranes united ..... *Lyconodes*

Genus ***Lyconodes*** Gilchrist, 1922

This problematic genus is based on a single species described from one specimen, now lost, caught west of the Cape.

89.1 *Lyconodes argenteus*
Gilchrist, 1922

Lyconodes argenteus Gilchrist, 1922: 59, Pl. 10 Fig. 1 (west of Cape of Good Hope); Smith, **SFSA No. 246*.**

D about 110; A more than 94; P 15; V 9. No C. Large teeth in both jaws. Gill membranes united, free from isthmus.

Darker above, pale below. Attains 45 mm. Probably pelagic.

89.1 *Lyconodes argenteus:* (off Cape of Good Hope; after Gilchrist, 1922).

Genus ***Lyconus*** Günther, 1887

Two described species; 1 in our area.

89.2 *Lyconus pinnatus*
Günther, 1887

Lyconus pinnatus Günther, 1887: 158, Pl. 42 C (South Atlantic, mid-ocean); Marshall, 1966: 275.

P 17, reaching well past anus; GR 3+13. Tail filamentous; C absent or very small. Large teeth on jaws and vomer. Gill membranes separate.

Attains at least 35 cm. Pelagic. Rare; probably circum-antarctic.

89.2 *Lyconus pinnatus:* 12.5 cm (after Günther, 1887).

Genus ***Macruronus*** Günther, 1873

At least 5 species have been described, of which 3 or fewer are valid. A single rare species in our area.

89.3 *Macruronus capensis*
Davies, 1950

Straptail — Bandstert

Macruronus capensis Davies, 1950: 512, Fig. (50 miles NW of Cape Town, 280 fms); Smith, 1953: 514, **No. 257a*.**

D_1 12-13 (sometimes a short preceding spine); D_2 about 88; A about 75; P 17-18; V 8; GR (6-7)+(21-23). Depth 7.5-7.8; head 5.7-5.8.

Attains 100+ cm. Known from a few examples trawled off the Cape; similar species are of commercial importance off South America and New Zealand.

89.3 *Macruronus capensis:* 90 cm (off Algoa Bay).

Genus ***Merluccius*** Rafinesque, 1810

A dozen or more species; 2 in our area. Both our hakes are very important commercial species in the southeast Atlantic Ocean; taken in great quantity by trawl and heavily fished by vessels from many countries, they are subject to international conservation measures. The biology of both species is very similar (Botha, 1969, 1971 & 1973). They undertake regular diurnal vertical migrations to feed near the surface at night and rest near the bottom by day. They spawn during September to January in midwaters over a wide area offshore. Although juveniles feed mainly on pelagic crustaceans and myctophids, adult hake (over 50 cm SL) are primarily piscivorous and feed heavily on their own juveniles (Davies, 1949).

KEY TO SPECIES

1a Vertebrae (23-26)+(24-28) = 49-53; no pigment spots on gill tubercles ..... *M. capensis*
1b Vertebrae (26-28)+(28-30) = 54-58; prominent pigment spots on gill tubercles ..... *M. paradoxus*

89.4 *Merluccius capensis*
Castelnau, 1861
PLATE 10

Shallow-water hake — Vlakwater-stokvis

Merluccius capensis Castelnau, 1861: 68; Barnard, 1925: 320*; Smith, **SFSA No. 257*;** Botha, 1971*; Inada, 1981: 25,*114. *Merluccius capensis capensis:* Franca, 1960: 28. *Merluccius merluccius capensis:* Franca, 1962: 25.

D_1 10-12; D_2 38-43; A 37-41; P 14-16; GR (3-6)+(11-15) = 15-20. Depth 5.0-6.8; head 3.3-3.7 in SL.

Light brown dorsally, silvery to white ventrally. Reaches

140 cm. Caught from about 10°S along west African coast, over the Agulhas Bank and to Port Elizabeth and East London; possibly to Natal and Valdivia Bank. On the shelf and slope to depths of 400 m.

89.5 *Merluccius paradoxus*
Franca, 1960

Deepwater hake — Diepwater-stokvis

Merluccius capensis paradoxus Franca, 1960: 28 (southwest Africa). *Merluccius merluccius paradoxus:* Franca, 1962: 25. *Merluccius paradoxus:* Botha, 1971*; Inada, 1981: 28,*118.

D_1 10-12; D_2 38-42; A 38-41; P 14-16; GR (4-7)+(13-18) = 18-23. Depth 4.9-6.4; head 3.5-3.8 in SL.

Dark brown dorsally, silvery to white ventrally. Attains 115 cm. Caught from Cape Frio at 18°S (Namibia) to East London. Generally in deeper water (200 - 1 000 m) than *M. capensis*, but the depth distributions of the two overlap. External appearance exactly like *M. capensis*.

Family No. 90: MORIDAE

by D.M. Cohen

Deepsea cods — **Diepsee-kabeljoue**

Body tapering to a narrow caudal peduncle. Two or 3 dorsal fins; caudal fin separate from dorsal and anal. No fin spines. Scales cycloid. No V-shaped ridge on top of head. First neural spine fused to skull; last vertebra supporting more than 1 hypural bone. Swimbladder attached to rear of skull on each side.

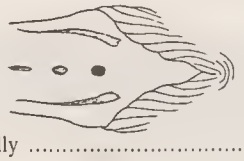
Benthopelagic at depths ranging from outer continental shelf to the abyss. Reaching nearly a metre in length, but mostly smaller; several species fished commercially in New Zealand and Australia. About 15 genera and 55-60 species; 5 genera and 9 species in our area.

KEY TO GENERA

1a Snout pointed, depressed, projecting slightly in front of upper jaw; A margin indented ..... *Antimora*
1b Snout rounded; mouth terminal 2

2a Three dorsal fins; D_2 base shorter than A base ..... *Tripterophycis*
2b Two dorsal fins; D_2 base longer than A base 3

3a Light organ a small, dark, scaleless patch on belly ..... *Physiculus*



3a

3b No light organ on belly 4

4a Two long rays in each V; several small basal rays also present in V of some species ..... *Laemonema*
4b V not as above ..... *Lepidion*

Genus *Antimora* Günther, 1878

Six nominal species, of which only 2 are valid; 1 in our area. Recently reviewed by Small (1981).

90.1 *Antimora rostrata*
Günther, 1878

Haloporphyrus (Antimora) rostratus Günther, 1878: 18 (between Cape of Good Hope and Kerguelen, and east of Rio Plata mouth). *Antimora australis* Barnard, 1925: 499 (off Cape Point); Smith, **SFSA No. 253.** *Antimora rostrata:* Iwamoto, 1975: 7* (in part); Small, 1981: 347*.

D_2 50-56, first ray prolonged; A 37-44, deeply divided and appearing as 2 fins; V 6; gill filaments on first arch 78-90. Chin barbel present. Small teeth on jaws and vomer.

Colour variable, blue-grey to blackish. Reaches 75 cm or larger. Benthopelagic on continental slope and upper rise to depths of 3 000 m or more. Locally abundant. Found in most oceans, but replaced by *A. microlepis* in the North Pacific (Small, 1981).

90.1 *Antimora rostrata:* 34.5 cm male (after Small, 1981).

Genus *Laemonema* Günther, 1862

A dozen or more species; 3 species in our area. *Laemonemodes*, proposed for *L. compressicauda*, is here considered a junior synonym of *Laemonema*.

KEY TO SPECIES

1a D_2 46; A 46 ..... *L. compressicauda*
1b D_2 62-72; A 60-70 2

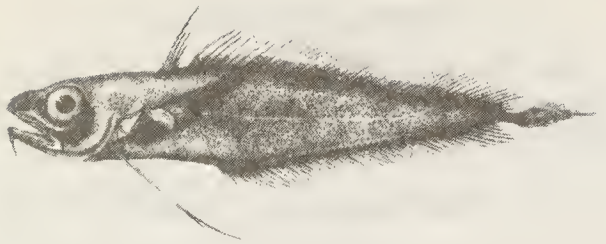
2a Chin barbel present; GR (7-8)+(17-19) ..... *L. laureysi*
2b Chin barbel absent or very small; GR (9-12)+(24-26) ..... *L. globiceps*

90.2 *Laemonema compressicauda*
(Gilchrist, 1904)

Laemonemodes compressicauda Gilchrist, 1904: 208, Pl. 16 (off Bashee River in 300 - 400 fms); Barnard, 1925: 328*; Smith, **SFSA No. 258*.**

D_2 46; first ray of D_1 scarcely if at all longer than anterior rays of D_2; A 46; chin barbel prominent. Small patch of teeth present on vomer.

Known only from 2 small specimens off Transkei coast.



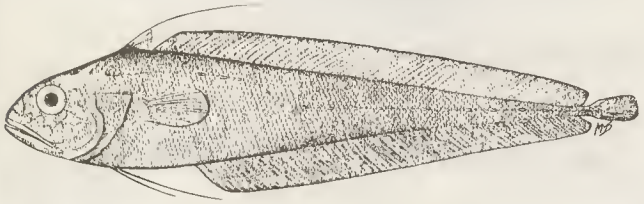
90.2 *Laemonema compressicauda:* length not stated (off East London; after Gilchrist, 1904).

90.3 *Laemonema globiceps* Gilchrist, 1906

Laemonema globiceps Gilchrist, 1906: 157, Pl. 43 (off Cape Point); Barnard, 1925: 327; Smith, **SFSA No. 254*.**

D_2 62-72, 1st ray of D_1 elongated; A 61-70; P 17-19; GR (9-12)+(24-26). Head 4.2-4.5, somewhat inflated. Vomer with few teeth or none at all.

Reaches about 18 cm. Benthopelagic on continental slope off southwestern Cape coast. Several specimens in South African Museum.



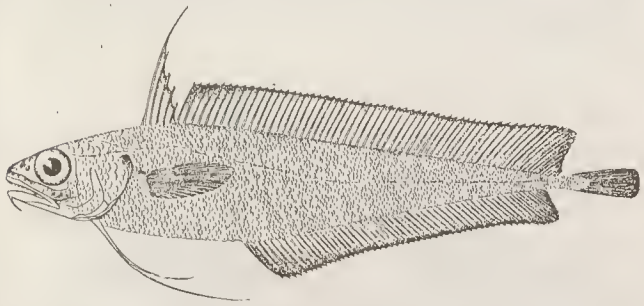
90.3 *Laemonema globiceps:* ca. 15 cm (off Cape of Good Hope).

90.4 *Laemonema laureysi* Poll, 1953

Laemonema laureysi Poll, 1953: 197, Fig. 84 (off Angola); Karrer, 1973: 220; Lloris, 1982: 9.

D_2 65-68; 2nd ray of D_1 elongated; A 60-66; P 20; GR (7- 8)+(17-19). Head 3.8-4.4 in SL. Vomer with a small patch of teeth.

Attains 30 cm. Known only in the eastern Atlantic from Guinea to Namibia.



90.4 *Laemonema laureysi:* 26 cm holotype (after Poll, 1953).

Genus ***Lepidion*** Swainson, 1839

A small round patch of teeth on vomer. About a dozen species; 2 endemic species in our area. Norman (1935) gives a key to some of the species.

KEY TO SPECIES

1a Chin barbel shorter than eye; scale rows between D_1 and LL 14-17; lower GR 9-10 ..... *L. capensis*
1b Chin barbel equal to or longer than eye; scale rows between D_1 and LL 12; lower GR 15 ..... *L. natalensis*

90.5 *Lepidion capensis* Gilchrist, 1922

Lepidion capensis Gilchrist, 1922: 61 (off the Cape and East London); Norman, 1935: 51. *Lepidion capense:* Barnard, 1925: 324*. *Haloporphyrus capensis:* Smith, **SFSA No. 255.**

D (5-6)+(53-55); A 46-48; P 20-22; V 7; GR x+9-10. Eye 2.5-3.0 in head. Scales present on branchiostegal membranes.

Greyish. Attains 50 cm. Benthopelagic on continental slope; locally abundant. Cape to East London.

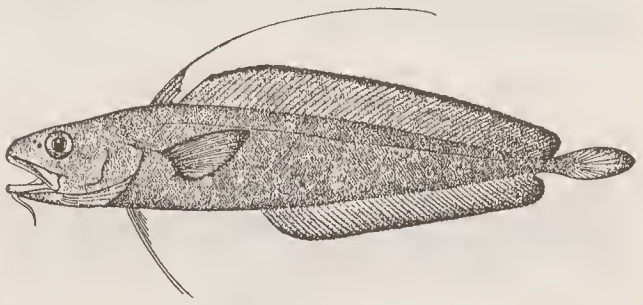
90.5 *Lepidion capensis:* length not stated (redrawn after Barnard, 1925).

90.6 *Lepidion natalensis* Gilchrist, 1922

Lepidion natalensis Gilchrist, 1922: 62 (Natal coast); Barnard, 1925: 324; Norman, 1935: 50*; Winterbottom, 1974: 3. *Haloporphyrus natalensis:* Smith, **SFSA No. 256*.**

D (5-6)+(54-59); A 49-52; P 22-23; V 7; GR 5+15. Eye 4.2-5.4 in head. Scales apparently absent on branchiostegal membranes.

Body grey-pink; vertical fins dark. Attains 41 cm. Benthopelagic on continental slope off Natal. Rather rare in collections.



90.6 *Lepidion natalensis:* ca. 25 cm (off Natal).

Genus ***Physiculus*** Kaup, 1858

No teeth on vomer. About 20 named species; 2 endemic species in our area.

KEY TO SPECIES

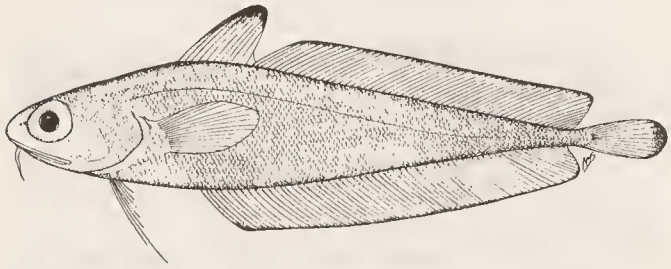
1a Upper jaw teeth in rows, outer teeth somewhat larger; D_1 10-11; D_2 53-55 ..... *P. capensis*
1b Upper jaw teeth closely spaced, evenly sized; D_1 8-9; D_2 62-68 ..... *P. natalensis*

90.7 *Physiculus capensis*
Gilchrist, 1922

Physiculus capensis Gilchrist, 1922: 62 (Cape); Barnard, 1925: 326; Smith, **SFSA No. 260***; Winterbottom, 1974: 6; Brownell, 1979: 8.

D (10-11)+(53-55); A 61-62; P 25-26; V 7; GR (2-3)+10; vertebrae 49-50. Ventral light organ about midway between V and A.

Body grey, belly darker. D_1 tip dark; D_2 and A with dark margin. Attains 18 cm. Benthopelagic over continental shelf and upper slope. Known only from the Cape Peninsula to East London; common.



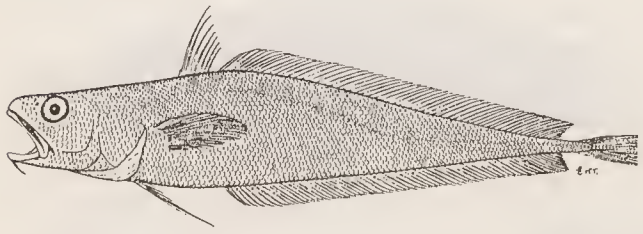
90.7 *Physiculus capensis:* 18 cm (off Cape south coast).

90.8 *Physiculus natalensis*
Gilchrist, 1922

Physiculus natalensis Gilchrist, 1922: 63 (Natal); Barnard, 1925: 327; Smith, **SFSA No. 259;** Winterbottom, 1974: 6.

D (8-9)+(62-68); A 65-70; P 23-24; V 7; GR 4+11; vertebrae 53-54. Ventral light organ close to V.

Body generally iridescent. Attains 24 cm. Benthopelagic on upper slope off Natal; rare.



90.8 *Physiculus natalensis:* 25 cm syntype (off Natal).

Genus ***Tripterophycis*** Boulenger, 1902

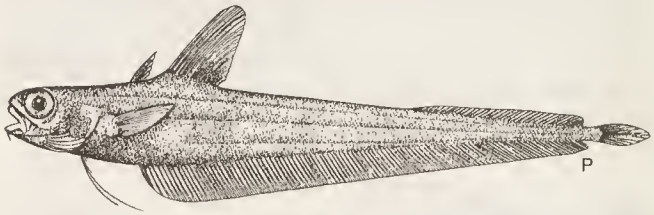
Jaws with a series of close-set incisors. Two species; *T. intermedia* Whitley, 1948 is known from the eastern Indian Ocean, Australia and New Zealand.

90.9 *Tripterophycis gilchristi*
Boulenger, 1902

Tripterophycis gilchristi Boulenger, 1902: 335* (off the Cape); Barnard, 1925: 329; Smith, **SFSA No. 250***; Pfaff, 1953: 147.

D (4-5)+(12-14)+(36-39); A 103-110; V 5. Snout rounded, shorter than eye. Chin barbel present. No teeth on vomer. Light organ immediately before anus.

Body pale; belly dusky. Attains 20 cm. Known only from upper slope region off the Cape and Durban; rare.



90.9 *Tripterophycis gilchristi:* 18 cm (off Cape Point).

Family No. 91: MELANONIDAE

by D.M. Cohen

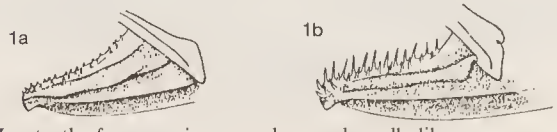
Melanonids **Melanoniede**

Body slender to deep anteriorly, tapering to a narrow caudal peduncle and small tail. A long, continuous dorsal fin (sometimes appearing as two); anal fin also very long. No fin spines. Pectoral fins midlateral; ventral fins beneath pectorals. Scales small, cycloid. Head with numerous small, dark, parallel fleshy ridges. No V-shaped crest on top of head. Last vertebra supporting 2 or more hypural bones. Swimbladder not attached to rear of skull.

Mesopelagic to bathypelagic. Found in oceanic waters around the world, but nowhere very common. A single genus, *Melanonus* Günther, 1878; *Melanosoma* Gilchrist, 1904 is a junior synonym. Both of the 2 valid species have been caught in our area.

KEY TO SPECIES

1a Jaw teeth uniformly short; P 11-13 ..... *M. gracilis*



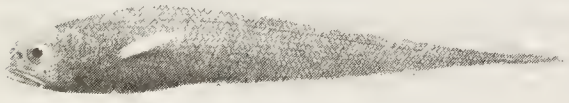
1b Jaw teeth of uneven size, some long and needle-like; P 14-16 ..... *M. zugmayeri*

91.1 *Melanonus gracilis*
Günther, 1878

Melanonus gracilis Günther, 1878: 19 (Antarctic, "Challenger" stn. 156); Norman, 1930: 340; Smith, **SFSA No. 261***; Hulley, 1972: 228. *Melanosoma acutecaudatum* Gilchrist, 1904: 104 (off Cape Peninsula).

D 67-72; A 52-54; P 11-13. Deepest part of body in larger specimens usually posterior to D origin.

Colour pale to dark brown. Reaches about 20 cm. Circumantarctic, generally south of Subtropical Convergence.



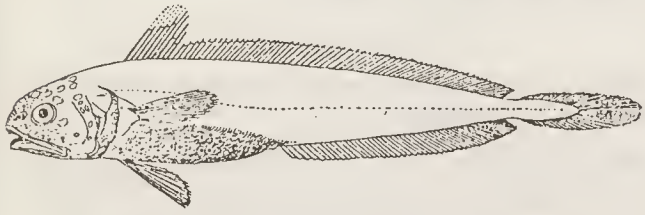
91.1 *Melanonus gracilis:* 15 cm (after Günther, 1887).

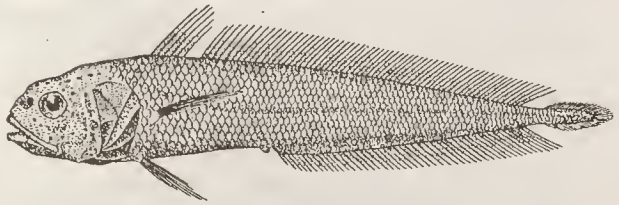
91.2 *Melanonus zugmayeri*
Norman, 1930

Melanonus zugmayeri Norman, 1930: 341, Fig. 35 (off Angola).

D 67-80; A 52-61; P 14-16. Anterior D rays elevated, appearing as a separate fin in some specimens. Deepest part of body in larger specimens at D origin.

Colour pale to dark brown. Reaches about 27 cm. All 3 major oceans, generally north of Subtropical Convergence, but sometimes farther south. Rare in our area (2 specimens, SAM 23574, 23361).





91.2 *Melanonus zugmayeri:* top: 23.5 and 26 cm SL composite (after Maul, 1952), bottom: 11 cm holotype (after Norman, 1930).

Family No. 92: BREGMACEROTIDAE

by M.M. Smith

Codlets **Kodlette**

Small, pelagic, plankton-eating fishes of tropical and subtropical seas. Body elongate; mouth terminal. A single, elongate dorsal fin ray on head, well separated from rest of fin; central portion of dorsal fin with very short rays; anal fin similar to dorsal fin; pelvic fins jugular, of 5-7 rays, inner 3-4 short, bifurcated, outer 3 rays free, very long, unbranched, thickened on each side and probably used as tactile organs, also fitting into grooves along middle of abdomen and each side of the anal fin; caudal fin free. Upper half of eye covered by transparent membrane. Pseudobranchia absent; 7 branchiostegal rays. Scales cycloid, thin and caducous; lateral line a large tube on each side of dorsal midline. Jaws with 1 or 2 series of minute, slender, movable teeth; similar teeth on vomer; palatines edentate. Gill membranes narrowly united below throat, free from isthmus. Vertebrae 43-59; first neural spine connected to supraoccipital. Swimbladder not joined to skull. A world revision by d'Ancona and Cavinato (1965); Houde (1984) discusses larval development and relationships. One genus, *Bregmaceros* Thompson, 1840, with about 7 valid species. Three species have been recorded from our Indian Ocean waters and the following is mostly compiled from the literature cited. Counts of the transverse scale series were made below the front part of the dorsal fin.

KEY TO SPECIES

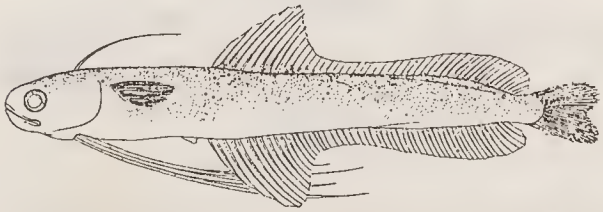
1a D 57-65; A 58-68 (usually more than 61 rays) ..... *B. macclellandii*
1b D 42-56; A 43-58 (usually less than 55 rays) 2

2a 11-13 scales in a transverse series; body depth 7.0-9.0 in SL; 2nd D 47-56 (usually 50-54); A 49-60 (usually 52-55); vertebrae 49-57 ..... *B. atlanticus*
2b 15-17 scales in a transverse series; body depth 6.0-7.3 in SL; D 42-55 (usually 47-50); A 42-55 (usually 50-52); vertebrae 47-52 ..... *B. nectabanus*

92.1 *Bregmaceros atlanticus*
Goode & Bean, 1886

Bregmaceros atlanticus Goode & Bean, 1886: 153 (Grenada, Caribbean); 1896: 388, Fig. 333; d'Ancona & Cavinato, 1965: 51*; Kotthaus, 1969: 40*; Belyanina, 1974: 32*.

D 1+47-56; A 49-60; P 16-22; vertebrae 49-57; LS 62-75; TS 11-13.



92.1 *Bregmaceros atlanticus:* 5.5 cm (after d'Ancona & Cavinato, 1965).

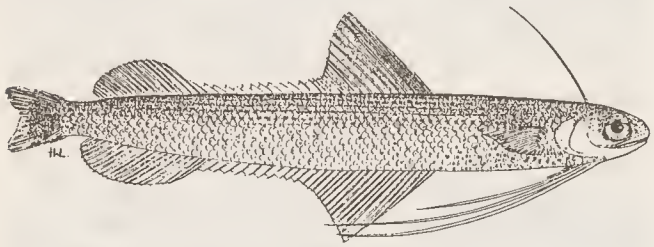
Brownish above, silvery below. Attains 6.7 cm. A circumtropical, oceanic species found in our area from off the south Cape and Natal coasts to the Mozambique Channel.

92.2 *Bregmaceros macclellandii*
Thompson, 1840

Bregmaceros macclellandii Thompson, 1840: 184, Fig. (Ganges Delta); Smith, **SFSA No. 251*;** Grindley & Penrith, 1965: 283; d'Ancona & Cavinato, 1965: 66*; Kotthaus, 1969: 45* Hulley, 1972: 228; Belyanina, 1974: 45*.

D 1+56-65; A 58-69; P 17-24; vertebrae 52-58; LS 70-90; TS 13-15; body depth 6.5-9.2; D origin opposite A origin.

Brownish above with speckling, silvery below; cheek and lower head silver. Attains 9.6 cm. Circumtropical, but not known from eastern Pacific; in our area from the Cape eastwards, frequently thrown up sometimes still alive on beaches of the southeast Cape coast, especially after stormy weather.



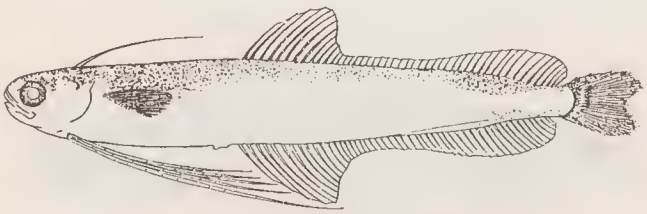
92.2 *Bregmaceros maclellandii:* 5 cm (Knysna).

92.3 *Bregmaceros nectabanus*
Whitley, 1941

Bregmaceros nectabanus Whitley, 1941: 25, Fig. 18 (Darwin, Australia); d'Ancona & Cavinato, 1965: 47*; Kotthaus, 1969: 39*; Belyanina, 1974: 14*.

D 1+41-55; A 42-55; P 15-20; vertebrae 47-52; LS 65-75; TS 15-18.

"Yellowish-white with a brownish stripe along each side of back; no dark markings on fins" (Whitley, 1941). Attains 7.6 cm. Typical neritic species known from the tropical E. Atlantic and Indo-West Pacific from the Cape eastwards.



92.3 *Bregmaceros nectabanus:* 7.5 cm (after d'Ancona & Cavinato, 1965).

Family No. 93: MACROURIDAE

by T. Iwamoto

Grenadiers **Grenadiere**

Head rather large; trunk short; tail long, strap-like, tapering to a fine point. No caudal fin (except a rudiment in *Trachyrincus* and a false caudal in individuals with a regenerated tail tip). Two dorsals (except one in Macrouroidinae, treated as a family by some); first dorsal short, high, with rudimentary spinous first ray and an elongate spinous second ray (not spinous in Trachyrincinae and Macrouroidinae), followed by 7-14 segmented rays; second dorsal long, 80 or more rays, continuous to end of tail. Anal fin long, continuous to end of tail. Pelvics thoracic (absent in *Macrouroides*) to almost jugular, 5-18 rays, outer ray often prolonged. Pectorals about mid-height on trunk. Snout often protruding, stout and armed with spiny scutes in many species; mouth terminal, subterminal or inferior. Eyes usually large, 2-5 in head length; "eye" diameter = horizontal diameter of bony orbit. Teeth on upper and lower jaws; none on palate. Scales with spinules in most species. Branchiostegals 6-7 (8 in occasional individuals).

More than 250 species in all oceans in 100 m to more than 5 000 m. Almost all benthopelagic, but a few bathypelagic. Most species attain 25-40 cm, a few about 100 cm, and one North Pacific species more than 143 cm. Often in considerable numbers, but usually not of commercial significance except as by-catch; two large North Atlantic species regularly exploited. One or two species in our area with commercial potential. Family most recently revised by Marshall (1973) and Okamura (1970a, 1970b). Several species in southern Africa undescribed at the time of this writing; 32 species recognised here, and others likely to be found when this area is adequately sampled.

KEY TO GENERA

(Genera not yet recorded from our area but which may be found here are enclosed in square brackets.)

1a One continuous D, anterior portion not elevated; no V ..... [*Macrouroides*]
1b Two dorsal fins, the first elevated; V with 6-17 rays 2

2a Second D usually much better developed than A, and starting immediately behind 1st D; outer gill arch free from gill cover; GR on 1st arch slender, not tubercular; branchiostegal rays 7 3
2b Anal fin usually better developed than second D, which is separated from 1st D by a distinct gap; outer gill arch restricted by folds of skin connecting uppermost and lowermost arms to gill cover; GR tubercular; branchiostegal rays 6 or 7 5

3a Snout long, pointed, covered with stout spinous scales; mouth inferior; body scales spinous; a distinct row of keeled, scute-like scales below D and another row above A; post-temporal fossa present ..... *Trachyrincus*

3b Snout rounded, not projecting beyond large terminal mouth; all scales thin, without spinules; no post-temporal fossa 4

4a Elongated rays in D, P and V; 4 retia mirabilia in swimbladder; V 8 ..... *Gadomus*
4b No greatly elongated rays in D and P; 2 retia mirabilia; V 8-10 ..... *Bathygadus*

5a Second spinous ray of 1st D smooth 6
5b Leading edge of 2nd spinous ray serrate 11

6a Teeth large, widely spaced and in 1 row in lower jaw 7
6b Teeth moderate to small, in 2 or more rows in lower jaw 8

7a Chin barbel absent; branchiostegal rays 6 ..... [*Odontomacrurus*]
7b Chin barbel well developed; branchiostegal rays 7 ..... *Malacocephalus*

8a Fine parallel black lines (ventral striae) on gular membrane, sides of isthmus, over shoulder girdle and in a triangular patch above V; head covering membranous, essentially transparent; head bones thin, fragile; V 8-12 ..... *Hymenocephalus* (subgenus [*Hymenocephalus*])
8b No ventral striae; membranes and bones of head relatively thick; V 7 9

9a Snout rounded; no strong ridges on head; colour black ..... *Trachonurus*
9b Snout moderately to acutely pointed; strong ridges on head; colour usually brown to grey, some species with silvery reflections ventrally 10

10a Mouth large, upper jaw more than ⅓ length of head ..... *Mahia*
10b Upper jaw ⅓ or less of head ..... *Coelorinchus*

11a Chin barbel absent ..... *Mesobius*
11b Chin barbel present 12

12a Fine parallel black lines (ventral striae) on gular membrane, shoulder girdle, isthmus and in triangular patch above V; anus immediately before A; 2 lens-like swellings of light organ on ventral midline, 1 immediately before anus connected by a black line to another on chest ..... *Hymenocephalus* (subgenus [*Hymenogadus*])
12b No ventral striae; anus position variously before A; light organ present or absent; if present, not as above 13

13a Head massive, globose, soft; opercle small; preopercle adnate to interopercle; scales uniformly cover all of head; scales along either side of 2nd D enlarged; 7 branchiostegal rays ..... [*Cetonurus*]
13b Head not especially massive or globose; opercle of normal size; preopercle not strongly adnate to interopercle; scales variously covering head, often with broad naked areas ventrally and on snout; no enlarged scales along 2nd D; 6 or 7 branchiostegal rays 14

14a Snout low, narrow, rounded, devoid of scales; no ridges on head; scales on head and front part of body without spinules or ridges; maxilla reaches vertical at front margin of eye ..... [*Haplomacrurus*]
14b Snout angular, completely naked to variously covered with scales; ridges usually present on head, often sharp and coarsely scaled; head and body scales covered with spinules or low ridges; maxilla extends past front margin of eye except in some *Sphagemacrurus* and *Ventrifossa* (subgenus *Lucigadus*), both of which have scales on snout 15

15a Ventral region of body swung far forward; gill membranes unite below eyes; V below opercle 16
15b Ventral region of body more normal; gill membranes unite under interopercle; V below opercle or P 19

16a All of high, broadly rounded snout and ventral surfaces of head naked; V 10 ..... [*Parakumba*]
16b Snout completely scaled to mostly naked ventrally but always with scales dorsally; ventral surfaces of head scaled to mostly naked; V 6-7 or 11-18 17

17a V 6-7 ..... *Paracetonurus*
17b V 11-18 18

18a Ventral surfaces of snout naked; a stout tubercular scale at tip and lateral angles of snout; V 11-13 ..... *Sphagemacrurus*
18b Ventral surfaces of snout scaled; tip and lateral angles of snout rounded, with no stout tubercular scales; V 15-18 ..... *Ventrifossa* (subgenus *Lucigadus*)

19a Anus immediately before A, no associated light organ; 6 branchiostegal rays 20
19b Anus remote from A, closer to V origin; light organ present in front of anus; 7 branchiostegal rays 21

20a Vertical and horizontal ridges of preopercle meet at an acute, sharply pointed angle; no rakers on lateral (outer) side of 1st gill arch; median spinule row on body scales forming an enlarged keel-like ridge ..... *Macrourus*
20b Preopercular ridges form a rounded, usually lobate angle; small tubercular rakers present on lateral side of 1st gill arch; median spinule rows on body scales not keel-like, not notably larger than adjacent spinule rows ..... *Coryphaenoides*

21a Stout suborbital shelf formed of 2 rows of coarsely spined scales; snout variously naked; total GR 12 or fewer (except *N. micronychodon* with 13-16) ..... *Nezumia*
21b Head completely and smoothly covered with small, finely spinulated scales; total GR 13-17 ..... *Ventrifossa*

Genus ***Bathygadus*** Günther, 1878

About 14 species, 3 in our area.

KEY TO SPECIES

1a V 9 2
1b V 8 ..... *B. melanobranchus*

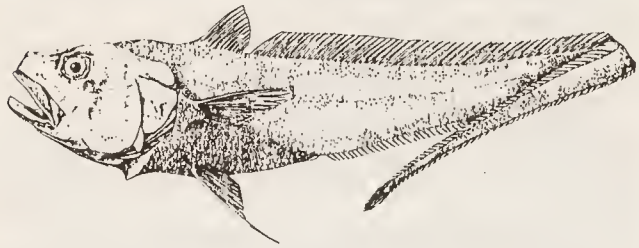
2a P 13-14; 1st D II,6-8; pyloric caeca 9-12 ..... *Bathygadus* sp.
2b P 15-18; 1st D II,7-9; pyloric caeca 16-27 ..... *B. favosus*

93.1 *Bathygadus favosus*
Goode & Bean, 1886

Bathygadus favosus Goode & Bean, 1886: 160 (Caribbean Sea); Goode & Bean, 1896: 420*; Iwamoto, 1970: 344*; Marshall, 1973: 526.

D II,7-9 + ca. 125; A ca. 130; P 15-18; V 9; GR (5-7)+(19-22) total 22-28; pyloric caeca 16-27. Upper jaw 1.6-1.9 in head, extends to below rear edge of eye. Eye 4.2-5.2 in head, about ½ interorbital width. Teeth minute in moderate bands in upper jaw, in narrow bands in lower. Outer GR of 1st arch about equal to eye.

Colour blackish. Size probably more than 30 cm. Off Cape Town, probably continuous with populations in Gulf of Guinea and northern Atlantic; 900 - 1 500 m.



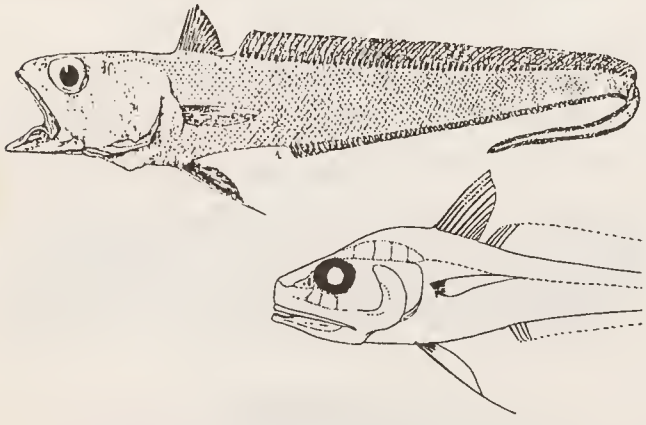
93.1 *Bathygadus favosus:* 30 cm.

93.2 *Bathygadus melanobranchus* Vaillant, 1888

Bathygadus melanobranchus Vaillant, 1888: 206, Pl. 18, Fig. 1 (north-eastern Atlantic); Gilchrist & von Bonde, 1924: 12; Barnard, 1925: 334; Smith, **SFSA No. 249;** Iwamoto, 1970: 336*; Marshall, 1973: 527*.

D II,9-11 + ?; P 16-20; V 8; GR (6-7)+(21-24); pyloric caeca 25-40. Upper jaw extends to below rear edge of eye, about 1.7-2.0 in head. Eye about 3.2-4.0 in head, about equal to interorbital space. Teeth minute, in broad bands in upper jaw, in narrow bands on lower. GR about 1.5 in eye.

Overall flesh-coloured; blackish over operculum, gills, suborbital; fins dusky. Attains 40 cm. Table Bay and Natal coast, 940 - 2 560 m. Also in western North Atlantic and eastern Atlantic south of Irish coast. Specimens reported by Gilchrist & von Bonde (1924) — and on which Barnard (1925) and Smith (1949) based their southern African records of the species — are not in the J.L.B. Smith Institute or the South African Museum. The southern African records are therefore not verified.



93.2 *Bathygadus melanobranchus:* head of 38+ cm SL (after Marshall & Cohen, 1973) and whole fish, ca. 35 cm (compiled).

93.3 *Bathygadus* sp. (cf. *favosus* Goode & Bean)

?Bathygadus furvescens literature from South Africa?

D II,6-8 + ca. 95; A ca. 90; P 13-14; V 9; GR (5-7)+(19-21) total 24-28; pyloric caeca 9-12. Upper jaw extends past eye, about 1.7 in head. Eye small, about 5 in head; about ½ interorbital width. Teeth small, in bands 6-8 teeth wide at widest part in upper jaw and 3-4 teeth wide in lower jaw. Outer GR about ½ interorbital width. This species may have been reported erroneously from southern Africa as *B. melanobranchus* Vaillant, 1888, or *B. furvescens* Alcock, 1894, but both those species have 8 V rays (as opposed to 9) and 20 or more pyloric caeca (compared with 9-12). The count of V 8 reported in the original description of *B. furvescens* distinguishes the species from specimens reported under that name by Gilbert & Hubbs (1920: 388). The species is most similar to *B. favosus* Goode & Bean, 1886, from the Atlantic, but differs in counts of pyloric caeca (9-12 compared with 16-27 in *B. favosus*), 1st D rays (II,6-8 vs. II,7-9), and P rays (13-14 vs. 15-18).

Overall colour blackish (with integument intact); body apparently paler in juveniles. Probably attains more than 30 cm. Mozambique and Agulhas Bank, 1 280 - 1 600 m (CAS 50157; 50895).

Genus ***Coelorinchus*** Giorna, 1809

More than 70 species, at least 7 in our area. The genus is in need of revision.

KEY TO SPECIES

1a Underside of head naked 2
1b Underside of head scaled 4

2a Snout blunt, short; eyes huge, diameter much greater than snout length ..... *C. fasciatus*
2b Snout acutely pointed, long; eye diameter less than snout length 3

3a Barbel more than ½ eye diameter; tooth band of upper jaw about as long as that of lower and extends to mouth angle; tips of V black; no bands on body ..... *C. denticulatus*
3b Barbel about ⅓ eye diameter; tooth band of upper jaw much shorter than that of lower, ending well short of mouth angle; V not black tipped; saddle-like diagonal bands on body ..... *C.* species
(Tanzania; not known from southern Africa, but may occur here)

4a Snout viewed from above blunt; eye diameter greater than snout length; prominent scaleless fossa on chest ..... *C. coelorhincus polli*
4b Snout viewed from above sharply pointed; eye diameter less than snout length; no scaleless fossa on chest 5

5a Upper jaw tooth band as long as that of lower jaw; 2nd spinous ray of 1st D shorter than postorbital length of head; barbel 2.5 or less in eye; pyloric caeca 40-53 ..... *C. flabellispinis*
5b Upper jaw tooth band much shorter than that of lower jaw; 2nd spinous ray of 1st D filamentous, longer than postorbital length of head; barbel more than 3 in eye; pyloric caeca 8-11 6

6a Interorbital 1.2 in orbit; scales below middle of 1st D 5½-7; lateral-line scales over distance equal to predorsal length about 40 ..... *C. acanthiger*
6b Interorbital about 1.5 in orbit; scales below middle of 1st D 4-4½; lateral-line scales over distance equal to predorsal length about 30 ..... *C. braueri*

93.4 *Coelorinchus acanthiger*
Barnard, 1925

Coelorhynchus acanthiger Barnard, 1925: 502 (Cape Point, 460 fms); 1925: 343; Smith, **SFSA No. 233;** Marshall & Iwamoto, *in* Marshall, 1973: 539. *Coelorinchus pseudoparallelus* Trunov, 1983: 895 (Namibia, Walvis Ridge, Discovery Tablemount, 800 - 1 080 m).

D II,7-8 + ca. 85+; A ca. 90; P 18; V 7; GR 1+(5-6); pyloric caeca 11; scales below second dorsal 6½. Snout conical, produced, dorsal and lateral profiles straight to convex, not concave; length nearly 2.5 in head. Interorbital about 1.0-1.2 in orbit, which goes 1.6-2.0 in snout and 3.5-4.8 in head. Barbel 11-14 into head, 3.5-4 into orbit. Teeth in broad, short villiform bands in premaxillary, narrow long bands in dentary. Subopercle with a pointed flap. Second ray of 1st D 2 in head. Interspace between dorsals 1.2-1.8 length of 1st D base. Scales with strong keel-like middle row of spinules flanked on each side by 1 or 2 subparallel rows of smaller spinules; spinules broad based.

Smith (**SFSA No. 233**) considered the species to be of douhtful validity, and Marshall & Iwamoto (*in* Marshall, 1973) synonymised it with *C. parallelus*, but examination of a syntype (SAM 12632, ca. 40 cm TL, here designated as lectotype) showed the distinctness of the species. Trunov (1983) ably distinguished the species (as *C. pseudoparallelus*) from *C. braueri* and *C. parallelus*, but did not realise that the name *C. acanthiger* applied to his new species.

Attains 40 cm. Off Namibia to Cape Point, and over Walvis Ridge and Discovery Tablemount.

93.4 *Coelorinchus acanthiger:* 40 cm lectotype (off Cape Point).

93.5 *Coelorinchus braueri*
Barnard, 1925

Coelorhynchus (Oxygadus) braueri Barnard, 1925: 501 (Saldanha and Table Bay, Cape Point, East London); 1925: 342*; Smith, 1968: 6. *Macrurus parallelus* (*non* Günther): Gilchrist, 1904: 137; Brauer, 1906: 257. *Coelorhynchus parallelus* (*non* Günther): Smith, **SFSA No. 232***. *Coelorinchus braueri:* Karrer, 1973: 219.

D II,7-9 + ca. 105; A 105; P 18-20; V 7; GR (1-2)+(5-7) total 7-9; 4½-5½ scales below 2nd D origin. Snout 2.2-2.5 in HL. Spinules on body scales shaped like recurved, overlapping blades; blades increase in height posteriorly and form as many as 5-8 ridge-like rows. Spinule rows basically parallel, the median row enlarged, those immediately adjacent on either side of median row very short and not reaching middle of exposed field. Light organ shorter than rear nostril. Interspace between dorsal fins about equal to 1st D base.

93.5 *Coelorinchus braueri:* 29 cm (off South Africa).

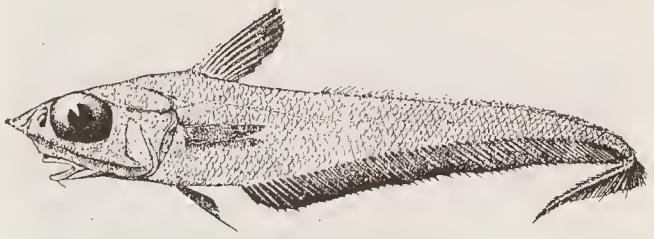
Body uniformly brownish except bluish over abdomen. Lining of mouth, abdominal cavity and gill cavity uniformly slate to black. Attains 40 cm. Common south of Angola and north to Mozambique.

93.6 *Coelorinchus coelorhincus polli*
Marshall & Iwamoto, 1973

Coelorhynchus coelorhynchus polli Marshall & Iwamoto, *in* Marshall, 1973: 562, Fig. 11e, 178 (off Kunene R., Angola); Karrer, 1975: 72. *Coelorhynchus coelorhynchus:* Poll, 1953: 231*.

D II,8-9 + ca. 80; A ca. 90; P 18-20; V 7; GR (1-2)+(7-9) total 9-10. Snout short; terminal scute a blunt trefoil. Spinules of body scales short, conical, arranged in somewhat parallel longitudinal rows midlaterally on exposed field, more quincunx in arrangement above and below. Tooth band of upper jaw falls short of angle of mouth.

Mouth cavity mostly pale; gullet dusky, gill and abdominal cavities blackish. A large dermal window (black scaleless fossa of light organ) on chest in front of V bases. Attains 30 cm. Angola and Namibia in 229 - 360 m.



93.6 *Coelorinchus coelorinchus polli:* 21.5 cm holotype (off Angola; after Marshall & Iwamoto, 1973).

93.7 *Coelorinchus denticulatus*
Regan, 1921

Coelorhynchus denticulatus Regan, 1921: 415 (Natal); Smith, **SFSA No. 234***. *Coelorhynchus (Paramacrurus) natalensis* Fowler, 1925: 198, Fig. 3 (Natal). *Coelorhynchus argentatus* (*non* Smith & Radcliffe): Barnard, 1925: 339; Smith, **SFSA No. 235.**

D II,8-9 + ca. 100; A ca. 100; P 15-16; V 7; GR (1-2)+(6-8) total 8-9; 4-5 scales below second D origin; pyloric caeca 10-12. Snout 2.2-2.4 in head. Posteroventral angle of suboperculum acute but not prolonged into long narrow flap. Light organ a dark streak extending forward from anus to chest, streak broadened at either end but anterior fossa not broadly naked. Tanzanian specimens prominently marked with black on midlateral stripe of 1st D, base of 1st D, tip and base of V, region around anus, tip of snout, nasal bone (as seen through thin snout covering), anterior face of premaxilla, tip and edges of mandible, and dorsal portion of branchiostegals. Specimens from other areas have less pronounced markings. Spinules on body scales slender, conical, recurved, in irregular subparallel

rows to somewhat quincunx pattern. Scales on anterolateral snout margin overlap broadly onto ventral surface. Nasal fossa broadly naked. Teeth uniformly small, conical, in bands, the upper jaw bands broader, both upper and lower bands extend to end of mouth opening.

Lining of mouth and gill cavities irregularly punctate, punctations heaviest along outer gill cavity margin. Attains 27 cm. Natal coast to Tanzania.

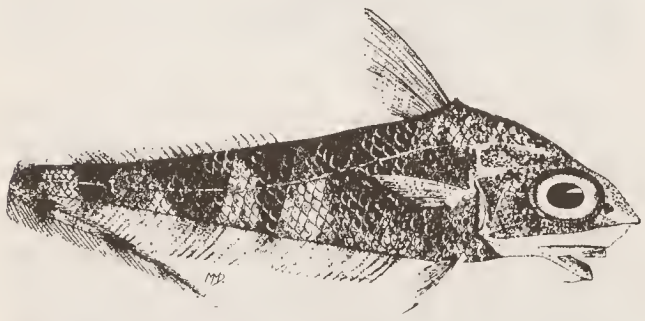
93.7 *Coelorinchus denticulatus:* 23 cm (off Mozambique).

93.8 *Coelorinchus fasciatus*
(Günther, 1878)

Macrurus fasciatus Günther, 1878: 24 (southern tip South America). *Coelorhynchus fasciatus:* Smith, **SFSA No. 236*;** Poll, 1953: 228*. *Coelorinchus fasciatus:* Iwamoto, 1978: 322*.

D II-9-11 + ca. 110; A ca. 90; P 18-19; V 7; GR (1-2)+(7-8); 3½-4 scale rows below 2nd D; pyloric caeca ca. 20. Snout 3.4-4, eye 2.3-2.5 in head. Posteroventral angle of suboperculum acute but not prolonged into a flap. Scales large, adherent, covered with parallel ridge-like rows of small, reclined, imbricate spinules that give appearance of horizontal striations on exposed fields. As many as 15 rows of spinules on body scales; number increases with size. Teeth uniformly small, none enlarged, in broad bands in both jaws; upper jaw band wider and notably shorter than lower jaw band. Light organ not extending to V bases, covered with scales.

Vertical saddle-like bands on body (indistinct in most preserved specimens). Mouth and gill cavities generally blackish. Attains 50 cm. Abundant off south coast to 550 m (Smith, 1949). Specimens referred to this species from southern Africa may be a different but closely related species.



93.8 *Coelorinchus fasciatus:* 43 cm (off Algoa Bay).

93.9 *Coelorinchus flabellispinis*
(Alcock, 1894)

Macrurus (Coelorhynchus) flabellispinis Alcock, 1894: 123 (Laccadive Sea); Alcock & McGilchrist, 1897-1907: Pl. 16, Figs. 2, 2a; Alcock, 1899: 107. *Coelorhynchus flabellispinis:* Fowler, 1934: 434; Smith, **SFSA No. 231.** *Coelorhynchus japonicus:* Smith, 1964: 292*; 1968: 7.

D II,8-9 + ca. 115; A ca. 115; P 17-19; V 7; GR 2+6; 4½ scales below 2nd D. Snout 2.4-2.6 in head. Spinules on body scales sharp and keel-like, usually in 3-6 radiating rows, median row enlarged. Posteroventral angle of suboperculum produced into a short, narrow flap. Light organ extends past midway between A origin and V insertion. Interspace between dorsal fins subequal to or shorter than 1st D base; anterior rays of 2nd D low, not as well developed as those of A rays. Outer series of upper jaw teeth enlarged.

Body uniformly brownish except bluish over abdomen; no bold markings on body or fins. Mouth and gill cavities mostly dusky, but with extensive pale areas. Attains 47.5 cm (Alcock). Indian Ocean. Specimens from southern Africa differ somewhat from those off India; they may represent a different species. No comparative material from Indian waters was examined.

93.9 *Coelorinchus flabellispinis:* 48 cm (after Alcock, 1895).

Genus ***Coryphaenoides*** Gunnerus, 1765

More than 50 species, at least 4 in our area, but more can be expected.

KEY TO SPECIES

1a Outer V ray and uppermost P ray greatly elongated, each much longer than predorsal length; V 7 ..... *C. subserrulatus*
1b Outer V ray shorter than head; no prolonged P rays; V 8-12 2

2a V 8; lower jaw teeth in a narrow band tapering to 1 row posteriorly ..... *C.* sp. indet.
2b V 10-12; lower jaw teeth in a single series throughout 3

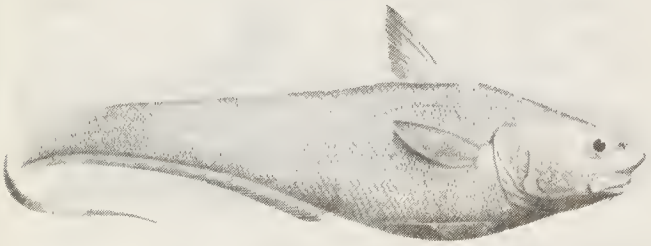
3a Lower surface of snout mostly scaled; upper jaw teeth in a broad band ..... *C. striatura*
3b Lower surface of snout naked; upper jaw teeth in 2 rows ..... *C. armatus*

93.10 *Coryphaenoides (Nematonurus) armatus*
(Hector, 1875)

Macrurus armatus Hector, 1875: 81 (New Zealand). *Coryphaenoides carinatus* (*non* Günther): Barnard, 1925: 336.

D II,8-10 + ca. 100; P 18-22; V 10-12; lateral GR (0-1)+(6-9), medial (1-3)+(10-11); 8-10 scales below 2nd D. Snout more pointed in young. Most ventral surfaces of snout, suborbital and mandibles naked; pores prominent in these areas. Body scales covered with slender, sharp spinules arranged in 3-10 (more in larger individuals) parallel rows, the median row slightly larger than lateral rows. Spinules reduced in specimens more than 10 cm HL. Abdomen long, distance isthmus to A more than head length. Horizontal eye diameter about 4-5 in head length; less than interorbital width, much less than snout length. Barbel less than eye diameter.

Attains at least 87 cm. An abyssal species in all oceans except Arctic; one Atlantic record off South Africa (SAM 23396); predominant depth range 2 000 - 4 000 m.



93.10 *Coryphaenoides armatus:* 22 cm (after Günther, 1887).

93.11 *Coryphaenoides (Coryphaenoides)* sp. indet.

D II,9 + ?; P 19-21; V 8; lateral GR 1+7; medial 1+11; about 6 scales below 2nd D. Snout pointed in young (probably blunt in adults). Most ventral surfaces of snout, suborbital region and mandible naked; pores large and prominent in these areas. Scales with closely set parallel rows of long, needle-like spinules. Distance isthmus to A less than head length. Eye diameter 4 in head; greater than interorbital width; less than snout length. Barbel extends to end of maxillary, about 3 in head.

Description based on 2 specimens (CAS 50151, FSFRL S.865) taken off Mozambique (850 - 960 m) and Algoa Bay (696 m). Probably represents an undescribed species closely related to *Coryphaenoides macrolophus* Alcock, 1889, which differs in its much longer 1st D (nearly twice head length) and shorter barbel (less than ½ eye diameter).

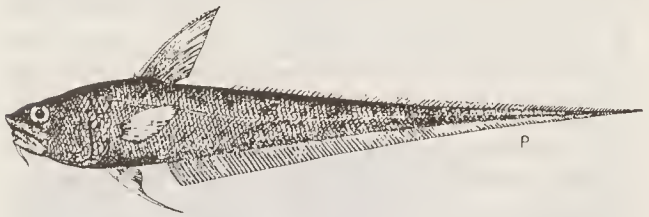
93.11 *Coryphaenoides (Coryphaenoides)* sp. indet.: 13+ cm (off Mozambique).

93.12 *Coryphaenoides (Chalinura) striatura*
Barnard, 1925

Coryphaenoides (Chalinura) striatura Barnard, 1925: 500 (Cape Point); Smith, **SFSA No. 237*.**

D II,9 + ca. 110; A ca. 110; P 21-22; V 12; lateral GR 0+9; medial 1+12; about 6 scales below 1st D. Snout protruding little beyond large mouth. Maxilla extends to below or behind rear edge of eye. Eye diameter less than snout length and interorbital space, about 4.5 into head. Barbel subequal to eye diameter, falling well short of rear margin of gill membranes.

Attains more than 60 cm. Taken only off the Cape in 823 - 1 738 m.



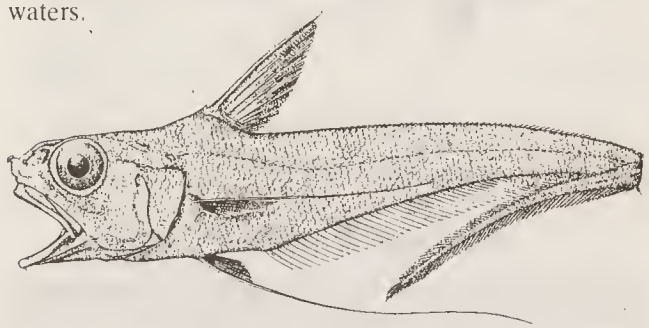
93.12 *Coryphaenoides (Chalinura) striatura:* ca. 23 cm (off (Knysna).

93.13 *Coryphaenoides (Coryphaenoides) subserrulatus*
Makushok, 1976

Coryphaenoides subserrulatus Makushok, 1976: 144 (New Zealand). *Coryphaenoides (Coryphaenoides) quadripennatus* McCann & McKnight, 1980: 41 (New Zealand).

D II,9 + ca. 135; A ca. 140; P 14-17; V 7; lateral GR (1-2)+(9-11), medial 2+(15-17); pyloric caeca 11-12. Snout with enlarged terminal scute directed obliquely upwards. Maxilla extends below rear ⅓ of eye. Barbel rudimentary. Interorbital less than eye diameter. Most of suborbital region and lower jaw scaled. Second P ray and outer V ray extremely elongated.

Attains at least 37 cm. Two specimens from Agulhas Bank (980 m), examined at Far Seas Fisheries Research Laboratory, Shimizu, Japan (FSFRL S.153 & S.679), represent the first record of this species outside New Zealand waters.



93.13 *Coryphaenoides (Coryphaenoides) subserrulatus:* 31 cm.

Genus ***Gadomus*** Regan, 1903

About 11 species, 1 in our area.

93.14 *Gadomus capensis*
(Gilchrist & von Bonde, 1924)

Bathygadus capensis Gilchrist & von Bonde, 1924: 13, Pl. 3, Fig. 2 (Table Bay); Smith, **SFSA No. 248*;** Winterbottom, 1974: 3. *Gadomus*

capensis: Marshall, 1973: 519. *Bathygadus fumosus* Barnard, 1925: 500 (Cape Point); 1925: 333*; Smith, **SFSA No. 247.**

D II,9-10 + ca. 160; A ca. 150; P 16-19; V 8; GR 7+(25- 28); pyloric caeca 18-20. Upper jaw extends beyond eye, about 1.6 in head. Eye diameter subequal to snout, slightly more than interorbital width, about 4 in head. First D, P and V with a prolonged filamentous ray, those of D and P more than twice, that of V about twice, head length. Barbel rudimentary to short, more than 1.6 in eye diameter. Teeth minute, in long narrow bands in both jaws, upper jaw band wider.

Dr P.C. Heemstra examined the holotype of *Bathygadus capensis* (RUSI 36) and found "a very small but distinct, conical barbel 0.9 mm high on the chin" (Heemstra, in litt., 5 Mar. 1981). He also reported no teeth on the palate, contrary to the statement in the original description, "...teeth very minute, villiform, in bands on jaws and palatines; larger teeth on vomer." Dr Heemstra noted that "There are minute, scattered, soft, dermal papillae on the roof of the mouth that might have been mistaken for teeth, but these are certainly not larger than the teeth on the jaws." Thus, no member of the Macrouridae has teeth on the palate. Aside from the rudimentary barbel in the holotype (and hitherto only known specimen) of *G. capensis,* the species agrees completely with *Bathygadus fumosus* Barnard. Barbel length, however, varies considerably in some macrourids. In their description of *Gadomus introniger,* Gilbert & Hubbs (1920: 402) stated that the mental barbel is "of extreme variability, its length ranging from half that of the eye to two-thirds that of the head...; it is probably a healed stub when extremely short." Thus, no tangible difference exists to support continued recognition of *B. fumosus.*

Overall colour pale, flesh-coloured; blackish over gill covers; fins dusky to black. Attains 46 cm. Table Bay to Mozambique, 850 - 1 480 m.

93.14 *Gadomus capensis:* 32+ cm (off Mozambique).

Genus ***Macrourus*** Bloch, 1786

Three species, 1 from our area. Species large; *M. berglax* Lacepède, 1802 of the northern Atlantic fished commercially. The genus has a bipolar distribution.

93.15 *Macrourus holotrachys*
Günther, 1878

Macrurus holotrachys Günther, 1878: 24 (off Uruguay); Günther, 1887: 136*; Marshall, 1973: 582. *Coryphaenoides carinatus* Günther, 1878: 28 (Prince Edward Ids.); Günther, 1887: 137*; Barnard, 1925: 336; Smith, **SFSA No. 238.** *Macrourus whitsoni* Regan, 1913, described from Antarctica, may be another synonym.

D II,9-10 + ca. 110-115; A ca. 110-115; P 19-20; V 8-9; medial GR 2+8, none on lateral side; 5½ scales below 2nd D. Snout slightly shorter than eye, which is 2.5-2.7 in head. Upper jaw 2.5-3.6 in head (proportionally larger with age). Ventral surface of snout naked, but most of suborbital region and mandibular rami scaled. Scales with a strong median row of spinules forming a keel; spinule rows on either side of median keel parallel to slightly divergent; in very large individuals only median keel may be present and spinules obsolescent.

Attains more than 60 cm. Cape Point and Prince Edward Ids.; also found off New Zealand and southwestern Atlantic. Okamura (1976: 63) has synonymised this species with *Macrourus berglax* Lacepède, 1802.

93.15 *Macrourus holotrachys:* ca. 54 cm holotype of *M. carinatus* (after Günther, 1887).

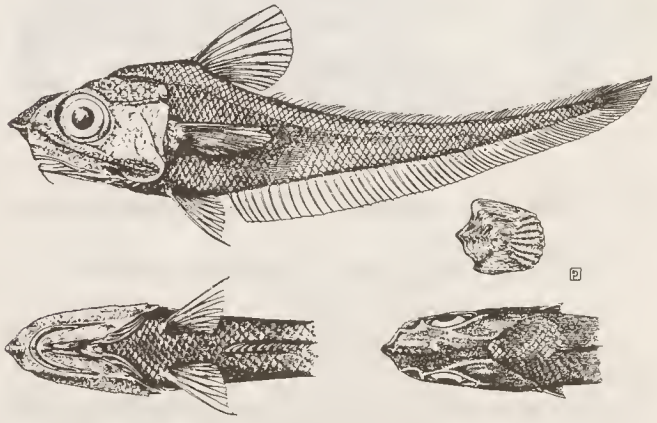
Genus ***Mahia*** McCann & McKnight, 1980

One species, probably widespread from New Zealand to South Africa. The genus is close to *Abyssicola* and *Coelorinchus* and may be combined in the latter by some authors.

93.16 *Mahia matamua*
McCann & McKnight, 1980

Coelorhinchus sp. Far Seas Fisheries Research Lab., 1972: 94, Fig. NZ-77. *Mahia matamua* McCann & McKnight, 1980: 53, Figs. 36-38 (New Zealand).

D II,9 + ?; P 17-18; medial GR 2+10; ca. 7 scales below 2nd D. Maxilla extends to below middle of orbit. Head uniformly scaled, including mandibles and ventral aspects of snout and suborbital; ridges of head stout, but not especially spiny. Snout tip with a conical tubercle. Subopercle prolonged ventrally into a narrow tab; interopercle posteriorly pointed, com-



93.16 *Mahia matamua:* 24+ cm.

pletely hidden by preopercle. Eye about 3 or less in head. Abdomen short, distance isthmus to A less than postrostral length of head. Anus immediately before A (removed at most by 1 or 2 scales); light organ a small globular gland within body wall in front of anus, not externally visible. No prolonged fin rays; 2nd D low throughout. Body scales with spinules in discrete, low, slightly divergent ridge-like rows (as many as 11 rows in large specimens).

Attains about 65 cm. Apparently abundant off South Africa; also found off New Zealand and southern Australia (*fide* T. Arai, April 1983).

Genus ***Malacocephalus*** Günther, 1862

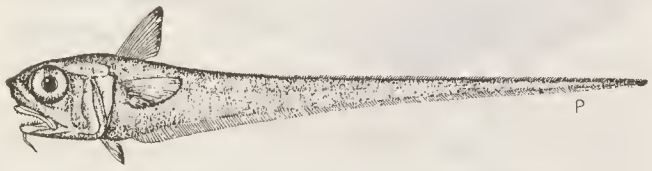
About 6 species, although *M. nipponensis* Gilbert & Hubbs, 1916, and *M. hawaiiensis* Gilbert, 1905, may be synonyms of *M. laevis* (Lowe, 1843). One species in our area.

93.17 *Malacocephalus laevis*
(Lowe, 1843)

Macrurus laevis Lowe, 1843: 92 (Madeira). *Malacocephalus laevis:* Barnard, 1925: 344; Smith, **SFSA No. 239*;** 1968: 6*; Marshall & Iwamoto, *in* Marshall, 1973: 651*.

D II,9-13 + more than 220; A more than 210; P 16-22; V 9; medial GR 11-14 total; 11-13 scale rows below 2nd D. Upper jaw 0.4-0.5 length of head. Upper jaw teeth in 2 series, outer series enlarged and widely spaced. Scale patches on lowermost branchiostegal rays and often on gular membrane. Ventral light organ well developed, with a bean-shaped fossa between V and a smaller circular fossa in front of anus. Anus remote from A. Pyloric caeca 70-100, branched.

Attains 60 cm. Widespread in Atlantic and Indian oceans, and, if *M. nipponensis* and *M. hawaiiensis* are synonyms, also in Pacific, in 200 - 750 m.



93.17 *Malacocephalus laevis:* 25 cm (off South Africa).

Genus ***Mesobius*** Hubbs & Iwamoto, 1977

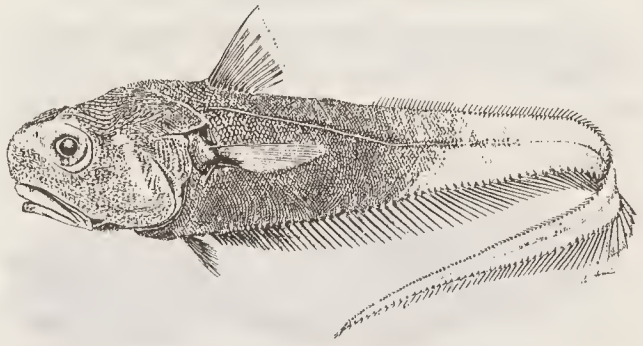
Two species, 1 in our area. Species bathypelagic, although our species known primarily from deep benthic trawls.

93.18 *Mesobius antipodum*
Hubbs & Iwamoto, 1977

Mesobius antipodum Hubbs & Iwamoto, 1977: 233, Figs. 1-11 (New Zealand); Arai, 1979: 286*; Shcherbachev et al., 1979: 25.

D II,8-10 + ?; P 13-16; V 6-7; medial GR 12-16 total; pyloric caeca 30-43. Head bones rather soft, head scales elongated; spinules longitudinally aligned, forming wavy lines on head. Eye less than ⅓ HL. First D spine weakly serrated; subequal to postorbital length of head. Teeth small, in 2-3 series in lower jaw, narrow band in upper jaw.

Colour swarthy to dark bluish, greyish brown on tail. Attains 66 cm. Off south coast; New Zealand, eastern Indian Ocean and Madagascar Plateau, also (*fide* T. Arai, April 1983) southern Australia.



93.18 *Mesobius antipodum:* 52 cm (after Arai, 1979).

Genus ***Nezumia*** Jordan, 1904

Macruroplus Bleeker has been used for some of the species treated here under *Ventrifossa, Nezumia* and *Sphagemacrurus.* The use of *Macruroplus* is, however, untenable because the type-species, *Macrurus serratus* Lowe, 1843, is a *nomen nudum* which may represent any of several eastern North Atlantic macrourids, including species of *Coryphaenoides, Nezumia, Sphagemacrurus* and *Ventrifossa.* About 45 species, 7 in our area.

KEY TO SPECIES

1a V 14-17 ..... *N. propinqua*
1b V 7-12 2

2a Leading dorsal margin of snout and entire ventral surface of head naked; no stout scales at tip or lateral angles of snout; V 8 ..... *N. hebetata*
2b Leading margin of snout scaled; ventral surface of head variously scaled; stout, spiny, tubercular scales at tip and lateral angles of snout; V 8-12 3

3a Medial GR on 1st arch 13-16 ..... *N. micronychodon*
3b Fewer than 13 medial (inner) GR on 1st arch 4

4a V 8-9; ventral surfaces of snout and suborbital mostly scaly 5
4b V 11-12; ventral surfaces of snout and suborbital mostly naked 6

5a V 8; barbel 3.0-3.6 in eye; scale rows below 2nd D 6-7; eye diameter about $^2/_5$ head, much greater than snout length ..... *N. milleri*
5b V 9; barbel about 1.8 in eye; scale rows below 2nd D about 12; eye ⅓ head, subequal to snout ..... *N. leonis*

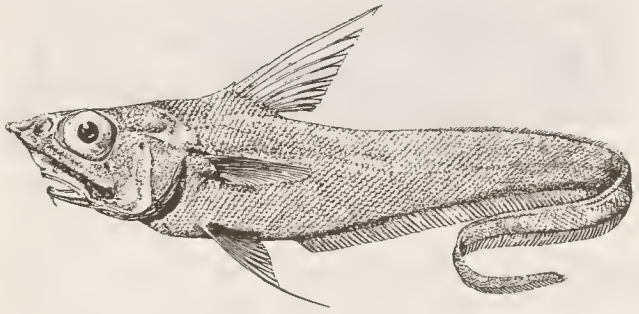
6a Snout pointed; barbel, ⅓ - ½ eye; spinules on body scales broadly lanceolate ..... *N. brevibarbata*
6b Snout blunt; barbel about ½ - ¾ eye; spinules on body scales slender, needle-like ..... *N. semiquincunciata*

93.19 *Nezumia brevibarbata*
(Barnard, 1925)

Lionurus brevibarbatus Barnard, 1925: 503 (Cape Point); 1925: 349. *Macruroplus brevibarbatus:* Smith, **SFSA No. 244.**

D II,9-11 + ca. 140; P 19-21; V 11; lateral GR 0+9, medial (1-2)+(10-11); 7-8 scales below 2nd D. Most ventral surfaces of snout, suborbital and chin naked. Barbel about 11% HL. Broadly lanceolate to shield-shaped scale spinules in somewhat convergent rows.

Attains about 26 cm. Known only off the Cape, where it is common in 549 - 1 737 m.



93.19 *Nezumia brevibarbata:* 18+ cm (off Cape Point).

93.20 *Nezumia hebetata*
(Gilbert, 1905)

Macrourus hebetatus Gilbert, 1905: 671, Fig. 262 (Hawaii).

D II,9-12 + ?; P 21-24; V 8; lateral GR 1+8, medial 2+8; 11 scales below origin of 2nd D. Extensive naked areas on head including leading dorsal margin and ventral surface of snout, ventral margins of suborbital and preopercle, and chin. Barbel about 11% of HL. Scale spinules needle-like, in distinct ridge-like rows. Outer V ray long.

Attains about 20 cm. One specimen (CAS 50152) collected off Mozambique in 850 - 960 m closely agrees with the original description of this species; previously known only from the small holotype from Hawaii.

93.20 *Nezumia hebetata:* 12.5 cm holotype (after Gilbert, 1905).

93.21 *Nezumia leonis*
(Barnard, 1925)

Lionurus leonis Barnard, 1925: 503 (Cape Point); 1925: 349*. *Macruroplus leonis:* Smith, **SFSA No. 240.** *Nezumia leonis:* Krefft, 1968: 36; Karrer, 1973: 219.

D II,8-12 + ?; P 22-24; V 9; lateral GR 0+8, medial 2+7; 17-18 scales 1st D origin to LL; pyloric caeca 14-18. Snout scaly below; suborbital region entirely scaled; rear ½ - ¾ of lower jaw scaly. Upper jaw 3.4-3.5 in head.

Colour brownish. Attains about 39 cm. Rare off Cape Point; Namibia; also known from southwestern Atlantic; 165 - 631 m.

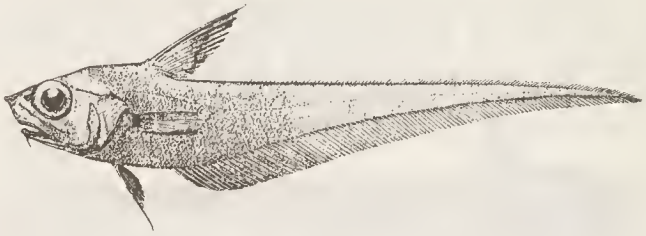
93.21 *Nezumia leonis:* 19+ cm syntype (off Cape Point; tail reconstructed).

93.22 *Nezumia micronychodon*
Iwamoto, 1970

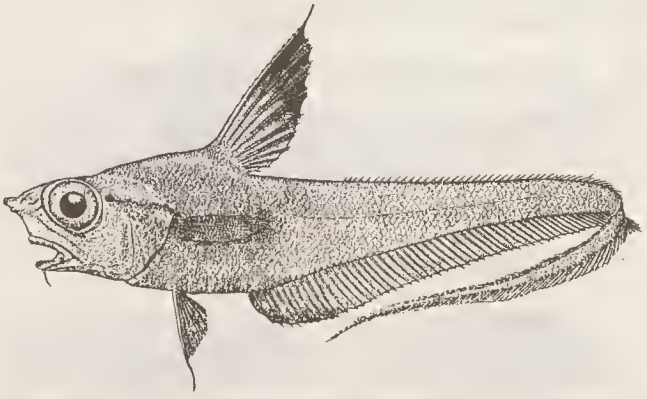
Nezumia micronychodon Iwamoto, 1970: 385 (Gulf of Guinea); 1973: 381; Karrer, 1975: 70.

D II,10-11 + ca. 130; P 20-25; V 8-10; lateral GR 0+(9-10), medial (1-2)+(13-16); scales below 2nd D origin 6. Snout blunter in large adults. Ventral surface of snout naked; suborbital and lower jaw scaled. Barbel 7-10% HL. Broadly lanceolate to shield-shaped scale spinules in adults.

Attains about 35 cm. Mauritania to Namibia in 350 - 1 100 m.



93.22 *Nezumia micronychodon:* 23 cm.



93.23 *Nezumia milleri:* 17.5 cm holotype (off Angola; after Iwamoto, 1975).

93.23 *Nezumia milleri*
Iwamoto, 1973

Nezumia milleri Iwamoto, 1973: 375, Fig. 1 (Angola). *Nezumia aequalis:* Karrer, 1973: 218.

D II,9-10 + ca. 175; P 18-21; V 8; medial GR 2+(8-9); 6-7 scales below 2nd D origin. Snout length much less than eye diameter which is 40-42% HL; naked medial strip ventrally on snout, head otherwise mostly scaled. Barbel 11-14% HL. Scale spinules broad, shield-shaped.

Attains 38 cm. Angola and Namibia, 320 - 620 m.

93.24 *Nezumia propinqua*
(Gilbert & Cramer, 1897)

Macrourus propinquus Gilbert & Cramer, 1897: 424, Pl. 42, Fig. 2 (Hawaii). *Nezumia evides* (Gilbert & Hubbs, 1920) and *N. condylura* Jordan & Gilbert, 1904, are possible synonyms.

D II,10-13 + ca. 150; P 19-24; V 13-17; lateral GR 0+(7-8), medial (1-2)+(7-8); 9½-12½ scale rows below 2nd D origin. Snout with a distinct tubercular scale at tip; ventral surface of snout and suborbital, and most of lower jaw naked, pores prominent in these areas. Barbel 17-21% HL. Spinules on body scales, needle-like, greatly reclined, and in distinct parallel longitudinal rows.

First D tip distinctly black. Attains about 27 cm. Two specimens (CAS 50146) from off Mozambique in 740 m represent the first record from the Indian Ocean.

93.24 *Nezumia propinqua:* 14.5 cm.

93.25 *Nezumia semiquincunciata*
(Alcock, 1889)

Macrurus semiquincunciata Alcock, 1889: 392 (Bay of Bengal). *Macrurus polylepis* Alcock, 1889: 395 (Bay of Bengal). *Lionurus polylepis:* Norman, 1939: 52.

D II,11-12 + ca. 130; P 20-21; V 11-12; medial GR (1- 3)+(8-9); 9½ scales below 2nd D origin. Ventral surface of snout, suborbital and anterior end of lower jaw almost entirely naked and with large pores. Barbel about ½ or more of orbit. Spinules on body scales long, in distinct rows.

Attains about 27 cm. One specimen (CAS 50135) off Mozambique in 450 - 455 m questionably this species; holotype and others from Andaman Sea, Bay of Bengal, Zanzibar.

93.25 *Nezumia semiquincunciata:* 16 cm.

Genus ***Paracetonurus*** Marshall, 1973

Three species currently recognised; description of 2 (new) species from southern Africa to be published by Soviet ichthyologists. Four *Anton Bruun* specimens (CAS 50158) here reported may represent 1 of these undescribed species.

93.26 *Paracetonurus* sp.

D II,8-10 + 170+; A ca. 150+; P 19-21; V 6; medial GR 2+(7-9); pyloric caeca 11-12. Head broad, deep; upper jaw 2.6-2.8 in head. Eye about 4 in head, about ½ interorbital. Barbel 2 or less in eye. Scales small, with fine, rather long, erect spinules; underside of snout naked.

Attains about 25 cm. Mozambique, 1 510 - 1 600 m.

Genus ***Sphagemacrurus*** Fowler, 1925

Six species, 1 in our area.

93.27 *Sphagemacrurus pumiliceps*
(Alcock, 1894)

Macrurus pumiliceps Alcock, 1894: 125 (Laccadive Sea). *Lionurus pumiliceps:* Gilbert & Hubbs, 1920: 559; Barnard, 1925: 347 (in part). *Macruroplus pumiliceps:* Smith, **SFSA No. 242.** *Sphagemacrurus pumiliceps:* Marshall & Iwamoto, *in* Marshall, 1973: 627.

D II,10-12 + ca. 135; P 20-23; V 11-13; lateral GR 0+8, medial 1+10; pyloric caeca 9-12. Snout about equal to eye, 26- 30% HL. Upper jaw ends below front ⅓ of eye. Barbel about ½ eye.

Attains about 23 cm. South African records of this species by Brauer (and subsequently followed by others) were probably based on *Ventrifossa ori.* A single poorly preserved specimen (CAS 50159) collected by the R/V *Anton Bruun* in 1 510 - 1 600 m (off Mozambique, 21°18′S, 36°18′E) represents the first authentic record from southern Africa. Also reported from Laccadive Sea, Philippines, and East Indies; 732 - 1 646 m.

93.27 *Sphagemacrurus pumiliceps:* 48 cm (after Alcock, 1894).

Genus ***Trachonurus*** Günther, 1887

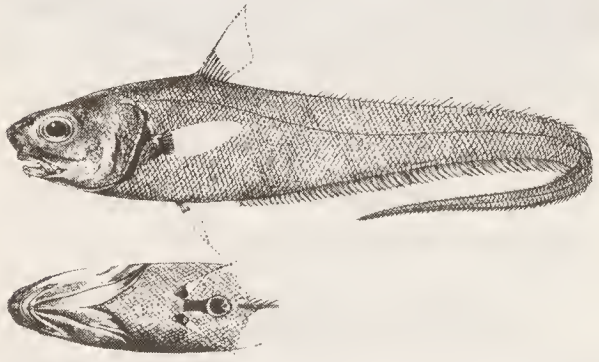
One species currently recognised (Marshall, 1973) but others probably present.

93.28 *Trachonurus villosus*
(Günther, 1877)

Coryphaenoides villosus Günther, 1877: 441 (Japan). *Trachonurus villosus:* Shcherbachev et al., 1979: 23.

D II,9-10 + ca. 160; P 15-17; V 7; medial GR 2+11. D spines smooth. Dark brown to blackish. Spinules on scales erect, bristly. Broad patch of scales on gular membrane.

Attains 60 cm. Mozambique, 850 - 960 m (CAS 50153). Midwaters of Indian Ocean, and off South Australia; other records mainly from bottom trawls in Atlantic and Pacific oceans.



93.28 *Trachonurus villosus:* ca. 45 cm (after Okamura, 1970).

Genus ***Trachyrincus*** Giorna, 1809

Five nominal species, 1 in our area.

93.29 *Trachyrincus scabrus*
(Rafinesque, 1810)

Trachyrincus anonyme Giorna, 1809: 179 (*nomen oblitum;* Nice). *Oxycephas scabrus* Rafinesque, 1810: 13, Pl. 1, Fig. 2 (Sicily). *Lepidoleprus trachyrincus* Risso, 1810 (Nice). *Trachyrincus trachyrincus:* Trunov, 1972: 398*; Karrer, 1973: 217.

D 9 + ?; P 18; V 6-7; 4 scale rows below 2nd D origin; about 32 dorsal scutes behind 1st D origin, 3 or 4 scutes before anus, about 59 ventral scutes behind anus. Eye 4, snout 2.5 in head. (Counts and proportions from HUMZ 73908.)

93.29 *Trachyrincus scabrus:* ca. 40 cm (after Günther, 1887).

Attains at least 60 cm. Namibia, west coast of South Africa; eastern North Atlantic and Mediterranean Sea.

Genus ***Ventrifossa*** Gilbert & Hubbs, 1920

Species primarily tropical in 200 - 700 m; some records to slightly below 900 m. About 25 species, 3 in our area.

KEY TO SPECIES

1a V 8-9; 1st D shorter than head; leading edge of snout blackish . 2
1b V 15-18; 1st D longer than head; snout without blackish margins ..... *V. ori*

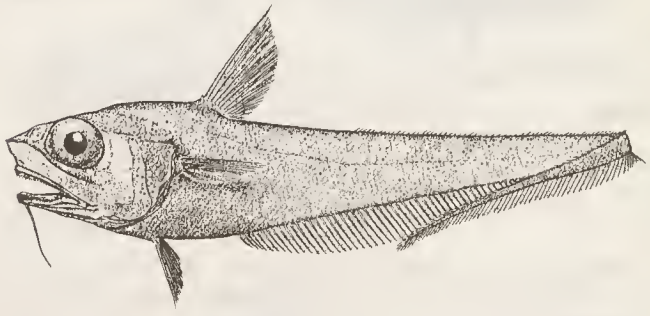
2a V 8; 1st D uniformly dusky; chin barbel much shorter than eye diameter ..... *V. nasuta*
2b V 9; 1st D clear at base and tip, rest of fin dusky to blackish; chin barbel subequal to or longer than eye ..... *V.* aff. *divergens*

93.30 *Ventrifossa* aff. *divergens*
Gilbert & Hubbs, 1920

Ventrifossa divergens Gilbert & Hubbs, 1920: 549, Fig. 37 (Philippines); Barnard, 1925: 346; Smith, **SFSA No. 245;** 1964: 293. *Macruroplus polylepis:* Smith, 1968: 4*.

D II,10-11 + ?; P 18-24; V 9; lateral GR 0+(8-13), medial (2-3)+(13-15). Short, conical spinules in quincunx arrangement on body scales. No scales on branchiostegal membranes. This species appears to differ from *V. divergens* in the shape of its suborbital shelf and supranasal ridge. It may be undescribed, but the inadequate study material does not justify a description at this time.

Attains at least 30 cm. Found off East London, Durban, Natal and southern Mozambique, in 421 - 740 m.



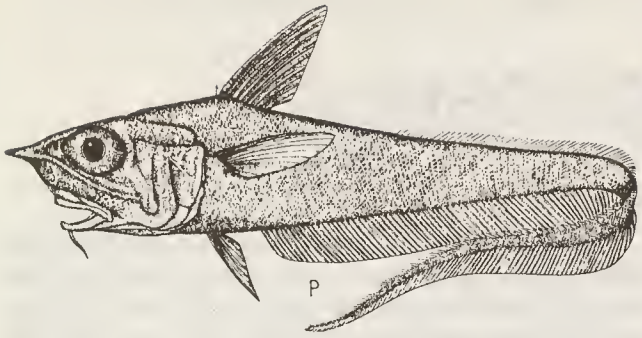
93.30 *Ventrifossa* aff. *divergens:* 23 cm (off Mozambique).

93.31 *Ventrifossa nasuta*
(Smith, 1935)

Lionurus nasutus Smith, 1935: 176, Fig. 3 (South Africa). *Macruroplus nasutus:* Smith, **SFSA No. 241*;** Smith, 1964: 294.

D II,8-10 + ca. 140; P 17-21; V 8; lateral GR 0+(10-11), medial (1-3)+(11-14). Numerous fine conical spinules arranged in quincunx pattern on body scales; 5-6½ scale rows below middle of D. No scales on branchiostegal membranes.

Attains 30 cm. Durban to Mozambique in 405 - 740 m.



93.31 *Ventrifossa nasuta*: 24.5 cm holotype (off South Africa).

93.32 *Ventrifossa ori*
(Smith, 1968)

?*Macrurus (Macrurus) pumiliceps:* Brauer, 1906: 262. *Lionurus nigromaculatus* (*non* McCulloch): Barnard, 1925: 348. ?*Lionurus pumiliceps:* Barnard, 1925: 347 (in part). *Macruroplus nigromaculatus* (*non* McCulloch): Smith, **SFSA No. 243.** *Macruroplus ori* Smith, 1968: 4, Pl. 2 (off Durban).

D II,9-11 + ca. 140; P 19-24; V 15-18; lateral GR 0+(8-10), medial (1-2)+(10-13). First D longer than head, with a black blotch distally; snout without blackish margins. Chin barbel about ½ head length. Scales on branchiostegal membranes. Spinules on scales fine, conical, arranged in discrete parallel rows. This species is close to *V. nigromaculata* (McCulloch, 1907) from Australia and Chile, but they can be distinguished by upper jaw length (33-39% head length in *V. ori,* 39-45% in *V. nigromaculata*), V ray count (15-18 vs. 13-15), greatest size (about 20 cm in *V. ori,* more than 34 cm in *V. nigromaculata*), and slight differences in physiognomy and head proportions.

Attains at least 20 cm. Off Agulhas Bank, Durban and East London, in about 275 - 550 m. Also probably from Somalia, Uruguay and southern Brazil.

93.32 *Ventrifossa ori*: 20 cm (off Natal?).

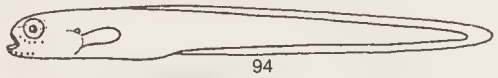
Order ZOARCIFORMES

Body elongate; scales present or absent. Dorsal and anal fins long, low and continuous with the small, pointed caudal fin; dorsal and anal fin rays in a 1/1 relationship with adjacent vertebrae; pelvic fins present or absent. Swimbladder absent. Vertebrae 56-150.

The relationships and classification of the fishes here assigned to this order are problematical. Gosline (1968, 1971) placed them in the perciform Suborder Blennioidei; Rosen and Patterson (1969) included them in the Gadiformes, but Marshall and Cohen (1973) questioned their gadiform affinities. Two families are here recognised. The Parabrotulidae were first distinguished as a subfamily of the Zoarcidae by Nielsen (1968). M. E. Anderson, in his unpublished Ph.D. dissertation, has adduced evidence to relate the zoarchids with the Perciformes, whereas the Parabrotulidae are perhaps derived from the ophidiiform Aphyonidae (Anderson, personal communication).

KEY TO FAMILIES

1a Single nostril on each side of head; small or large sensory pores on head ..... ZOARCIDAE (No. 94)



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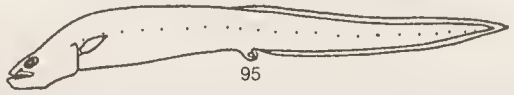
1b Two nostrils on each side of head; no sensory canals or pores on head ..... PARABROTULIDAE (No. 95)



95

Family No. 94: ZOARCIDAE

by M.E. Anderson

Eelpouts **Palingpuite**

Body eel-like. Dorsal and anal fins long, low, united with caudal. Mouth moderate, with small, conical teeth in jaws and usually on vomer and palatine bones. Pelvic fins, when present, rudimentary (except in 1 species), of 2 or 3 soft-rays, inserted on throat. Single pair of tubular nostrils. Gill openings variably a small, pore-like slit to a broad, wide opening not attached to isthmus. Gill-rakers generally small and blunt, not numerous. Small or large sensory pores present on head; patterns usually characteristic for each species. No gasbladder.

Generally small, deep-living bottom fishes of polar and cold-temperate seas; some dwell in intertidal regions, a few occur in brackish areas, especially in the Arctic. Two genera, *Melanostigma* and *Lycodapus* are mesopelagic or bathypelagic in near-coastal waters and may associate for a time with the bottom. Of some 225 species in the family, only 3 have been captured in our area.

KEY TO GENERA

1a No V or scales; gill slit a small, pore-like opening above P; skin thin, transparent, gelatinous ..... *Melanostigma*

1b V and scales present; gill slit large, extending to at least lower margin of P; skin dark and firm 2

2a Bony scutes running along bases of D and A; body depth 22-25 in SL; sensory pores in head large and prominent ..... *Lycodonus*

2b No bony scutes along bases of D and A; body depth 8-15 in SL; sensory pores in head small, obscure ..... *Lycodes*

Genus ***Lycodes*** Reinhardt, 1835

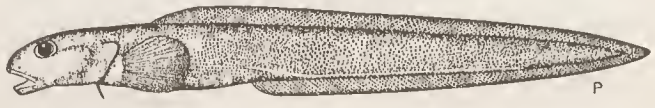
About 50 species; 1 in our area.

94.1 *Lycodes agulhensis*
Andriashev, 1959

Lycodes frigidus (*non* Collette): Barnard, 1927: 872; Smith, **SFSA No. 1026***. *Lycodes agulhensis* Andriashev, 1959: 465, Figs. 1-3 (Agulhas Bank); Golovan, 1978: 226.

D + ½C 111; A + ½C 100; P 22; GR 2+11; branchiostegal rays 6; vertebrae 21+94. Head about 20-23. Gill slit ends ventrally anterior to V origin. Body with small rounded scales, extending onto P base and D and A. LL with ventral branch from upper edge of gill slit descending gradually to A base and continuing to tail tip; branch running along midbody from above A origin nearly to tail tip.

Attains 45 cm. Uniformly dark (blackish brown or purplish brown); P black. Known from 14 specimens reported from off Cap Blanc, Mauritania, to Agulhas Bank, all taken by trawls in 630 - 1 920 m.



P

94.1 *Lycodes agulhensis:* 28.5 cm.

Genus ***Lycodonus*** Goode & Bean, 1883

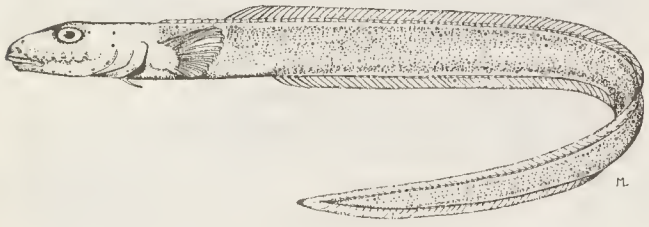
Four species; 1 in our area.

94.2 *Lycodonus vermiformis* Barnard, 1927

Lycodonus vermiformis Barnard, 1927: 873, Pl. 35, Fig. 3 (off Cape Point); Smith, **SFSA No. 1027.**

D + ½C 117-121; A + ½C 108-115; P 13-15; GR 10-11; branchiostegal rays 4; vertebrae 126-129. Head about 10. Gill slit ends ventrally at lower edge of P base. Small rounded scales cover body and P base. LL absent.

Preserved coloration reported as yellowish brown, abdomen black, throat and gill cavities dark. Attains 27 cm. Known from 4 specimens taken by bottom trawls off Cape Point in 841 - 1 152 m.



94.2 *Lycodonus vermiformis:* composite using 27+ cm syntype and Goode & Bean, 1896 (tail reconstructed).

Genus ***Melanostigma*** Günther, 1881

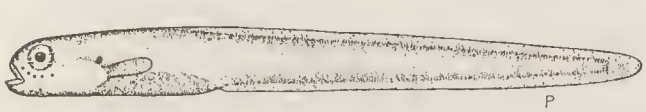
Seven species; 1 in our area.

94.3 *Melanostigma gelatinosum* Günther, 1881

Melanostigma gelatinosum Günther, 1881: 21, Pl. 2, Fig. A (Straits of Magellan); Barnard, 1927: 874; Smith, **SFSA No. 1025***; McAllister & Rees, 1964: 89.

D + ½C 82-90; A + ½C 68-73; P 7-8; GR 10-12; vertebrae about 80-90. Depth 6.6-8.9; head 5.9-7.5. P 1-2 eye diameters in length.

Skin thin and flabby, pale yellowish brown or greyish, tip of tail with black swath extending onto D and A. Attains 23 cm. A pelagic species, reported as shallow as 44 m (probably rare below 1 000 m). Taken off Cape Town by bottom trawl in 2 561 m. Also occurs off New Zealand, tip of South America and in the Scotia Sea. Probably also present at appropriate depths throughout subantarctic islands.



94.3 *Melanostigma gelatinosum:* 15 cm (off South Africa).

Family No. 95: PARABROTULIDAE

by M.E. Anderson

False brotulas **Vals brotulas**

Body eel-like. Dorsal and anal fins low and united with caudal; dorsal fin origin at about mid-length. Mouth small, lower jaw protrudes beyond upper. Jaw teeth, when present, very fine in *Parabrotula,* stronger, sharp and retrorse in *Leucobrotula.* Pelvic fins, scales and gasbladder absent. Pectoral fin small, with 6-8 rays. Two pairs of pore-like nostrils. Gill opening large, extending ventrally to throat. Gill-rakers small and few. Lateralis system composed of elevated, free neuromasts located on head, body and tail; no sensory canals or pores.

Viviparous; ovaries bilobed. Parabrotulids are very small, bathypelagic fishes. Only 2 genera are known, 1 from our area.

Genus ***Parabrotula*** Zugmayer, 1911

One species.

95.1 *Parabrotula plagiophthalma* Zugmayer, 1911

Parabrotula plagiophthalmus Zugmayer, 1911: 10 (northeastern Atlantic); 1911: 129, Pl. 6, Fig. 5; Marshall, 1954: 320*; Nielsen, 1968: 225*.

D 37-41; A 34-38; P 6-8; GR 7-10; vertebrae 56-59. Depth about 8-11; head 14-21. Skin loose, thin but not gelatinous, dark brown or black (transparent where it covers the eyes). Number of teeth in lower jaw quite variable, from 0 to 10 on each side. Teeth never present on upper jaw, usually not present on vomer. Branchiostegal membranes free of isthmus. Lateral-line organs slightly raised, running down body midline onto tail. Pectoral fin about 2 eye diameters in length. Ovaries bilobed, 1 female contained 23 embryos in the left ovary.

Attains about 5 cm. Known from both sides of the North Atlantic, 3 specimens have been taken off East London in midwater trawls fished to 1 416 m. A deep pelagic species, most captures have been made in depths between about 800 and 2 000 m.

95.1 *Parabrotula plagiophthalma:* 3 cm, composite.

Order OPHIDIIFORMES

Body more or less elongate; scales small and cycloid or absent. Dorsal and anal fins single, low, with long bases, extending to and often joined with the caudal fin; dorsal and anal fin pterygiophores more numerous than adjacent vertebrae; pelvic fins with 1 or 2 soft-rays or completely absent, inserted well anterior to pectoral fin base in most species (below pectoral base in a few species); fin spines absent (except for minute pelvic spines in some species). Two nostrils on each side of head. Mouth large, the maxilla usually reaching to or beyond vertical at rear edge of eye; gill openings unrestricted in all but a few species.

The classification of this order is unsettled. Rosen and Patterson (1969) advocated inclusion in the Gadiformes. Fraser (1972), McAllister (1968), Marshall and Cohen (1973) and Cohen and Nielsen (1978) recognise the group as a separate order. Ophidiiforms are primarily marine and occupy a variety of habitats, from the intertidal region to the greatest depths of the sea. Some species are of considerable economic importance, e.g. the kingklip, *Genypterus capensis*. Cohen and Nielsen (1978) recognise 87 genera divided into 4 families.

Exterilium larva: 7 cm SL (East London).

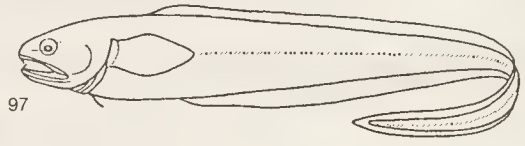
The remarkable *exterilium* larval stage described by Fraser and Smith (1974) is probably the larva of an ophidiid fish, but it cannot be assigned with certainty to any of the known species of southern Africa. This 7 cm SL specimen was found alive on a beach near East London. The proximal part of the enormous abdominal appendage contains a long loop of the intestine, with the anus on the dorsal edge of the appendage near its base. The meristic features of this larva do not quite match any of the known ophidiid species: D 132, A 108, P 22/22, V 3/3, C 4+4, vertebrae 71 (ca. 12+59), branchiostegal rays 8. In life, it was transparent like a leptocephalus with black blotches as shown. The huge abdominal appendage probably serves a dual purpose: the numerous fleshy streamers may aid in flotation, and the overall effect of white streamers and black blotched appendage and body resembles the stinging tentacles of some siphonophores, thus providing some protection from predators by mimicry.

KEY TO FAMILIES

1a Anterior nostril well above upper lip in most species; dorsal and anal fins continuous with caudal fin; oviparous, males lacking an external intromittent organ 2

1b Anterior nostril close to upper lip in most species; dorsal and anal fins continuous with or separate from caudal fin; viviparous, males with an external intromittent organ 3

2a Supramaxilla and scales absent; anal fin origin under or anterior to dorsal fin origin (except in the genus *Snyderidia*, which does not occur in our area) ..... CARAPIDAE (No. 97)



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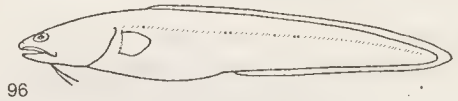
2b Supramaxilla present; scales small, cycloid; anal fin origin well behind dorsal fin origin ..... OPHIDIIDAE (No. 96)



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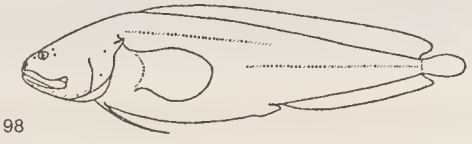
3a Eyes poorly developed, barely or not visible externally; skin loose, transparent, gelatinous; scales and swimbladder absent; dorsal and anal fins continuous with caudal fin; precaudal vertebrae 26-50 ..... APHYONIDAE (No. 99)

99

3b Eyes well developed in most species (minute and covered with skin in a few genera in which the median fins are separate); skin not as above; scales present or absent; swimbladder present; median fins separate or continuous; precaudal vertebrae 9-22 ..... BYTHITIDAE (No. 98)



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Family No. 96: OPHIDIIDAE

by J.G. Nielsen & D.M. Cohen

Cuskeels **Kuskpalings**

Body more or less elongate. Dorsal and anal fins long-based, joined to caudal fin. Ventral fins absent or of 1 or 2 slender rays. Scales small and cycloid. Gill-rakers on first arch 3 or more (usually 7 or more).

Unlike the related Bythitidae, ophidiids are all oviparous; fertilisation occurs outside the body of the female, so males do not have a specialised copulatory organ. About 39 genera (19 from our area) with 135 described species and many more un-named ones. Formerly included in the families Brotulidae and Ophidiidae. The genera have been reviewed by Cohen & Nielsen (1978). Sizes range from 15 cm in some shallow water forms to benthopelagic deep-sea species reaching a metre or more.

KEY TO GENERA

1a Barbels present on snout and chin . . . . . *Brotula*
1b No barbels on snout or chin 2

2a V present 4
2b V absent (in adults) 3

3a P reaching nearly to vent; skin on head thin, the fragile head bones usually exposed . . . . . *Lamprogrammus*
3b P falling far short of vent; skin on head thick . . . . . *Brotulotaenia*

4a V far forward, under eyes 5
4b V farther back, behind eyes 7

5a Rear margin of preopercle with 3 strong spines . . . . *Hoplobrotula*
5b Preopercle smooth, no spines 6

6a Scales on body set at oblique angles . . . . . *Ophidion*
6b Scales on body in regular rows . . . . . *Genypterus*

7a GR on 1st arch 3 . . . . . *Luciobrotula*
7b GR on 1st arch 7 or more 8

8a Body long and slender; depth at vent 10 or more in SL 9
8b Body shorter; depth at vent less than 10 in SL 11

9a Snout long, projecting over mouth; upper spine on opercle curved . . . . . *Penopus*
9b Mouth terminal or nearly so; upper opercular spine straight or absent 10

10a P rays 23-31 . . . . . *Bassozetus*
10b P rays 16-20 . . . . . *Porogadus*

11a Ends of V rays rather flattened . . . . . *Holcomycteronus*
11b Ends of V rays rounded or filamentous 12

12a Lower P rays separate from each other . . . . . *Dicrolene*
12b All P rays joined by membrane 13

13a Jaw teeth needle-like and separate from each other . . . . . *Epetriodus*
13b Jaw teeth tiny, granular and close-set 14

14a Head length more than twice in preanal distance . . . . . *Spectrunculus*
14b Head length 2 or less in preanal distance 15

15a P more than 2 in head length 16
15b P less than 2 in head length 17

16a GR on 1st arch 7-9 . . . . . *Bassogigas*
16b GR on 1st arch 13-27 . . . . . *Monomitopus*

17a Eye equal to or slightly shorter than snout . . . . . *Neobythites*
17b Eye definitely larger than snout 18

18a Mouth terminal; P reaching beyond level of vent . . . . . *Glyptophidium*
18b Mouth inferior, beneath inflated snout; P falling well short of vent . . . . . *Selachophidium*

Genus ***Bassogigas*** Goode & Bean, 1896

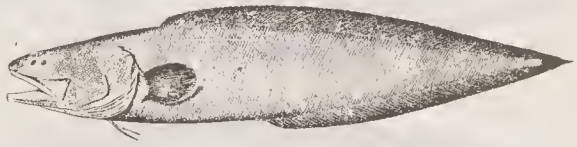
Median basibranchial tooth patches 2; vomer tooth patch V-shaped; opercular spine strong. Monotypic?

96.1 *Bassogigas ? gillii*
Goode & Bean, 1896

Bassogigas gillii Goode & Bean, 1896: 328, Pl. 83, Fig. 291 (off Delaware, U.S.A.). *Bassogigas* sp. Cohen, 1981: 1086 (Agulhas Bank).

D 106; A 84; P 28; V 2; developed GR 7. Distinct dorsal LL.

Attains 85 cm. One specimen recorded from the area. It is still unsettled whether this specimen and 1 from off Madagascar are conspecific with northwest Atlantic specimens. Known from deep bathyal and abyssal depths.



96.1 *Bassogigas gillii:* 44.5 cm SL (after Goode & Bean, 1896).

Genus ***Bassozetus*** Gill, 1884

Preopercle unarmed and posteriorly expanded. Ten species; 1 in our area.

96.2 *Bassozetus robustus*
Smith & Radcliffe, 1913

Bassozetus robustus Smith & Radcliffe, *in* Radcliffe, 1913: 156, Pl. 11, Fig. 3 (Palawan Passage, Philippines); Shcherbachev, 1980: 122.

D 116-123; A 94-102; P 25-30; V 1; developed GR 11-15; 1 median basibranchial tooth patch. Body tapering. Opercular spine weak.

Attains about 60 cm. One specimen from off Natal; known from a few specimens from Philippines to Africa in depths of 1 390 - 2 350 m.

96.2 *Bassozetus robustus:* 36 cm holotype (after Radcliffe, 1913).

Genus ***Brotula*** Cuvier, 1829

Four species chiefly in shallow tropical waters; 1 in our area. *Brotula barbata* (Bloch, 1801) may also occur in our area, as it has been recorded from off Namibia at 18°S (Karrer, 1973: 236). The vertical fins are uniformly dark in *B. barbata*.

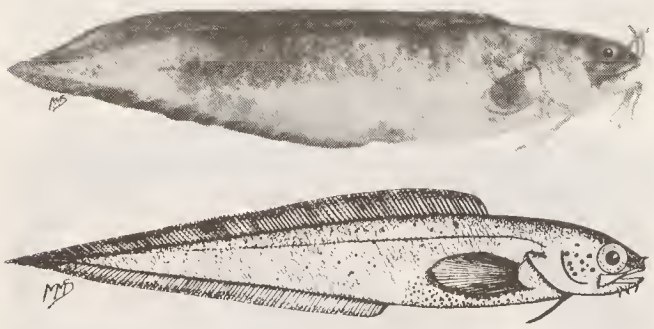
96.3 *Brotula multibarbata*
Temminck & Schlegel, 1846

Bearded brotula — Baardbek-brotula

Brotula multibarbata Temminck & Schlegel, 1846: 251, Pl. 111, Fig. 2 (Simabara Bay, Japan); Hubbs, 1944: 170; Smith, **SFSA No. 1014*.** *Brotula palmietensis* Smith, 1935: 220, Pl. 21, Fig. C (Great Fish Point).

D 117-123; A 88-100; P 22-26; V 2.

Colour generally dusky in adults; vertical fins pale, with black submarginal band; juveniles lighter. Juveniles in shallow reef areas and also caught pelagically, sometimes far offshore. Larger specimens move off the reefs to deeper water, but are apparently restricted to nearshore areas. Attains nearly 100 cm. Widely distributed from Red Sea to Port Alfred and east to the central Pacific.



96.3 *Brotula multibarbata:* top: 22 cm adult (Transkei); bottom: 5 cm juvenile (N. Mozambique).

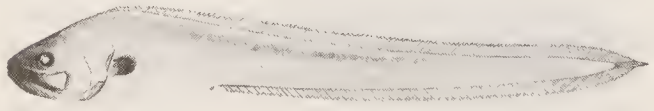
Genus ***Brotulotaenia*** Parr, 1934

Scales reduced to small prickles. GR are spiny tubercles. Four species, mesopelagic, 1 in our area.

96.4 *Brotulotaenia crassa*
Parr, 1934

Brotulotaenia crassa Parr, 1934: 36, Fig. 12 (Bahamas); Cohen, 1974: 140*; Shcherbachev et al., 1978: 189; Shcherbachev, 1980: 105.

D 119-134; A 98-108; P 22-23; vertebrae 88-96. Head 5.3- 8.5 in SL.



96.4 *Brotulotaenia crassa:* 44.5 cm SL.

Colour variable but generally pale grey to brown or purple, the muzzle often quite dusky. Attains 83 cm. Rarely caught. Tropical Atlantic off South Africa (900 - 1 000 m) and in southwest Indian Ocean.

Genus ***Dicrolene*** Goode & Bean, 1883

Fifteen species; 3 in our area.

KEY TO SPECIES

1a Body pale; supraorbital spine absent; preopercular spines feeble or absent . . . . . *D. pallidus*
1b Body brownish; supraorbital spine absent or present; preopercular spines well developed 2

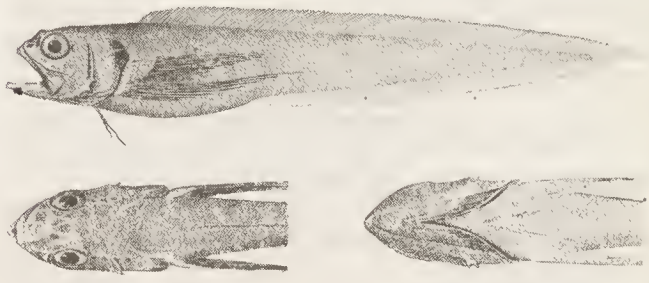
2a Supraorbital spine present; lower 6-9 P rays free . . . . . *D. intronigra*
2b Supraorbital spine absent; lower 9-11 P rays free . . . . . *D. multifilis*

96.5 *Dicrolene intronigra*
Goode & Bean, 1883

Dicrolene intronigra Goode & Bean, 1883: 202 (northwest Atlantic); Smith, **SFSA No. 1015*;** Golovan, 1978: 222; Lloris, 1981: 25.

D 100-114; A 85-95; P 25-29 (6-9 lower rays free); V 2; developed GR 11-17. Distinct pores on head. Rear margin of preopercle with 3 spines.

Attains about 30 cm. All specimens from South African collections labelled *D. intronigra* that we have examined are now referred to *D. multifilis*. However, according to Golovan (1978) and Lloris (1981) *intronigra* does occur off Namibia between 200 and 1 050 m. Otherwise the species is known from off northwest Africa and from the western North Atlantic.



96.5 *Dicrolene intronigra:* 24 cm (after Goode & Bean, 1896).

96.6 *Dicrolene multifilis*
(Alcock, 1889)

Paradicrolene multifilis Alcock, 1889: 387 (Bay of Bengal); 1894: Pl. XI, Fig. 1. *Dicrolene multifilis:* Alcock, 1899: 86; Shcherbachev, 1980: 137.

D 102-115; A 82-95; P 23-30 (9-11 lower rays free); V 2; developed GR 11-17. Snout equals diameter of eye. Distinct pores on head. Rear margin of preopercle with 2-3 spines.

Attains 20 cm. Off Table Bay and east coast of South Africa in 400 - 1 750 m; also from other parts of Indian Ocean.

96.6 *Dicrolene multifilis:* 16 cm (after Alcock, 1894).

96.7 *Dicrolene pallidus*
Hureau & Nielsen, 1981

Dicrolene pallidus Hureau & Nielsen, 1981: 9, Figs. 8 & 9 (off Namibia).

D 112-118; A 89-94; P 23-28 (5-6 lower rays free); V 2; developed GR 8-12. Distinct pores on head. Rear margin of preopercle without spines.

Attains 16 cm. Known from 2 localities off Namibia in 2 772 - 2 992 m.

96.7 *Dicrolene pallidus:* 18 cm.

Genus ***Epetriodus*** Cohen & Nielsen, 1978

Median basibranchial tooth patches 2; opercular spine short and sharp. A single species, known only from 4 localities in western Indian Ocean.

96.8 *Epetriodus freddyi*
Cohen & Nielsen, 1978

Epetriodus freddyi Cohen & Nielsen, 1978: 30, Fig. 45 (off Mozambique); Shcherbachev, 1980: 143.

D 95-98; A 74-77; P 24-29; V 2; GR 20-21. Eye about 2 in snout. Maxilla extends well beyond eye; jaw teeth sharp, slender.

Body pale brown, fins darker. Attains 22 cm. Benthopelagic in 1 000 - 1 750 m between about 18° and 35°S in western Indian Ocean.

96.8 *Epetriodus freddyi:* 21.5 cm SL holotype.

Genus ***Genypterus*** Philippi, 1857

Possibly 5 or more species; 1 in our area.

96.9 *Genypterus capensis*
(Smith, 1847)
PLATE 10

Kingklip — Koningklip

Xiphiurus capensis Smith, 1847: Pl. 31 (South Africa). *Hoplophycis lalandi* Kaup, 1858: 92. *Genypterus capensis:* Barnard, 1927: 887*; Smith, **SFSA No. 1023***. *Xiphiurus capensis* Smith & Smith, 1966: 81*.

GR 4. Depth about 7 in SL; P 2.1-2.9 in head. Maxilla reaches past eye. No spines on opercle.

Colour variable, mottled. Attains 160 cm or more. Known only from Walvis Bay to Algoa Bay in 55 - 500 m. One of South Africa's most sought after table fish; taken mainly by trawlers or deep line boats. J.L.B. Smith states (**SFSA,** p. 364): "The liver is of a delicacy and flavour unsurpassed by even chicken liver. If it became known ashore, it would likely command a high price as a delicacy." Smith & Smith (1966, p. 81) state: "as it is nowhere abundant, far more fish named 'kingklip' on menus is eaten than is ever caught."

Genus ***Glyptophidium*** Alcock, 1889

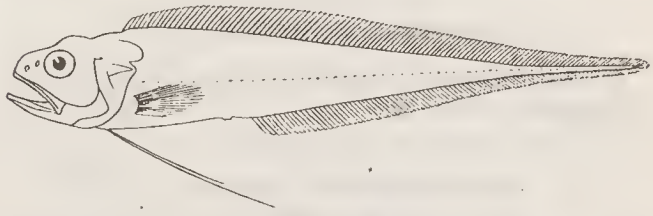
Six species; 1 in our area.

96.10 *Glyptophidium longipes*
Norman, 1939

Glyptophidium longipes Norman, 1939: 77, Fig. 28 (near Zanzibar); Smith, 1968: 17*; Shcherbachev, 1980: 149.

D 130-135; A ca. 100; P 23-25; V 2; lower GR 25-26. Head bones with thin crests. Eye diameter larger than length of snout. Opercular spine weak. Pseudobranchial filaments 8-10.

Attains about 25 cm. Rather common on upper part of continental slope off East Africa; extends south to Bazaruto Id., Mozambique.



96.10 *Glyptophidium longipes:* 24 cm (after Norman, 1939).

Genus ***Holcomycteronus*** Garman, 1899

Opercular spine strong; 2 median and 1 pair of basibranchial tooth patches. Six species; 2 in our area.

KEY TO SPECIES

1a D rays 111-113; A rays 88-91 . . . . . *H. aequatoris*
1b D rays 127; A rays 100 . . . . . *H. digittatus*

96.11 *Holcomycteronus aequatoris*
(Smith & Radcliffe, 1913)

Bassogigas aequatoris Smith & Radcliffe, *in* Radcliffe, 1913: 153, Pl. 10, Fig. 3 (off Celebes).

D 111-113; A 88-91; P 20-21; V 2; developed GR 8-10. LL indistinct.

Attains 22 cm. Three specimens from off the east coast differ slightly from Indo-Australian specimens. Known from 1 510 to 2 980 m.

96.11 *Holcomycteronus aequatoris*: 19 cm SL.

96.12 *Holcomycteronus ? digittatus*
Garman, 1899

Holcomycteronus digittatus Garman, 1899: 163, Pl. 36, Fig. 1 (eastern Pacific); Hureau & Nielsen, 1981: 16*.

D 127; A 100; P 20; V 2; developed GR 9. Eyes small. LL indistinct.

Attains 30 cm. One 305 mm specimen from 2 953 m off Namibia; possibly conspecific with *H. digittatus* from eastern Pacific.

96.12 *Holcomycteronus digittatus*: 33 cm.

Genus ***Hoplobrotula*** Gill, 1863

Basibranchial with 1 median and 1 pair of tooth patches. Two species; 1 in our area.

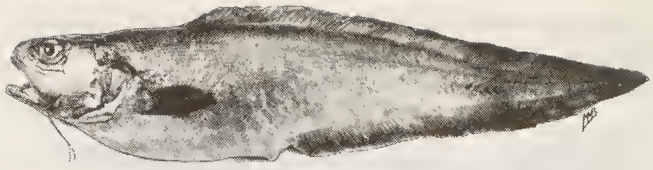
96.13 *Hoplobrotula gnathopus*
Regan, 1921
PLATE 10

False kingklip — Vals koningklip

Hoplobrotula gnathopus Regan, 1921: 417 (off Natal); Smith, **SFSA No. 1017***.

D 99-103; A 78-82; P 22-25; V 2; GR 4-5. Depth about 6. P reaching nearly to anus. Eye larger than snout.

Generally reddish or pinkish. Attains about 45 cm. Taken occasionally at 180 - 550 m. Known only from Natal and a few localities somewhat to the north.



96.13 *Hoplobrotula gnathopus*: 48 cm (off Algoa Bay).

Genus ***Lamprogrammus*** Alcock, 1891

No V in adults. Head cavernous, bones poorly ossified. Four or more species; 2 in our area.

KEY TO SPECIES

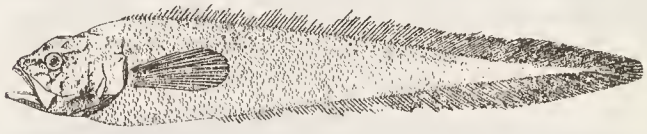
1a Body pale rose-pink (yellowish in alcohol); total GR 20-25; basibranchial bone with teeth . . . . . *L. exutus*
1b Body blackish; total GR 17-21; no teeth on basibranchial . . . . . *L. niger*

96.14 *Lamprogrammus exutus*
Nybelin & Poll, 1958

Lamprogrammus exutus Nybelin & Poll, 1958: 4, Fig. 1 (Gulf of Guinea); Trunov, 1971: 733*; Golovan, 1978: 223.

D 108-119; A 88-96; P 18-21.

Attains about 40 cm. Caught on or above continental slope in 260 - 650 m. Gulf of Guinea to Walvis Bay.



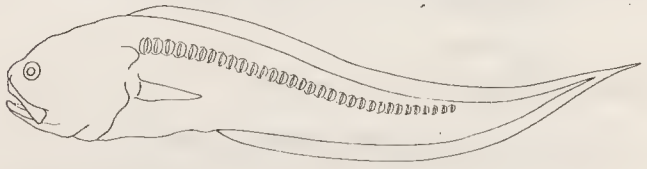
96.14 *Lamprogrammus exutus*: 40 cm SL holotype (after Nybelin & Poll, 1958).

96.15 *Lamprogrammus niger*
Alcock, 1891

Lamprogrammus niger Alcock, *in* Wood-Mason & Alcock, 1891: 33, Fig. 2 (Bay of Bengal); Shcherbachev, 1980: 154.

D 105-115; A 84-91; P 16-19; V rudiments present in 16-cm specimen from tropical Atlantic. A row of large scales along LL (sometimes lost in trawl-caught specimens).

Attains 55 cm or more. Probably bathypelagic, but larger



96.15 *Lamprogrammus niger*: 25 cm.

specimens are sometimes taken in bottom trawls in 800 - 2 000 m. Caught off Natal; probably circumtropical.

Genus ***Luciobrotula*** Smith & Radcliffe, 1913

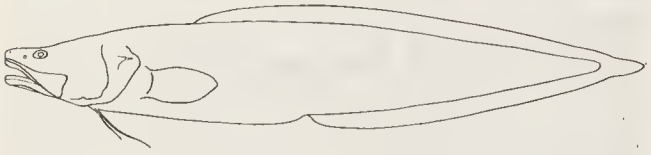
Teeth granular; single median basibranchial tooth patch. Four or 5 species; 1 in our area.

96.16 *Luciobrotula bartschi*
Smith & Radcliffe, 1913

Luciobrotula bartschi Smith & Radcliffe, *in* Radcliffe, 1913: 171, Pl. 16, Fig. 2 (Palawan Passage, Philippines); Cohen, 1981: Tab. 1, 3.

D 87-93; A 68-75; V 2; GR 3. Snout depressed, naked, with fleshy flaps and ridges. P falling far short of A origin. Maxilla reaches well beyond eye.

Body usually pale, lighter than fins, head colour variable. Attains about 45 cm. Trawled in 500 - 800 m. One specimen trawled off Natal; known from Hawaii, Philippines, and several localities in western Indian Ocean.



96.16 *Luciobrotula bartschi:* 26 cm.

Genus ***Monomitopus*** Alcock, 1889

Single median basibranchial tooth patch. Thirteen species, 1 in our area.

96.17 *Monomitopus nigripinnis*
(Alcock, 1889)

Sirembo nigripinnis Alcock, 1889: 384 (Andaman Sea). *Monomitopus nigripinne:* Alcock, 1890: 297; Norman, 1939: 76; Shcherbachev, 1980: 156.

D 99-104; A 79-86; P 29-33; V 1 (short and thin); developed GR 13-19. Eye diameter equals snout length. Strong opercular spine.

Fins black. Attains 35 cm. Eleven specimens from off Natal in 700 - 1 200 m. Known from several localities in Indian Ocean.

96.17 *Monomitopus nigripinnis:* 20 cm SL.

Genus ***Neobythites*** Goode & Bean, 1886

Opercular spine strong; 2 median basibranchial tooth patches. Cohen & Nielsen (1978) tentatively recognise 14 species in this genus; 1 species in our area.

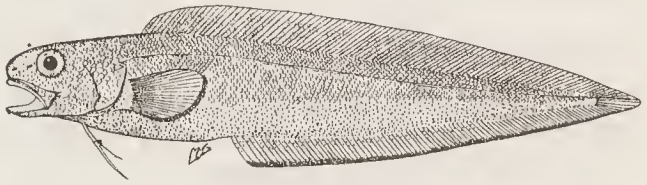
96.18 *Neobythites analis*
Barnard, 1927

Black-edged cuskeel — Swartrand-kuskpaling

Neobythites macrops (*non* Günther): Gilchrist & Thompson, 1914: 89; 1917: 416; Gilchrist & von Bonde, 1924: 19; Smith, **SFSA No. 1019*;** Hulley, 1972: 230. *Neobythites analis* Barnard, 1927: 879 (Algoa Bay and Natal coast); Shcherbachev, 1980: 159.

D 103-106; A 83-86; P 24-28; V 2. Head 4.5-5, depth at vent 6.0-6.4 in SL.

Head and body brownish; D pale, C dusky, A pale with a black margin. Attains 17 cm. If this species is not identical with *N. macrops,* then it appears to be endemic to South Africa. Trawled in 85 - 1 280 m from Algoa Bay to Natal coast.



96.18 *Neobythites analis:* 12.5 cm (off South Africa).

Genus ***Ophidion*** Linnaeus, 1758

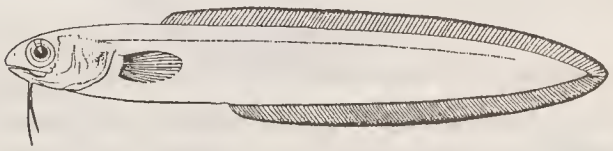
This genus needs revision. About 18 valid species; 1 in our area.

96.19 *Ophidion smithi*
(Fowler, 1934)

Otophidium smithi Fowler, 1934: 508, Fig. 52 (Umgui, Natal); Smith, **SFSA No. 1024*.**

D 98; A 95; P 22; V 2; developed GR 4-7. Scales absent from top and sides of head. V below eyes.

One specimen (14 cm) from shallow water in Natal; known from Red Sea to Natal. Very rare; more specimens wanted.



96.19 *Ophidion smithi:* 15 cm holotype (after Fowler, 1934).

Genus ***Penopus*** Goode & Bean, 1896

Opercle with strong curved spine dorsally; preopercle with 4 or 5 spines at lower angle. Median basibranchial tooth plates 2. Two species; 1 in our area.

96.20 *Penopus microphthalmus*
(Vaillant, 1888)

Sirembo microphthalmus Vaillant, 1888: 275, 24, Fig. 4 (Cape Verde). *Penopus microphthalmus:* Shcherbachev et al., 1978: 189.

D 139; A 109; P 18-19; V 2 (bound together for length of fin); GR 8-10. Depth at vent 10-11 in SL. P falling well short of A origin; LL in the form of 3 rows of circular organs (sometimes destroyed).

Attains about 35 cm. One specimen from 1 350 to 1 400 m off the Cape; also a few specimens from tropical Atlantic.

96.20 *Penopus microphthalmus:* 27 cm.

Genus ***Porogadus*** Goode & Bean, 1886

Single median basibranchial tooth patch; vomer with V-shaped tooth patch. This genus is much in need of revision; about 14 species, 1 in our area.

96.21 *Porogadus miles*
Goode & Bean, 1886

Porogadus miles Goode & Bean, 1886: 602 (northwest Atlantic); Smith, **SFSA No. 1022*;** Shcherbachev, 1980: 166*.

D 165-174; A 135-140; P 16-20; V 2. Body long and slender. Strongly developed spines on head. Prominent mucous cavities on head and operculum; 3 LL.

Attains about 30 cm. One specimen from off the Cape. Relatively common on both sides of Atlantic Ocean; also recorded from Indian Ocean in 1 000 - 2 000 m.

96.21 *Porogadus miles:* ca. 19 cm (after Goode & Bean, 1896).

Genus ***Selachophidium*** Gilchrist, 1903

Vomer with subtriangular tooth patch; 2 median basibranchial tooth patches. One species, known only off southern Africa.

96.22 *Selachophidium guentheri*
Gilchrist, 1903

Selachophidium guentheri Gilchrist, 1903: 209, Pl. 17 (off Cape Peninsula); Smith, **SFSA No. 1018*;** Nielsen, 1971: 21*; Karrer, 1973: 237.

D 113-121; A 89-97; P 26-29; V 1; developed GR about 20.

Attains about 30 cm. Common in 275 - 1 000 m from Angola to Mozambique.

96.22 *Selachophidium guentheri:* 20 cm (off South Africa).

Genus ***Spectrunculus*** Jordan & Thompson, 1914

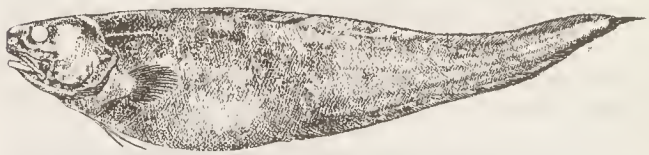
Opercular spine strong; 2 median basibranchial tooth patches. One species found in the Atlantic and Pacific oceans.

96.23 *Spectrunculus grandis*
(Günther, 1877)

Sirembo grandis Günther, 1877: 437 (Japan). *Spectrunculus grandis:* Nielsen & Hureau, 1980: 162*.

D 121-148; A 90-113; P 23-33; V 2; developed GR 5-10. Counts for South African specimens are D 130-148; A 99-112; P 24-30; GR 8-9. Anterior nostril with a thick, fleshy raised rim. Snout longer than diameter of eye.

Attains 127 cm. A few specimens from off west coast of South Africa in 800 to ca. 3 200 m; also known from Japan.



96.23 *Spectrunculus grandis:* 46 cm SL.

Family No. 97: CARAPIDAE

by J.E. Olney & D.F. Markle

Pearlfishes **Pêrelvisse**

Scaleless, eel-like, compressed or cylindrical body tapering to a long, slender tail. Mouth with fine teeth on jaws and palate, sometimes with large fang-like teeth. Gill membranes separate or united, always free from isthmus. Anus located behind, below or anterior to pectoral fin base.

Supramaxillary bone absent. Pectoral fins usually present (absent in some *Encheliophis*). Pelvic fins usually absent (present in *Pyramodon*). Unique pelagic larval stage, the vexillifer, characterised by a long, variously ornamented, predorsal filament (Olney & Markle, 1979; Markle & Olney, 1980; Govoni et al., 1984).

Pearlfishes are a highly specialised family of shallow to moderately deep-dwelling fishes with worldwide distribution and greatest abundance and diversity in tropical seas. Although some deep-water species (*Pyramodon*) are free-living, adults of most species live within the body cavity of invertebrate hosts such as sea cucumbers (which they enter tail first through the anus), starfish and molluscs (hence "pearlfish"). These inquiline (from the Latin *inquilinus*, tenant) fishes display remarkable behaviour including pair formation, host parasitism (some species have been shown to eat the gonads of the sea cucumber in which they live), and cannibalism.

The biology of a few species is well treated by Arnold (1956), C.L. Smith (1964), C.L. Smith & Tyler (1969), Trott (1970) and Trott & Trott (1972). The group is poorly known, in part due to rarity of adult specimens in collections. Pearlfish eggs and larvae are reported to occur in False Bay and Hout Bay (Brownell, 1979). A review of the genera is provided by Cohen & Nielsen (1978), and a limited revision of the family by Arnold (1956). Trott (1981) has recently reviewed the systematics, ecology and behaviour of carapine fishes, and Williams (1983) has reviewed the Pyramodontinae. Western Indian Ocean carapids were described by J.L.B. Smith (1955). See also two papers published in 1984 by J.T. Williams.

Pearlfishes are morphologically conservative, hence difficult to identify. The family needs revision, and the species here recognised should be considered tentative. At least 6 genera containing about 30 species, with 4 genera and 11 species in our region.

KEY TO GENERA

1a Gill membranes united; upper jaw bound by skin to side of head . . . . . *Encheliophis*
1b Gill membranes separate; upper jaw free 2

2a P rays 24-30; V present; precaudal vertebrae 14-19 . . . *Pyramodon*
2b P rays 14-22; V absent; precaudal vertebrae 15-25 3

3a Body slightly compressed or cylindrical; teeth in bands or single continous row with no pronounced gap near front of jaw; enlarged teeth at front of jaws present or absent, no median rocker bone at anterior end of swimbladder . . . . . *Carapus*
3b Body strongly compressed; pronounced gap separating large fang-like canines at front of jaws from a following band of smaller teeth; median rocker bone at anterior end of swimbladder . . . . . *Onuxodon*

Genus ***Carapus*** Rafinesque, 1810

Fifteen nominal species; 4 species in our area, currently under study, and the key, which is based on preserved material, is tentative.

KEY TO SPECIES

1a No enlarged teeth on jaws; head 9-11% TL; P less than ⅓ head length . . . . . *C. parvipinnis*
1b Enlarged teeth on upper and/or lower jaw; head greater than 11% TL; P more than ⅓ head length 2

2a P 15; precaudal vertebrae 25 . . . . . *C. cinereus*
2b P 17-21; precaudal vertebrae 15-19 3

3a Darkly pigmented and usually inhabiting the cushion starfish, *Culcita*; precaudal vertebrae 15-17 . . . . . *C. mourlani*
3b Pigment generally absent except on head; usually inhabiting sea cucumbers (holothurians); precaudal vertebrae 17-19 . . . . . *C. homei*

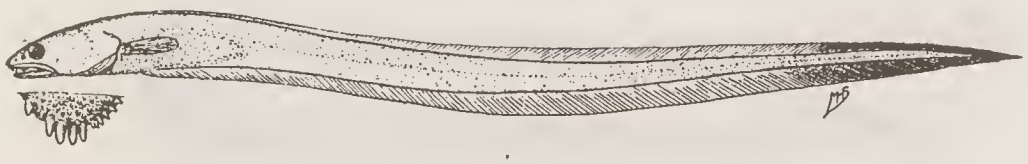
97.1 *Carapus cinereus* Smith, 1955

Eel pearlfish — Paling-pêrelvis

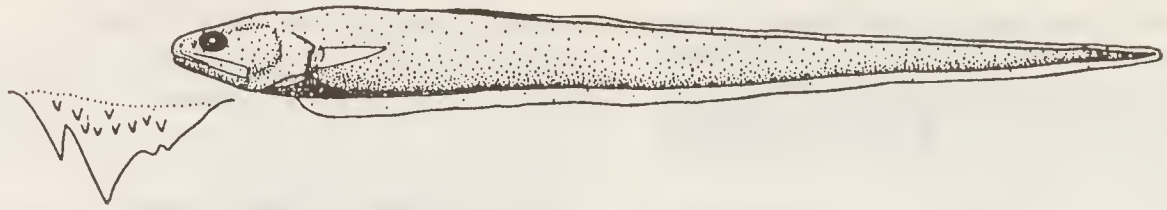
Carapus cinereus Smith, 1955: 409, Fig. 4 (Inhaca Id., Mozambique); Arnold, 1956: 295; Smith, 1961: 571, **No. 1009b.**

P rays 15; precaudal vertebrae 25; lateral processes of vertebrae 3-13 greatly expanded; D origin over vertebrae 6-7; A origin under vertebra 5. Head elongate, slightly compressed; dorsal profile almost straight; vent slightly behind P base. Lower jaw with small, blunt subconical teeth in about 6 series in a fusiform band and 1 or 2 large recurved canines at symphysis; in upper jaw small, blunt subconical teeth in band with a pair of recurved canines at symphysis; vomer with blunt subconical teeth of varying sizes and 4 large canines.

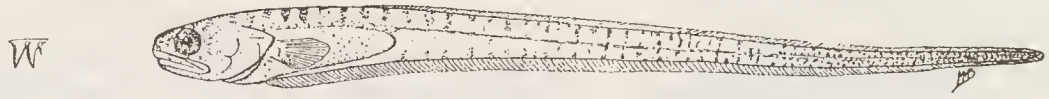
Colour in life: translucent with pink sheen, abdomen silvery. Known only from a 215 mm specimen taken in a tide pool on Inhaca Island. The generic assignment of this species is uncertain; it may belong in the genus *Echiodon* Thompson, 1837.



97.1 *Carapus cinereus:* 21.5 cm holotype and enlarged vomerine teeth (Inhaca Id.).



97.2 *Carapus homei:* 11 cm holotype and enlarged vomerine teeth (after Arnold, 1957).



97.3 *Carapus mourlani:* 7.5 cm holotype of *C. pindae* and enlarged vomerine teeth (N. Mozambique).

97.2 *Carapus homei*
(Richardson, 1844)

Silver pearlfish — Silwer-pêrelvis

Oxybeles homei Richardson, 1844: 73 (questionably Tasmania or Timor). *Carapus neglectus* Peters, 1855: 260 (Ibo, Mozambique); Smith, **SFSA No. 1009**; 1955: 413. *Carapus homei:* Smith, 1955: 414 (in part); Arnold, 1956: 273* (in part); Trott, 1970: 14.

P rays 17-21; precaudal vertebrae 17-19; total vertebrae 116-128; branchiostegal rays 7; olfactory rosettes with 15 pairs of lamellae; vent anterior to or below P base. Small, polyserial teeth in jaws; small canines at front of upper jaw; 1-4 large canines on vomer.

Colour in life: translucent; silver spot between eye and maxilla; silver patches along flank; no superficial melanophores. Attains 17 cm. Widely distributed in tropical seas and recorded from various host species. Reported from the holothurians *Stichopus* and *Thelonota* near Tulear, Madagascar (Hipeau-Jacquotte, 1967). Ibo (Mozambique), Zanzibar, Seychelles and Mauritius; not yet known from southern Africa.

97.3 *Carapus mourlani*
(Petit, 1934)
PLATE 11

Star pearlfish — Seester-pêrelvis

Fierasfer mourlani Petit, 1934: 393, Fig. (Sarodrano, Madagascar). *Carapus homei:* Smith, 1955: 414 (in part). *Carapus pindae* Smith, 1955: 412, Fig. 7 (Pinda, Mozambique); Arnold, 1956: 277. *Carapus mayottae* Smith, 1955: 415, Fig. 8 (Mayotte, Comores). *Carapus mourlani:* Trott, 1970: 15*; Trott & Trott, 1972; Meyer-Rochow, 1977: 582.

P rays 19; precaudal vertebrae 15-17, total vertebrae 102-114; branchiostegal rays 7. Vent anterior to P base. Olfactory rosettes with 15 pairs of lamellae. Otolith scalloped. Premaxilla (of a 145 mm female) with 3 large conical teeth anteriorly, followed by a band of smaller teeth, diminishing to 1 row posteriorly; lower jaw with 4 large conical teeth anteriorly separated by a gap from 4 similar teeth at rear; vomer with 2 large canines. Arnold (1956) considered *F. mourlani* synonymous with *C. homei*, but Trott (1970) demonstrated that *C. mourlani* varies significantly from *C. homei* in dentition and otolith structure, in vertebral counts, preferred host and in body proportions.

Colour in life: translucent with silver patches laterally from behind P to end of abdomen; head and body with numerous superficial melanophores. Attains 17 cm. Indo-West Pacific; found at Sodwana Bay in a large starfish. Usually found in starfish (C.L. Smith, 1964; Trott & Trott, 1972), occasionally in holothurians (Meyer-Rochow, 1977).

97.4 *Carapus parvipinnis*
(Kaup, 1856)

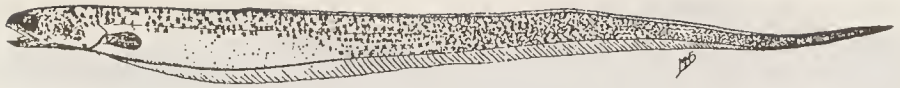
Pinhead pearlfish — Speldekop-pêrelvis

Fierasfer parvipinnis Kaup, 1856: 97 (Carteret Harbour). *Carapus parvipinnis:* Smith, 1955: 412*.

P rays 15-21; precaudal vertebrae 15-16. Vent anterior to P base. Jaw teeth small, nearly uniform; 3 or 4 large, stout teeth on vomer. The small size of the head and P is distinctive.

Colour in life: brown to reddish with small black specks. Attains 30 cm. Occurs in holothurians; widely distributed in tropical Pacific; Mauritius, but not yet recorded from southern Africa.

97.4 *Carapus parvipinnis:* ca. 26 cm and enlarged vomerine teeth (after Arnold, 1956).



97.5 *Encheliophis gracilis:* 15.5 cm (Aldabra).

Genus ***Encheliophis*** Müller, 1842

Upper jaw bound by skin to side of head. Four species, 1 in our area.

97.5 *Encheliophis gracilis*
(Bleeker, 1856)

Graceful pearlfish — Sierlike pêrelvis

Oxybeles gracilis Bleeker, 1856: 105 (Banda Ids., Indonesia). *Fierasfer punctatus:* Barnard, 1927: 886. *Carapus punctatus:* Smith, **SFSA No. 1008.** *Jordanicus gracilis:* Smith, **SFSA No.1010*;** 1955: 404*; Trott, 1970: 17. *Jordanicus punctatus:* Smith, 1955: 405. *Encheliophis (Jordanicus) gracilis:* Arnold, 1956: 299*.

P rays 17-18; precaudal vertebrae 26-31; branchiostegal rays 7; olfactory rosettes with 23 pairs of lamellae. Vomer with a median row of about 3 teeth.

Colour in life: dark, with evident pigment spots; bluish tinge in males, yellowish in females; caudal spots metamerically arranged; double row of spots along LL; middorsal line from D origin to rear of head; P pigmented (Trott, 1970). (At Pinda a live specimen collected in 1956 had iris metallic silver under transparent skin, belly (unspotted area) metallic silver, spotted area transparent with numerous black spots. – M.M. Smith.) Attains 30 cm. Indo-West Pacific; to Natal. Recorded from starfish (*Culcita discoidea*) and sea cucumbers (*Holothuria scabra* and *H. argus*). In the latter, reported by Trott (1970) to form male/female pairs (females larger) and to parasitise hosts.

Genus ***Onuxodon*** Smith, 1955

Median rocker bone at anterior end of swimbladder presumably used in sound production (Courtenay & McKittrick, 1970). Two species; both in our area. *Carapus reedi* Smith, 1955: 410, described from Durban, is a juvenile *Onuxodon*, as suggested by Arnold (1956).

KEY TO SPECIES

1a P less than 30% head length . . . . . *O. parvibrachium*
1b P more than 30% head length . . . . . *O. margaritiferae*

97.6 *Onuxodon margaritiferae*
(Rendahl, 1921)

Pearlfish — Pêrelvis

Fierasfer margaritiferae Rendahl, 1921: 5 (Cape Jaubert, Northwest Australia). *Jordanicus caninus* (*non* Günther): Fowler, 1927: 30, Fig. 5. *Jordanicus fowleri* Smith, 1955: 403 (on *J. caninus* of Fowler, 1927; Christmas Id.). *Carapus margaritiferae:* Smith, 1955: 408*; 1961: 571, **No. 1009a.** *Carapus (Onuxodon) margaritiferae:* Arnold, 1956: 285*. *Onuxodon margaritiferae:* Trott & Trott, 1972: 842.

P length 28-54% head length; P rays 16; precaudal vertebrae 20-22.

Translucent in life, with pink sheen and dusky caudal. Attains 9 cm. Indo-West Pacific to Durban; reported to live in "clams" (Smith, 1955). Trott & Trott (1972) found this species in the mantle cavity of the giant rock oysters (*Pycnodonta hyotis*) in the Philippines; it feeds on crustaceans and polychaetes and exhibits a tendency towards sexual pairing in the host.

97.7 *Onuxodon parvibrachium*
(Fowler, 1927)

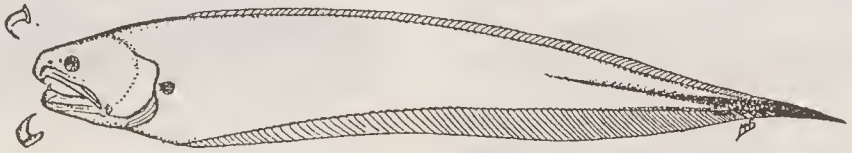
Oyster pearlfish — Oester-pêrelvis

Carapus parvibrachium Fowler, 1927: 31, Fig. 6 (Suva, Fiji). *Onuxodon parvibrachium:* Smith, 1955: 406*; Tyler, 1970; Trott & Trott, 1972.

P length 16-30% head length; P rays 14-15; precaudal vertebrae 17-20, caudal vertebrae 48-65; 1 or 2 laterally compressed canine teeth at front of each dentary and premaxilla; elongate patches of small teeth on dentaries, premaxillae, vomer and palatines.

Translucent in life with pink sheen; preserved specimens with dark pigment at bases of D and A rays and along

97.6 *Onuxodon margaritiferae:* 9.5 cm (Durban).



97.7 *Onuxodon parvibrachium:* 10 cm and enlarged canine teeth (Seychelles).

97.8 *Pyramodon punctatus:* 28.5 cm (East London).

vertebral column. Attains 10 cm. Indo-West Pacific, Seychelles, and recently found at Durban. A commensal inquiline in the giant oyster *Pycnodonta hyotis.* Little is known of the biology of the species.

Genus ***Pyramodon*** Smith & Radcliffe, 1913

At least two species; 1 known from our area. The species have been confused in the past and are reportedly difficult to distinguish (Williams, 1983). *P. ventralis* Smith & Radcliffe, 1913 has 24-26 P rays, 14-15 precaudal vertebrae and a relatively larger P (preanus length divided by P length = 0.9-1.6). Recent records in the J.L.B. Smith Institute of Ichthyology show *P. ventralis* off Sumatra and Kenya.

97.8 *Pyramodon punctatus*
(Regan, 1914)

Dogtooth pearlfish — Hoektand-pêrelvis

Cynophidium punctatum Regan, 1914: 16 (Cape North, New Zealand). *Pyramodon ventralis* (*non* Smith & Radcliffe): Smith, 1955: 547*; 1961: 571, **No. 1010d;** Markle & Olney, 1980: 174*.

V 1 or 2; P 26-28; precaudal vertebrae 17-19. Small conical teeth on jaws, vomer and palatines, plus 2 large fang-like teeth at front of both jaws and 1 fang-like tooth on vomer. Preanus length divided by P length 1.8-2.2.

Attains 29 cm TL (48 mm HL). New Zealand, Australia and South Africa (one adult collected in 201 m off East London). Probably a free-living species of the outer shelf and upper continental slope.

Family No. 98: BYTHITIDAE

by D. M. Cohen

Bythitids — **Bythitiede**

Body more or less elongate. Dorsal and anal fins single, with long bases continuous with or adjoining caudal fin. Pelvic fins each with a single filamentous ray (2 fleshy rays in *Thalassobathia,* which is not known from the area). Scales small and cycloid, absent in a few species. Gill-rakers on first arch 6 or fewer. Abdominal vertebrae 9-22.

Viviparous; males have a variously developed copulatory organ in front of the anal fin. At least 23 genera with at least 200 species, half of which are undescribed. Formerly included in the Brotulidae, the genera have been reviewed by Cohen & Nielsen (1978). Sizes range from 5 cm or less, in cryptic tidepool species, to benthopelagic deep-sea species reaching 70 cm or more.

KEY TO GENERA

1a C separate from D and A 2
1b C continuous with D and A 4

2a Scales absent or sparse and non-overlapping; 6 branchiostegal rays ..... *Dermatopsoides*
2b Scales small, in regular overlapping rows; 7 or 8 branchiostegals 3

3a A origin far behind mid-length of body ..... *Bidenichthys*
3b A origin close to mid-length of body ..... *"Dinematichthys"*

4a Palatine teeth absent ..... *Granmonoides*
4b Palatine teeth present 5

5a No scales on head ..... *Diplacanthopoma*
5b Scales present on head ..... *Cataetyx*

Genus ***Bidenichthys*** Barnard, 1934

Two or 3 species, 1 or 2 in our area, the other from New Zealand described as *Dinematichthys consobrinus* Hutton, 1876.

98.1 *Bidenichthys capensis*
Barnard, 1934

Freetail brotula — Vrystert-brotula

Bidenichthys capensis Barnard, 1934: 234, Fig. 3 (St. James, False Bay); Smith, **SFSA No. 1012***.

D about 75; A about 38; P 18-20. Depth about 4.5; head about 3.6-3.7. Head naked; body with rows of minute overlapping scales. Sharp pointed spine on opercle; P with an elongate peduncle.

Generally yellowish. Attains 9 cm. Endemic, found in rocky tidepools from East London to the Cape. Possibly 2 species, 1 unnamed, in our area.

98.1 *Bidenichthys capensis:* 4.5 cm (Buffels Bay, Cape).

Genus ***Cataetyx*** Günther, 1887

Rather large benthopelagic fishes found around the world at bathyal to abyssal depths. Ten or more species; 3 in our area.

KEY TO SPECIES

1a Colour pale; A with about 100 rays ..... *C. chthamalorhynchus*
1b Colour dark brown; A 69-85 2

2a Head about 4 in SL; interorbital 6 to 7 in head length ..... *C. laticeps*
2b Head nearly 3 in SL; interorbital 3.4-3.6 in head ..... *C. niki*

98.2 *Cataetyx chthamalorhynchus*
Cohen, 1981

Cataetyx chthamalorhynchus Cohen, 1981: Figs. 4 & 5 (33°04′S, 16°43′E; depth 1 000 m).

D 140; A 100; P 28; vertebrae 77. Eyes dorsolateral, 7.3, interorbital 6.8 in head. Snout depressed, length about equal to head width; a sharp spine behind posterior nostril, another at upper angle of opercle and a third at upper end of P base.

Known only from the 38 cm holotype taken off Saldanha Bay.

98.2 *Cataetyx chthamalorhynchus:* 35.5 cm.

98.3 *Cataetyx laticeps*
Koefoed, 1927

Cataetyx messieri (*non* Günther): Gilchrist, 1905: 141; Smith, SFSA **No. 1020** (fig. = *messieri,* not *laticeps*). *Cataetyx laticeps* Koefoed, 1927: 137, Pl. 6, Fig. 3 (28°08′N, 13°35′W, 1 365 m); Cohen, 1981: 1095. *Cataetyx memoriabilis* Meyer-Rochow, 1970: 39 (33°51′S, 17°14′E, 1 350 m).

D 98-107; A 75-83, P 29-30; vertebrae 60-61. Eyes dorsolateral, 7.1-8.9. Snout depressed, somewhat broader than long; blunt knob buried in skin behind posterior nostril.

Apparently widely distributed in Atlantic Ocean in 1 000 - 2 000 m.

98.3 *Cataetyx laticeps:* 29 cm holotype (after Koefoed, 1927).

98.4 *Cataetyx niki*
Cohen, 1981

Cataetyx niki Cohen, 1981: 1096, Figs. 7 & 8 (35°04′S, 24°20′E, 1 000 m).

D 91-95; A 69-77; P 29-30; vertebrae 54-56. Eyes 9.1. Snout depressed, about twice broader than long. Strong spine at upper angle of opercle; no spine at rear nostril or P base.

Known only from 2 specimens trawled off the Cape in 1 000 - 1 100 m.

98.4 *Cataetyx niki:* 64 cm holotype (diagrammatic, after Cohen, 1981).

Genus ***Dermatopsoides*** Smith, 1947

Two species of small, secretive, small-eyed fishes found only along our south coast in shallow water.

KEY TO SPECIES

1a Body with minute, indistinct scales; P rays 24 ..... *D. kasougae*
1b No scales; P rays 17-18 ..... *D. talboti*

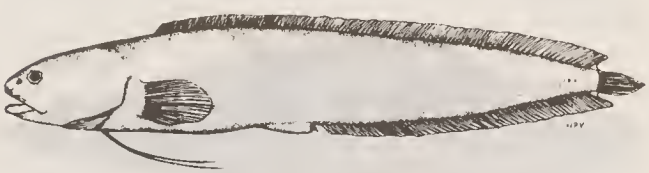
98.5 *Dermatopsoides kasougae*
(Smith, 1943)

Orange brotula — Oranje brotula

Dermatopsis kasougae Smith, 1943: 72, Fig. 3 (Mouth of Kasouga River, west of Port Alfred). *Dermatopsoides kasougae:* Smith, 1947: 344; Smith, SFSA **No. 1011***; Cohen, 1966: 198; Smith, 1966: 92.

D 100; A 71. V more than ½ head length, reaching beyond tip of P. Eye about 10 in head.

Live colour light salmon pink. Attains 65 mm. Found only from Algoa Bay to Port Alfred.



98.5 *Dermatopsoides kasougae:* 6.5 cm holotype (E. Cape).

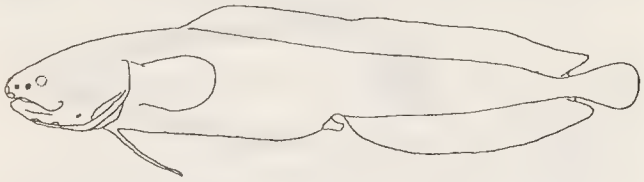
98.6 *Dermatopsoides talboti*
Cohen, 1966
PLATE 10

Lesser orange brotula — Kleiner oranje brotula

Dermatopsoides talboti Cohen, 1966: 196, Fig. 5 (Algoa Bay); Smith, 1966: 92; Day, Field & Penrith, 1970: 99.

D 59-80; A 36-54. V no more than ½ head length, not reaching beyond tip of P. Eye about 15 in head.

Live colour orange, pale in preservative. Attains 57 mm. Known only from Saldanha Bay to Algoa Bay.



98.6 *Dermatopsoides talboti:* 4 cm SL (after Cohen, 1966).

Genus ***"Dinematichthys"*** Bleeker, 1855

Although a number of species have been named in this genus, it is possible that there is only 1 described species that can be correctly referred to it. The difficult taxonomy of *Dinematichthys* has been discussed by Cohen & Nielsen (1978). *Dinematichthys ilucoeteoides* has been listed by Smith, 1961: 571, **No. 1012a** ("Reaches Inhaca"); however, *D. ilucoeteoides* has never been caught in the area. The record is based on 1 or more species, probably un-named, which cannot be easily assigned to a genus.

Genus ***Diplacanthopoma*** Günther, 1887

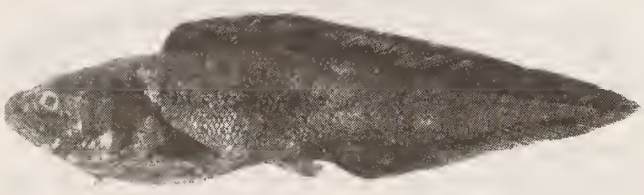
A prominent skin flap with a large pore is found over the opercle. Eight species have been named; 1 in our area.

98.7 *Diplacanthopoma nigripinnis*
Gilchrist & von Bonde, 1924

Diplacanthopoma nigripinnis Gilchrist & von Bonde, 1924: 20, Pl. 4, Fig. 2 (off Durban, 1 281 m); Smith, **SFSA No. 1021*.** *Sarcocara nigripinnis:* Smith, 1968: 18*.

D about 120; A about 70; P 29. Depth 4.1; head 3.8 in SL. About 73 rows of overlapping scales on body, none on head.

Body dark brown; head and vertical fins black. Attains 30 cm. Off Natal in 410 - 1 281 m; known from only 2 specimens.



98.7 *Diplacanthopoma nigripinnis:* 16 cm (off Durban).

Genus ***Grammonoides*** Smith, 1947

A single species.

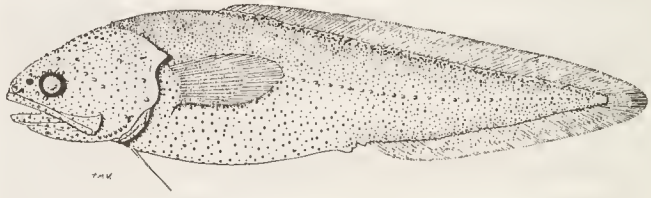
98.8 *Grammonoides opisthodon*
(Smith, 1934)

Bighead brotula — Grootkop-brotula

Grammonus opisthodon Smith, 1934: 52, Pl. 6, Fig. B (Port Alfred). *Grammonoides opisthodon:* Smith, 1947: 335; **SFSA No. 1016*;** Cohen & Nielsen, 1978: 47*.

P 23. No teeth on palatines. Jaw teeth separate, conical, in an irregular row.

Attains 50 mm. Two specimens known: 1 from Port Alfred and a second recently collected in 22 m off the mouth of the Storms River (24°E).



98.8 *Grammoides opisthodon:* 4.5 cm SL holotype.

Family No. 99: APHYONIDAE

by J. G. Nielsen

Aphyonids — **Aphyoniede**

Body elongate. Dorsal and anal fins elongate, joined to caudal fin; pelvic fins rudimentary or absent. Scales absent; skin loose, transparent and gelatinous. Eyes poorly developed. Gill-rakers present or absent. Basibranchial tooth patches absent. Viviparous; males with a variously developed copulatory organ. Abdominal vertebrae 26-48.

Deep-sea fishes attaining a length of up to 18 cm, found on or near bottom (from 500 m down to more than 5 000 m) and some most probably deep-pelagic. Reviewed by Nielsen (1969) and Cohen & Nielsen (1978). Five genera with about 20 species; 3 species in our area.

KEY TO GENERA

1a Developed GR on anterior arch 24-33; C rays 9-10; palatine teeth present ..... *Barathronus*
1b Developed GR 3-14; C rays 6-7; palatine teeth absent ..... *Aphyonus*

Genus ***Aphyonus*** Günther, 1878

Four species; 2 in our area.

KEY TO SPECIES

1a D 93-118; predorsal length 27-31% SL ..... *A. gelatinosus*
1b D 72; predorsal length 44% SL ..... *A. brevidorsalis*

99.1 *Aphyonus brevidorsalis*
Nielsen, 1969

Aphyonus brevidorsalis Nielsen, 1969: 20, Fig. 6 (34°09'S, 30°45'E; depth 4 360 m).

D 72; A 58; P 17. Anal origin below 20th D ray. Developed GR on 1st gill arch 9.

Owing to the transparent skin the general colour derives from the underlying muscle tissues. Known from a single specimen (71 mm SL).

99.1 *Aphyonus brevidorsalis:* 8 cm.

99.2 *Aphyonus gelatinosus*
Günther, 1878

Aphyonus gelatinosus Günther, 1878: 22 (between NE Australia and New Guinea); Günther, 1887: 120*; Nielsen, 1969: 15*.

D 93-118; A 65-71; P 17-18. Anal origin below D rays 42-47. Developed GR on 1st gill arch 3-4.

Peritoneum bluish. Attains 15 cm. One specimen from off Natal in 625 - 900 m; known from relatively few specimens from all oceans.

99.2 *Aphyonus gelatinosus:* 13.5 cm.

Genus ***Barathronus*** Goode & Bean, 1886

Seven species; 1 or 2 in our area.

99.3 ?*Barathronus bicolor*
Goode & Bean, 1886

?*Barathronus bicolor:* Gilchrist, 1906: 158; Smith, **SFSA No. 1013***. Gilchrist (1906) briefly described a 120 mm specimen caught off Cape Point, referring it to *B. bicolor*, previously known only from the tropical West Atlantic. Judging from its locality, Shcherbachev (1976: 165) suggested that Gilchrist's specimen was probably *B. maculatus*. Since Gilchrist noticed both dark patches along the body (as in *B. maculatus*) and dark streaks (as in *B. bicolor*); and since the specimen now is lost, it is not possible to make an exact specific identification.

99.3 *Barathronus bicolor:* 12 cm (after Goode & Bean, 1896).

99.4 *Barathronus maculatus*
Shcherbachev, 1976

Barathronus maculatus Shcherbachev, 1976: 164 (off Durban; 950 m); Shcherbachev et al., 1978: 191.

D 76-78; A 57-66; P 24-25. Developed GR on 1st gill arch 30-32. Predorsal length 37-41% SL. Fangs on vomer and dentaries; palatines edendate.

Peritoneum dark. Several irregular brown pigmented areas along both sides. Attains 18 cm. Two specimens from our area, 1 from off northern Madagascar, and 2 from off Japan (Nielsen & Machida, in press).

99.4 *Barathronus maculatus:* 17 cm.

Order BATRACHOIDIFORMES

Body elongate, cylindrical or somewhat depressed anteriorly, compressed posteriorly; body naked or with small, embedded cycloid scales. Head broad, more or less depressed; mouth large. Ribs and pyloric caeca absent. See family account below for additional characters.

A single family with about 18 genera and 60 species. Batrachoidids are thought to be closely related to the Lophiiformes and Gobiesociformes (Rosen & Patterson, 1969).

Family No. 100: BATRACHOIDIDAE

by J.B. Hutchins

Toadfishes **Platannavisse**

Small to medium-sized fishes; body cylindrical, compressed posteriorly; head usually depressed. Skin smooth or with ridges, loosely attached to head, body and fins; body either covered with small embedded cycloid scales, partly scaly or entirely naked. Fleshy tentacles usually present around mouth. Gill cover with 3-5 strong spines, usually hidden below skin; 3 gill arches; gill opening extending from above pectoral fin base to above pelvic fin base. A band of small to moderate conical acute teeth in jaws; similar teeth on vomer and palatines. Spinous dorsal fin of 3 short strong spines, usually hidden in thick skin immediately behind head; pelvic fins jugular, with a concealed short spine, a simple thick ray encased in thick skin, and a much branched second ray. Three lateral lines along side of body, middle and lower lines usually difficult to detect; lateral line pores usually surrounded by a low bifid tentacle (in some species, the tentacle encloses a double pore, which is still considered a single unit). Swimbladder well developed, used for sound production by some species. A foramen or "pocket" may be present in upper portion of pectoral fin axilla.

Batrachoidids are benthic fishes found mostly in 10 - 250 m, but some species occur in intertidal areas. The largest species attains 35 cm, the smallest 10 cm. The flesh is good, but their repulsive appearance makes them unattractive as food-fish. Toadfishes occur in temperate and tropical waters of all oceans; 5 genera and 9 species are found in our area. One of our species extends to Angola, but the others appear to be restricted to southern Africa. Although some species in the tropical Atlantic have venomous spines, none of our species does.

KEY TO GENERA

1a Prominent foramen or pocket in upper portion of P axilla 2
1b No foramen in P axilla 4

2a Body scaly, at least posteriorly (may be difficult to detect in fish over 20 cm in length) 3
2b Body scaleless ..... *Austrobatrachus*

3a Prominent tentacles above eye; body scaly only on posterior half ..... *Riekertia*
3b No orbital tentacles; body completely scaly ..... *Perulibatrachus*

4a Body scaleless ..... *Batrichthys*
4b Body scaly (scales embedded, covered with mucus) ..... *Chatrabus*

Genus ***Austrobatrachus*** Smith, 1952

Two species; 1 in our area.

100.1 *Austrobatrachus foedus*
(Smith, 1947)
PLATE 12

Puzzled toadfish Fronsende platannavis

Pseudobatrachus foedus Smith, 1947: 820 (Algoa Bay). *Austrobatrachus foedus:* Smith, 1952: 323; **SFSA No. 1218*.**

D III+20-21; A 16-17; P 18-21. Many obvious fine skin ridges on head. Gill cover armed with 3-4 spines (lower subopercular spine small or absent). Upper LL with 48-55 pores.

Attains 27 cm. Known only from Algoa Bay to Coffee Bay, Transkei; rare.

Genus ***Batrichthys*** Smith, 1934

The earlier *Bathybatrachus* Gilchrist & von Bonde, 1924 and its type-species, *Bathybatrachus albolineatus* Gilchrist & von Bonde, 1924 were inadequately described (Smith, 1952: 339; **SFSA No. 1221***). The descriptions show some resemblance to *Batrichthys felinus* Smith, but differ significantly in fin-ray counts. As the type of *B. albolineatus* appears to be lost (Smith, 1952), this genus is considered a *nomen dubium.* There are 4 species of *Batrichthys,* with 3 in our area.

KEY TO SPECIES

1a V reach anus; 33-39 LL pores in upper series ..... *B. felinus*
1b V do not reach anus; 20-25 LL pores 2

2a Network of fine skin ridges dorsally on head, most prominent between the eyes ..... *B. apiatus*
2b No network of skin ridges dorsally on head ..... *B. albofasciatus*

100.2 *Batrichthys albofasciatus*
Smith, 1934
PLATE 12

White-ribbed toadfish — Witrib-platannavis

Batrichthys albofasciatus Smith, 1934: 99, Pl. 5, Fig. B (Great Fish Point); Smith, **SFSA No. 1217*;** 1952: 318.

D III+19; A 14; P 20. Gill cover with 4 strong spines. Upper LL with 23 pores.

Known from one 12 cm specimen found at Great Fish Point.

100.3 *Batrichthys apiatus*
(Valenciennes, 1837)
PLATE 12

Snakehead toadfish — Slangkop-platannavis

Batrachus apiatus Valenciennes, *in* Cuv. & Val., 1837: 477 (Cape of Good Hope). *Amphichthys ophiocephalus* Smith, 1946: 819. *Batrichthys ophiocephalus:* Smith, 1952: 316. *Gymnobatrachus ophiocephalus:* Smith, **SFSA No. 1216*;** Smith & Smith, 1966: 148*. *Batrichthys apiatus:* Penrith & Penrith, 1971: 47*.

D III+18-20; A 14-17; P 16-19; vertebrae 8+20. Gill cover with 4 spines; upper LL with 20-25 pores.

Ground colour buff, with prominent, dark brown, irregular crossbars on sides, continued onto soft D and A; in adults the body bars may be broken into smaller botches. Attains 10 cm. An intertidal species found only from Saldanha Bay to the Umtata River, Transkei.

100.4 *Batrichthys felinus*
Smith, 1952
PLATE 12

Pleated toadfish — Geplooide platannavis

Gymnobatrachus apiatus (*non* Cuvier, 1837): Smith, **SFSA No. 1215*.** *Batrichthys felinus* Smith, 1952: 320 (Port Alfred); Penrith & Penrith, 1971: 48; Winterbottom, 1978: 45.

D III+19-22; A 17-18; P 20-23. Gill cover with 4 spines; upper LL pores 33-39. Network of fine skin ridges on interorbital region.

Ground colour brown with darker blotches forming irregular crossbars on side of body; P and C dusky with indications of crossbars sometimes present. Attains 19 cm. Found only from the Cape to Port Alfred.

Genus ***Chatrabus*** Smith, 1949

Smith's genus *Tharbacus,* described in 1952, is a synonym of *Chatrabus.* The main distinguishing feature thought to separate these two genera is the presence or absence of scales on the nape, a character that is too variable to be of taxonomic value. Two species only.

KEY TO SPECIES

1a Soft D rays 20-23; A 16-18; roof of mouth blackish ..... *C. hendersoni*
1b Soft D rays 18-20; A 14-17; roof of mouth not blackish ..... *C. melanurus*

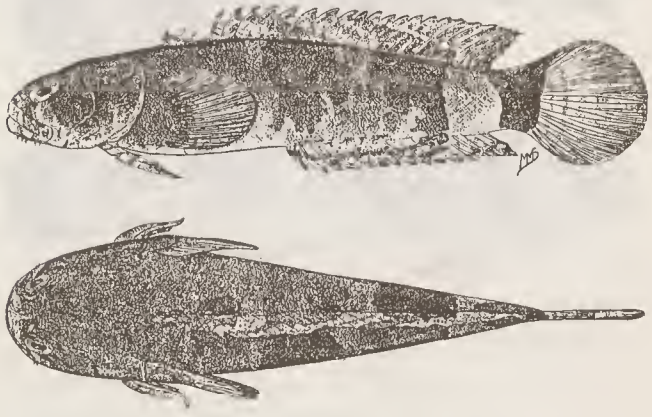
100.5 *Chatrabus hendersoni*
(Smith, 1952)
PLATE 12

Chocolate toadfish — Sjokolade-platannavis

Tharbacus hendersoni Smith, 1952: 336, Fig. 3 (Algoa Bay); Smith, 1953: p. 523, **No. 1219b*.**

D III+20-23; A 17-18; P 22-25; vertebrae 10-11+22. Gill cover with 4 spines. Upper LL pores 36-42. Small embedded cycloid scales on body from C base to rear of head, present or absent on nape.

Ground colour brown, with 3 or 4 darker crossbars on body; dorsal surface of head chocolate brown. P yellow-orange, with vague dark bars basally; C light orange-brown, faintly mottled darker. Attains 22 cm. Known only from Port Alfred to Storms River mouth.



100.5 *Chatrabus hendersoni*: 19 cm holotype (Algoa Bay).

100.6 *Chatrabus melanurus*
(Barnard, 1927)
PLATE 12

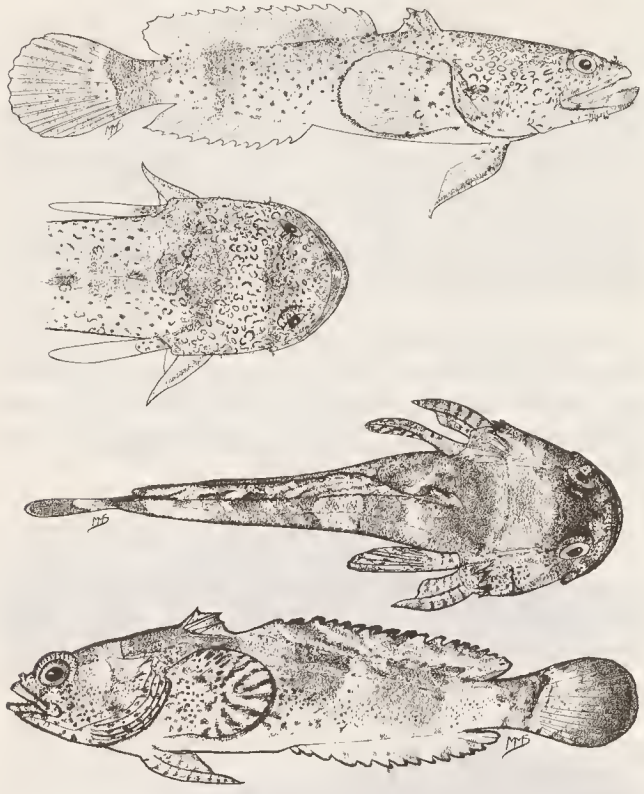
Humpback toadfish — Boggel-platannavis

Batrachoides melanurus Barnard, 1927: 994 (Cape St. Blaize). *Batrachoides damaranus* Barnard, 1927: 995 (Walvis Bay). *Chatrabus melanurus:* Smith, **SFSA No. 1219*;** 1952: 328; Penrith & Penrith, 1971: 50. *Chatrabus damaranus:* Smith, **SFSA No. 1220*;** 1952: 331; Penrith & Penrith, 1971: 51; Roux, 1971: 637*. *Tharbacus vanecki* Smith, 1952: 333, Fig. 2 (Port Alfred); Smith, 1953: 523, **No. 1219a*.**

D III+18-21; A 14-17; P 21-25; vertebrae 10+19-22. Gill cover with 4 (rarely 5) spines; upper LL pores 33-43. Small embedded scales on body from C base to just behind head; head usually scaleless.

Ground colour buff, with 4 dark bars on body; head and body covered with dark brown spots; soft D and A with irregular oblique dark bands; P pale, with irregular brown

bars; C dark brown, rear margin pale; large adults (>20 cm SL) with irregular dark ring-like markings on head. Attains 26 cm. Known only from Angola round the coast to Port St. Johns; abundant in 120 - 250 m off Cape Fria, Namibia (Karrer, 1973).



100.6 *Chatrabus melanurus*: top: 25 cm holotype of *C. damaranus* (Walvis Bay), bottom: 17.5 cm holotype of *Tharbacus vanecki* (Port Alfred).

Genus ***Perulibatrachus*** Roux & Whitley, 1971

Two species in our area.

KEY TO SPECIES

1a P rays 26; anterior nostril with a tuft of tentacles; globules of glandular tissue on inner face of P ..... *P. elminensis*

1b P rays 23; anterior nostril tubular with a simple tentacle; no globules of glandular tissue on inner face of P ..... *P. rossignoli*

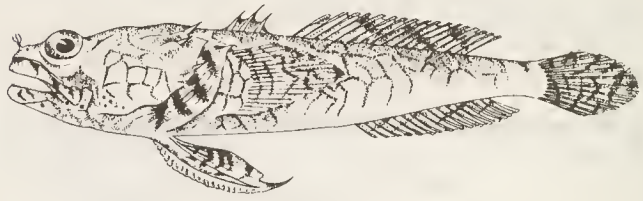
100.7 *Perulibatrachus elminensis*
(Bleeker, 1863)

Guinean toadfish — Guinese-platannavis

Batrachus elminensis Bleeker, 1863: 98 (Guinea). *Batrachus budkeri* Roux, 1957: 221*. *Parabatrachus elminensis:* Roux, 1971: 633*. *Perulibatrachus elminensis:* Roux, 1981*.

D III+16-21; A 14-17; P 26. Gill cover with 4 strong spines. Upper LL with 60 pores.

Ground colour dark brown on back, light brown on sides and belly; a network of irregular brown lines covering entire body except belly; soft D and A with oblique brown stripes. Attains 35 cm. West African coast south to Walvis Bay.



100.7 *Perulibatrachus elminensis:* 24 cm (after Roux, 1981).

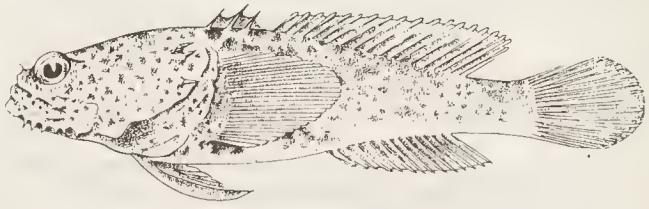
100.8 *Perulibatrachus rossignoli*
(Roux, 1957)

Westcoast toadfish — Weskus-platannavis

Batrachus rossignoli Roux, 1957: 221*. *Parabatrachus rossignoli:* Roux, 1971: 635*. *Batrachus rossignoli:* Lloris, 1981: 25. *Perulibatrachus rossignoli:* Roux, 1981*.

D III+19; A 13-15; P 23. Gill cover with 3 strong spines. Upper LL with 40 pores. Inner surface of P with diffuse glandular tissue.

Ground colour brownish, belly paler; 3-4 brown crossbars on body and 2 on head; brown spots sometimes spread over head and body. Attains 30 cm. West African coast from Gabon to Namibia; one specimen reported from off Walvis Bay.



100.8 *Perulibatrachus rossignoli:* 23 cm (after Roux, 1981).

Genus ***Riekertia*** Smith, 1952

Only 1 species.

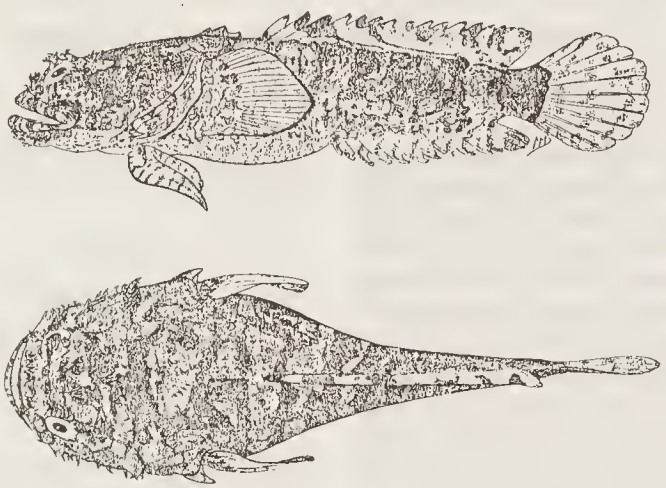
100.9 *Riekertia ellisi*
Smith, 1952

Broadbodied toadfish — Breëlyf-platannavis

Riekertia ellisi Smith, 1952: 325, Fig. 1 (Pondoland); 1953: 523, **No. 1218a*.**

D III+19-20; A 15-17; P 24-25; vertebrae 11+18. Gill cover with 3 or 4 spines; upper LL pores 47-50. A patch of small embedded scales on body from C base to just before anus, the patch narrowing anteriorly; rest of body scaleless.

After preservation, ground colour dark brown, mottled with lighter brown; dark blotches on body tend to form irregular crossbars in smaller specimens. Attains 29 cm. Known only from Durban to Port St. Johns (Transkei).



100.9 *Riekertia ellisi:* 20 cm holotype (Transkei).

Order LOPHIIFORMES

Introduction and Key to Families by T.W. Pietsch

Anglerfishes — Hengelaars

Anglerfishes are so named because nearly all are equipped with a fishing rod and lure on the tip of the snout. This angling apparatus, or "illicium" (from the Latin *illix*, decoy), is thought to be a greatly modified first dorsal-fin spine; it bears at the tip a structure called the "esca" (Latin, food or bait). Depending on the species, the esca may be a fleshy blob, a tuft of filaments, or (in deep-sea species) a luminescent organ containing light-emitting bacteria. These sedentary but voracious fishes lie in wait for smaller fishes or invertebrates to pass by and then enticingly wriggle their bait to attract the potential prey to their cavernous mouths.

Body elongate oval and greatly flattened to globose and somewhat laterally compressed. Head large; mouth enormous, oblique to vertical (except in the ogcocephalids, which have a small inferior mouth); teeth small and villiform to extremely large and fang-like. Gill openings more or less restricted, immediately above, behind or below (rarely partly in front of) base of pectoral fins. Pectoral-fin base elongate and leg-like; benthic species use their paired fins to "walk" along the bottom. Skin highly spinulose to naked, often with numerous cutaneous filaments or flaps. Brightly coloured and patterned to monotone grey, brown or black. Eggs of most species spawned in a double, scroll-shaped, mucous sheath. Vertebrae 18-31.

Inshore benthic on muddy to rocky bottom, coral and rocky reefs, to meso- and bathypelagic. Adult sizes range from 3 cm to over a metre. Lophiids (goosefishes or monks) are delicious and marketed either fresh or frozen; antennariids (frogfishes) are important in the aquarium trade, but other anglers are of no commercial value.

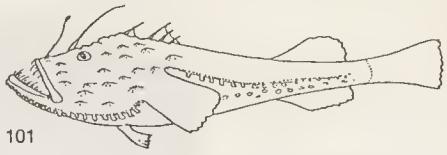
Anglerfishes occur in all tropical and temperate seas. Sixteen families with about 59 genera and 250 species; 9 families represented in our area.

KEY TO FAMILIES

1a Pelvic fins present (may be withdrawn beneath skin in some chaunacids) 2
1b Pelvic fins absent 5

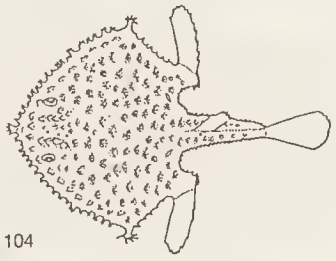
2a Body and head greatly flattened (depressed) 3
2b Body and head not flattened; globose or slightly compressed . 4

3a At least 3 free D spines on top of head; body naked; mouth very large, with long needle-like teeth ..... LOPHIIDAE (No. 101)



101

3b A single short D spine (the illicium) lying within a cavity between the eyes; body encased in armour of hard spiny scales; mouth small, inferior, with villiform teeth ..... OGCOCEPHALIDAE (No. 104)



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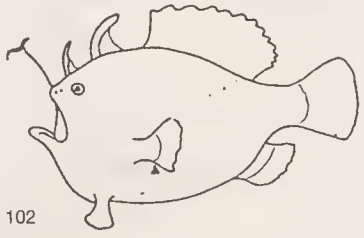
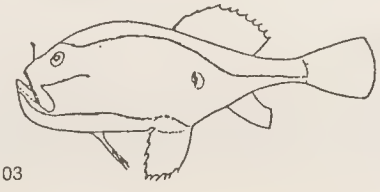
4a First D spine (illicium) not short and stubby, not received in a depression on snout; 2nd and 3rd D spines well developed though covered by skin ..... ANTENNARIIDAE (No. 102)



102

4b Illicium short and stubby, received in a depression on snout; 2nd and 3rd D spines not discernible ..... CHAUNACIDAE (No. 103)



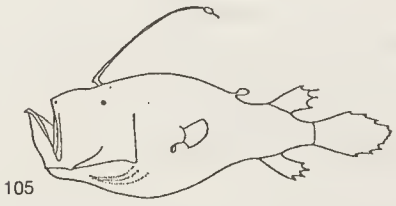
103

5a Soft D rays 12-17 ..... MELANOCETIDAE (No. 107)

107

5b Soft D rays 4-8 6

6a Two or 3 bulbose "caruncles" on dorsal midline in front of D; mouth vertical to strongly oblique ..... CERATIIDAE (No.105)

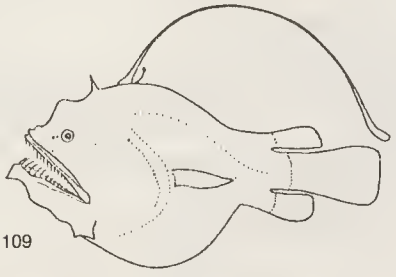


105

6b No "caruncles" on dorsal midline; mouth oblique to nearly horizontal 7

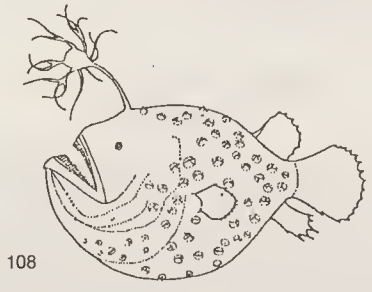
7a Second D spine minute, embedded beneath skin of head ... 8

7b Second D spine well developed, with esca at tip ..... DICERATIIDAE (No. 109)



109

8a Skin with large bony scales, each bearing a median spine ..... HIMANTOLOPHIDAE (No. 108)



108

8b Skin naked or with scattered microscopic spinules ..... ONEIRODIDAE (No. 106)

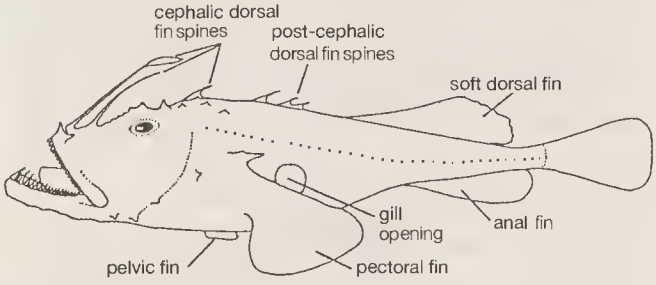
106

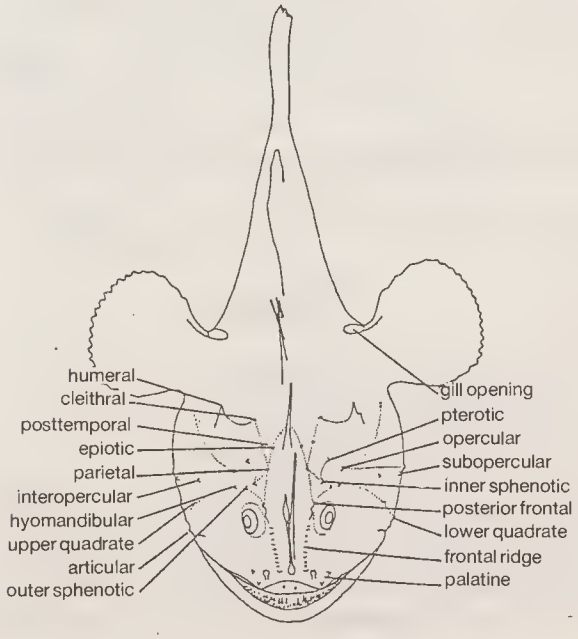
Family No. 101: LOPHIIDAE

by J.H. Caruso

Monks **Monnikke**

Head and body oval or moderately to strongly depressed. Head massive; dorsal surface with prominent bony spines, knobs and ridges. Mouth wide, cavernous, bearing large, slender, depressible, recurved teeth; lower jaw projecting well beyond upper. Pectoral fin base greatly elongated and arm-like; pectoral fin rays unbranched, terminating in pale, fleshy, recurved tips. Gill opening extending below and behind, or below, behind and in front of pectoral fin base. Skin thin, loose and scaleless; bearing numerous well-developed fleshy tendrils or cirri on lateral margins of head, lower jaw and body. Dorsal fin divided into separate soft and spinous portions. Soft dorsal fin located near tail; of 8 to 12 rays. Spinous dorsal fin divided into two portions, one on head (cephalic), one on body in front of soft dorsal fin (post-cephalic); cephalic portion usually composed of 3 isolated spines, first and second close together near tip of snout, third near posterior end of head, first spine modified as angling apparatus and usually bearing fleshy bait (esca) at tip, second and third dorsal fin spines usually with fleshy





tendrils along entire length; postcephalic portion of 1-3 spines, some or all of which may be embedded or absent. Anal fin below soft dorsal, of 6 to 10 rays. Pelvic fins on ventral surface of head anterior to pectoral fins. Gills present on first 3 branchial arches, absent on fourth.

Occurring in all oceans; commercially important in some areas. Four genera with a total of 25 species. Recent generic revisions by Caruso & Bullis, 1976; Caruso, 1977, 1981, 1983. To ensure accurate counts of D and A rays, make an incision at base of each fin, so that the proximal part of each ray can be seen; the last 2 rays arise from the same base. Since P rays are unbranched, accurate counts can be made by counting projecting tips of rays.

KEY TO GENERA

1a Head and body depressed (flattened); 3rd cephalic D spine present; humeral, articular, quadrate and subopercular spines present 2
1b Head and body not depressed; 3rd cephalic D spine absent; humeral, articular, quadrate and subopercular spines absent ..... *Sladenia*
(Not reported from our area)

2a Frontal ridge smooth (can be felt through skin); gill opening extending well in front of P base; articular with a spine before and 1 after jaw joint; sphenotic with 1 spine ..... *Lophiodes*
2b Frontal ridge rugose, bearing knobs, spines or ridges (can be felt through skin); gill opening not extending in front of P base; articular with a single spine before jaw joint; sphenotic with 2 or 3 spines 3

3a Soft D rays 8; A rays 6; floor of mouth with dark reticulations; quadrate with one spine; interopercle with 2 spines; frontal ridge, outer surface of maxilla and lower jaw bearing low, sharp spines; vertebrae 19 ..... *Lophiomus*
3b Soft D rays 9-12; A rays 8-10; floor of mouth without dark reticulations; quadrate with 2 spines; interopercle with 1 spine; vertebrae 26-31 ..... *Lophius*

Genus ***Lophiodes*** Goode & Bean, 1896

Thirteen species; 2 in our area.

KEY TO SPECIES

1a Three long postcephalic D spines; inner sphenotic spines recurved; 2nd cephalic D spine 26-48% SL; distance between frontal spines 30-35% HL (premaxillary symphysis to posteromedial end of cranium); esca with translucent bulb, cirri and pennant-like flap ..... *L. insidiator*
1b One or 2 reduced or embedded postcephalic D spines; inner sphenotic spines straight, not recurved; 2nd cephalic D spine 20-30% SL; distance between frontal spines 36-46% HL; esca a simple pigmented bulb ..... *L. mutilus*

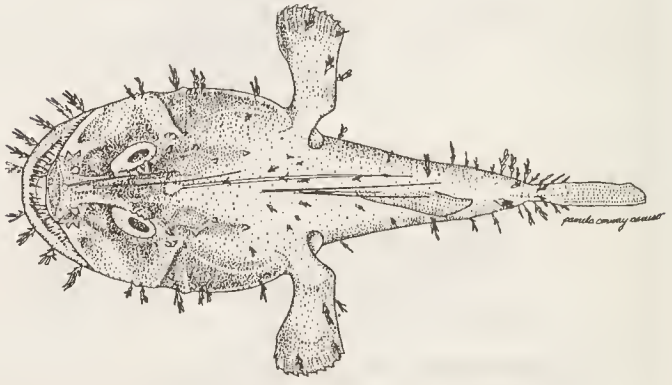
101.1 *Lophiodes insidiator*
(Regan, 1921)

Natal monk — Natalse monnik

Chirolophius insidiator Regan, 1921: 418 (off Natal). *Chirolophius crosnieri* Le Danois, 1974: 77, Figs. 51 & 52 (Indian Ocean north of Madagascar). *Chirolophius phycoides* Le Danois, 1974: 82, Figs. 54 & 55 (Indian Ocean off Madagascar). *Lophiodes insidiator:* Smith, **SFSA No. 1223;** 1968: 21; Caruso, 1981: 527*.

D I+I+I+III+8; A 6; P 14-18. Head 2.6-3.0. Cephalic and postcephalic D spines well developed. Supraorbital crests elevated, interorbital area forming deep U-shaped trough between eyes. Inner frontal spines absent. Esca (bait) with pennant-like flap, long cirri, translucent bulb and frequently with dark, stalked, bulb-like appendages that resemble shrimp eyes.

Head and body uniform light to dark brown above, lighter below; P and median fins pigmented as adjacent areas of body, A darker distally, soft D and C with interradial membranes lightly pigmented or unpigmented; D spines 2-6 pigmented as dorsal body surface, with numerous dark tendrils; inside of mouth pale except for dark patch on floor behind lower pharyngeal tooth plate and mottled dark brown on tongue; peritoneum solid black. Attains 30 cm. Natal to northern Madagascar at depths of 200 - 600 m.



101.1 *Lophiodes insidiator:* 20 cm.

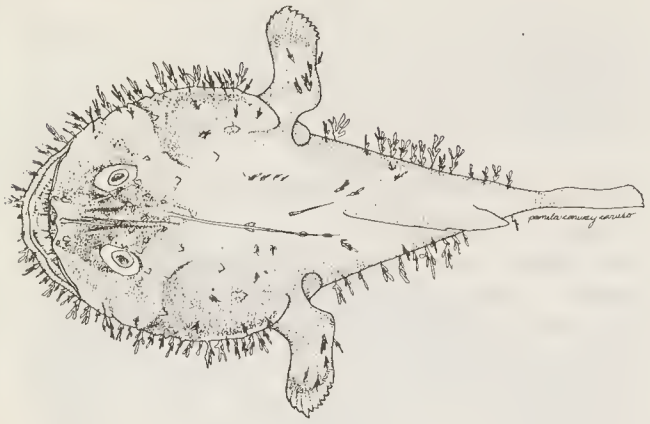
101.2 *Lophiodes mutilus*
(Alcock, 1893)

Lophius mutilus Alcock, 1893: 179, Pl. 10, Fig. 2 (Bay of Bengal). *Lophiodes mutilus:* Smith, **SFSA No. 1222;** Caruso, 1981: 538.

D I+I+I+I or II+8; A 6; P 15-18. Head 2.3-2.8. Third D spine 36-64% SL; post-cephalic portion reduced, 4th spine absent, 5th and 6th spines reduced or embedded. Supraorbital crests not greatly elevated; interorbital moderately concave, but not forming U-shaped trough between eyes. Inner frontal spines present, may be somewhat reduced in large specimens. Esca a simple rounded or flattened bulb, lacking pennant-like flap, long cirri, and bulb-like appendages.

Head and body uniform light to dark brown above, lighter below; P pigmented as body, darker distally; median fins pigmented as adjacent areas of body; inside of mouth

pale, tongue dusky. Attains 35 cm. Indo-West Pacific south to Natal in 300 - 500 m.



101.2 *Lophiodes mutilus*: 30 cm.

Genus ***Lophiomus*** Gill, 1893

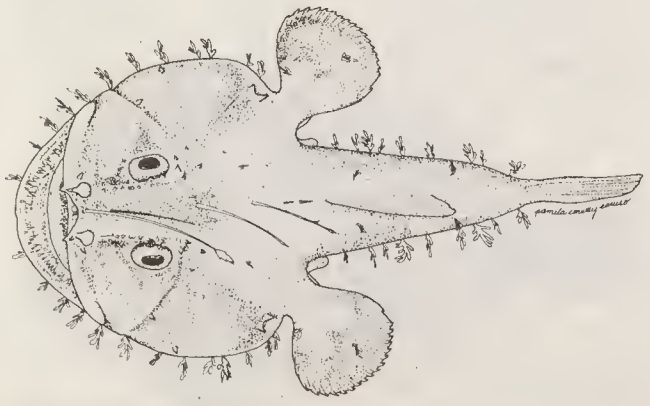
One species.

101.3 *Lophiomus setigerus*
(Vahl, 1797)

Lophius setigerus Vahl, 1797: 215, Pl. 3, Figs. 5 & 6 (Pacific Ocean off China). *Lophiomus setigerus:* Smith, **SFSA No. 1224*;** Caruso, 1983: 13*.

D I+I+I+III+8; A 6; P 21-25. Head 2.5-3.1. D spines 1-4 long and slender, spines 5 and 6 very short, 6th often embedded. Esca with pennant-like flap and frequently with dark, stalked, bulb-like appendages that resemble shrimp eyes.

Head and body mottled light to dark brown above, very light tan to nearly white below; fins pigmented as adjacent areas of body except distal part of ventral surface of P with brown reticulations; first D spine pale, second spine very darkly pigmented, with numerous tendrils, spines 3-6 pigmented as dorsal body surface; pigmentation of peritoneum variable, usually dusky, light or dark extremes rare. Attains 35 cm. Indo-West Pacific south to False Bay in 70 - 250 m.



101.3 *Lophiomus setigerus:* 24 cm SL.

Genus ***Lophius*** Linnaeus, 1758

Eight species; 2 in our area.

KEY TO SPECIES

1a Peritoneum pale; 3rd cephalic D spine 4.8-8.1% SL ..... *L. upsicephalus*

1b Peritoneum dark; 3rd cephalic D spine long, 11-18% SL ..... *L. vomerinus*

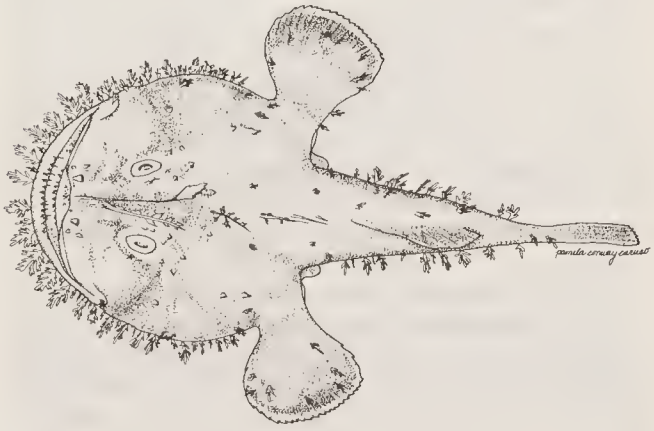
101.4 *Lophius upsicephalus*
Smith, 1841
PLATE 15

Monk — Monnik

Lophius upsicephalus Smith, 1841, Pl. 9 (off Cape of Good Hope); Caruso, 1983: 25. *Lophius piscatorius* (*non* Linnaeus): Smith, **SFSA No. 1225*.**

D I+1+I+III+10-11; A 9; P 22-26. Head 2.9-3.2. First and 2nd D spines long, spines 3-6 very short. Esca a simple pennant-like flap with dark pigment at base.

Head and body mottled dark brown to light brown above, light tan to nearly white below; P, D & A pigmented as adjacent areas of body proximally, darker distally; ventral surface of P with distinct dark brown or black band distally; V pale, with some dark pigment on inter-radial membranes; D spines pigmented as dorsal body surface, spines 2-6 with dark brown tendrils; floor of mouth dusky behind tongue; peritoneum pale. Attains 100 cm. Known only from eastern South Atlantic and southwestern Indian oceans off South Africa at depths of 170 - 310 m.



101.4 *Lophius upsicephalus:* 17 cm.

101.5 *Lophius vomerinus*
Valenciennes, 1837

Lophius vomerinus Valenciennes, *in* Cuv. & Val., 1837: 381 (off Cape of Good Hope); Caruso, 1983: 27.

D I+I+I+III+9-10; A 9; P 23-25. Head 2.9. Cephalic D spines long, postcephalic spines short. Esca a simple pennant-like flap.

Head and body dark brown above, light tan to nearly white below; P pigmented as adjacent areas of body proximally, darker distally, the ventral surface with distinct dark brown band distally; other fins pigmented as adjacent areas of body; A darker distally; floor of mouth dusky behind tongue; peritoneum dark, nearly black. Attains 100 cm. Off Cape of Good Hope and Bay of Bengal off Burma.

Family No. 102: ANTENNARIIDAE

by T.W. Pietsch

Anglers **Hengelaars**

Body short, globose, slightly compressed. Mouth large, oblique to vertical, with numerous, small, villiform teeth. Gill opening restricted to a small pore located behind and below pectoral fin base. Illicium slender; esca usually well developed. Second and third dorsal fin spines free from soft dorsal fin, well developed, and covered by skin; pectoral fin base elongate, limb-like; pelvic fins present. Skin spinulose or naked, often with membranous filaments or flaps. Colour and colour pattern highly variable, two extremes: a more common light phase with light tan to yellow, brown or rust background usually overlaid with black, brown, pink, or bright yellow streaks, bars, and/or spots on head, body and fins; dark phase with green, dark red, dark brown to black background with streaks, bars or spots showing through as deeper black; tips of rays of paired fins often white. Vertebrae 5+14.

Anglers (also called "frogfishes" or "toadfishes") are of no economic importance except in the aquarium trade. Occur in all tropical and subtropical seas; juveniles and adults on bottom in 0 - 92 m, or, as in the case of *Histrio,* in floating *Sargassum* weed. Some species attain a length of 49 cm. Thirteen genera, with a total of 40 species; 2 genera and 9 species known from our area. Generic revision by Pietsch (1984).

J.L.B. Smith writes (**SFSA,** p. 430): "These small fishes live mainly about reefs and rocks among weed, where their shape and markings render them virtually invisible. As they can inflate the body to some extent, they have little difficulty in drifting with floating weed by which they are completely concealed. The filaments of the lure (spine) on the snout can be moved to attract fishes and other creatures. It is an education to see this fish at work. With body perfectly still but tensed, and with eyes glued on the prospective prey, the filaments are moved about to resemble a writhing worm. They even change colour with varying iridescence. As the small fish darts forward to seize this tasty morsel, levered by the pectorals the toadfish (angler) shoots out and with open mouth engulfs its prey."

KEY TO GENERA

1a Skin with minute prickles (rough); P base broadly connected to body; associated with coral or rock substratum . . . . . *Antennarius*
1b Skin naked (smooth), often with membranous filaments or flaps; P with narrow limb-like base; usually associated with floating sargassum weed . . . . . *Histrio*

Genus ***Antennarius*** Daudin, 1816

Antennarius (Commerson, MS) Lacepède, 1798, is a non-binomial name validated by Opinion 24 of the International Commission on Zoological Nomenclature but later suspended by Opinion 89. Approximately 25 species; 8 occur in our area.

KEY TO SPECIES

1a Illicium tapering to a fine point; no esca; 2nd D spine straight, slightly tapered; 3rd D spine immobile, tightly bound to head by thick, firm skin; A rays nearly always undivided . . . . . *A. tuberosus*
1b Esca well developed; 2nd D spine usually curved posteriorly, not tapered; 3rd D spine mobile, only loosely held to head by skin; A rays all divided 2

2a Bony support for 1st and 2nd D spines extending in front of upper jaw 3
2b Bony support for 1st and 2nd D spines not extending in front of upper jaw 4

3a Esca of 2-3 stout tentacles . . . . . *A. striatus*
3b Esca a dense tuft of fine filaments . . . . . *A. hispidus*

4a First D spine (excluding esca) nearly twice length of 2nd; 2nd spine joined to head by membrane 5
4b First D spine (excluding esca) subequal to or shorter than 2nd; 2nd spine not joined to head by membrane 6

5a D I+I+I,11-13; A 7-8; P 10-11; skin joining 2nd D spine to head membranous and only lightly covered with dermal spines . . . . . *A. pictus*
5b D I+I+I,12-13; A 8; P 10-11; skin joining 2nd D spine to head thick and densely spinulose . . . . . *A. commersoni*

6a First D spine (excluding esca) subequal to 2nd; P 10-12 7
6b First D spine (excluding esca) distinctly shorter than 2nd; P 8-10 . . . . . *A. dorehensis*

7a Distinct C peduncle present; esca comprises a cluster of darkly pigmented swellings and an anteriorly directed appendage . . . . . *A. nummifer*
7b No distinct C peduncle (D and A joined to base of C); esca a small whitish blob . . . . . *A. coccineus*

102.1 *Antennarius coccineus*
(Lesson, 1831)
PLATE 13

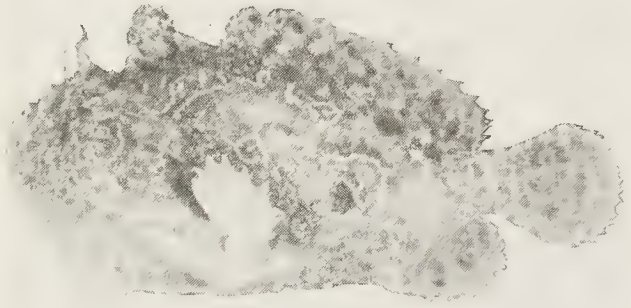
Freckled angler Sproet-hengelaar

Chironectes coccineus Lesson, 1831: 143, Pl. 16, Fig. 1 (Mauritius). *Antennarius leucus* Fowler, 1935: 512, Fig. 53 (Natal). *Antennarius coccineus:* Smith, **SFSA No. 1238*.**

D I+I+I,12-13; A 7; P 10-12. Esca a spherical, whitish blob. Second D

spine curved posteriorly, not connected to head by membrane. D and A joined to peduncle or C base.

Colour in preservative grey, tan or yellow to yellow-brown, usually with darker brown to black mottling or spots especially on cheeks and opercular region. Attains 13 cm. Natal; throughout Indian Ocean, Red Sea and tropical Pacific to Hawaiian Ids.; tropical eastern Pacific off Costa Rica and Cocos and Galapagos islands.



102.1 *Antennarius coccineus:* (Mauritius; photo by J.E. Randall).

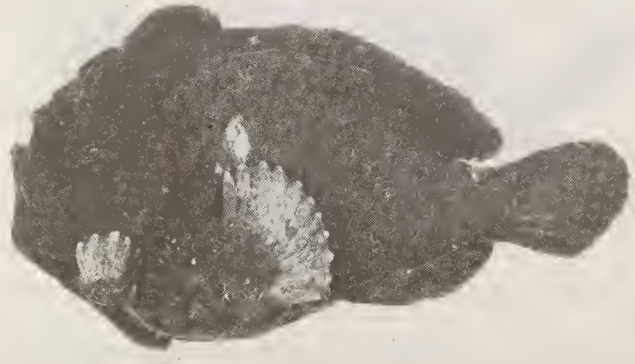
102.2 *Antennarius commersoni*
(Latreille, 1804)
PLATE 13

Big angler — Groot hengelaar

Lophius commerson Latreille, March 1804: 73. *Lophius commersonii* Shaw, June 1804: 387 (Indian Seas). *Antennarius commersoni:* Smith, **SFSA No. 1236*.**

D I+I+I,12-13; A 8; P 10-11. First D spine considerably longer than 2nd; esca a small tuft of flattened appendages. Second D spine curved posteriorly, bound to head by thick, spiny skin. C peduncle distinct.

Colour in preservative light beige or tan, green, brown to black; lighter phases finely peppered with small dark spots or mottled with dark patches of variable size; darker phases with light-coloured (white to pink, green or blue) patches, and with tips of P rays white; dark basi-dorsal and basi-anal spots occasionally present. The largest antennariid in our area, attaining a length of 33 cm. Natal, Red Sea and tropical Indo-West Pacific to Hawaiian Ids.; extremely rare in tropical eastern Pacific (Panama).



102.2 *Antennarius commersoni:* black variety (Transkei; photo by R.E. Stobbs).

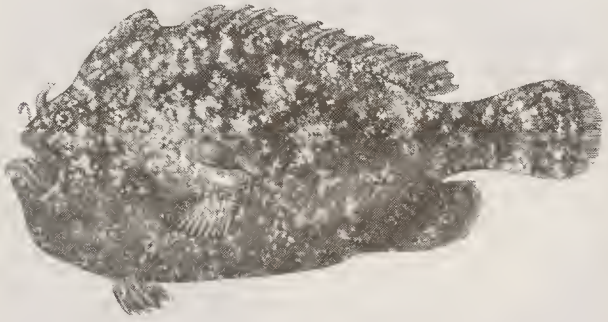
102.3 *Antennarius dorehensis*
Bleeker, 1859

Bandtail angler — Balkstert-hengelaar

Antennarius dorehensis Bleeker, 1859: 21 (Doreh, New Guinea); Schultz, 1957: 97*.

D I+I+I,11-13; A 7; P 8-10. Esca oblong or tapering, usually directed ventrally. Second spine curved posteriorly, not connected to head by membrane. C peduncle distinct.

Colour in preservative brown to black with numerous small white dots or pale patches; tips of soft D and A rays white; distal ½ of P rays white, peppered with small dark spots; C with conspicuous pale bar; a dark basi-dorsal spot occasionally present. Attains 7 cm. Delagoa Bay to Kenya, Aldabra and Seychelles Ids., and tropical western Pacific as far east as Tahiti.



102.3 *Antennarius dorehensis:* 7 cm TL (after Bleeker, 1865).

102.4 *Antennarius hispidus*
(Bloch & Schneider, 1801)
PLATE 13

Shaggy angler — Harige hengelaar

Lophius hispidus Bloch & Schneider, 1801: 142 (Coromandel, India). *Antennarius hispidus:* Smith, **SFSA No. 1234*.**

D I+I+I,12-13; A 7; P 10. First D spine as long as second; esca a large, dense tuft of fine filaments. Second D spine curved posteriorly with a narrow membranous connection to surface of head. Pterygiophore supporting D spines extending slightly beyond upper jaw. C peduncle distinct.

Colour in preservative light yellow, dark yellow-brown, to black; lighter colour phases everywhere (except on belly) covered with numerous, narrow, dark brown to black streaks or elongate blotches typically radiating outward from eye and extending posteriorly to level of P, more or less parallel and extending from P region onto soft D and A; C similarly banded; belly without markings or with scattered, dark, rounded spots. Attains 20 cm. Indo-West Pacific, south to Knysna.

102.5 *Antennarius nummifer*
(Cuvier, 1817)

Spotfin angler — Kolvin-hengelaar

Chironectes nummifer Cuvier, 1817: 430, Pl. 17, Fig. 4 (locality unknown). *Antennarius nummifer:* Schultz, 1957: 102*.

D I+I+I,12; A 7; P 10-11. First D spine as long as 2nd; esca usually consisting of a cluster of spherical, darkly pigmented swellings associated with a variable number of thin cylindrical filaments, and a large, usually anteriorly directed, pleated appendage. Second D spine more or less straight, without membranous connection to surface of head. C peduncle distinct.

Colour in preservative beige, pink, brown to black; lighter-coloured phases often with dark irregularly shaped patches over entire body; soft D, A and C often peppered with numerous, small dark spots; a conspicuous, dark, basidorsal spot nearly always present; black phases with tips of P rays white. Attains 13 cm. Delagoa Bay to Zanzibar, Red Sea and throughout Indo-West Pacific.

102.5 *Antennarius nummifer:* (Mauritius; photo by J.E. Randall).

102.6 *Antennarius pictus*
(Shaw & Nodder, 1794)
PLATE 13

Painted angler — Skilder-hengelaar

Lophius pictus Shaw & Nodder, 1794: Pl. 176, upper figure (coast of eastern Australia and neighbouring islands, i.e. Tahiti). *Antennarius polyophthalmus:* Smith, **SFSA No. 1242***. *Antennarius oligospilos:* Smith, **SFSA No. 1241***; Smith & Smith, 1963: 61*.

D I+I+1,11-13; A 7-8; P 10-11. Esca an elongate tuft of flattened appendages. Second D spine curved posteriorly. C peduncle distinct.

Colour in preservative light tan, yellow-brown, dark brown or black; lighter phases everywhere covered with dark circular spots (some occasionally ringed with white), and somewhat lighter-coloured, irregularly shaped patches, particularly on nape, cheek and P region; darker phases with tips of P rays white, body ranging from opaque black with no conspicuous markings, to brown everywhere covered with small black circular spots and lighter-coloured, irregularly shaped patches. Attains 24 cm. Smith (**SFSA,** p.431) states *re* the fish illustrated as "*A. oligospilos*" that, although only 15 cm in length, he had managed to swallow a *Lethriniid* and a *Crenidens* each 10 cm long. "These were packed rather neatly, side by side and head to tail, in his capacious maw." Durban to Zanzibar and throughout tropical Indo-West Pacific to Hawaii.

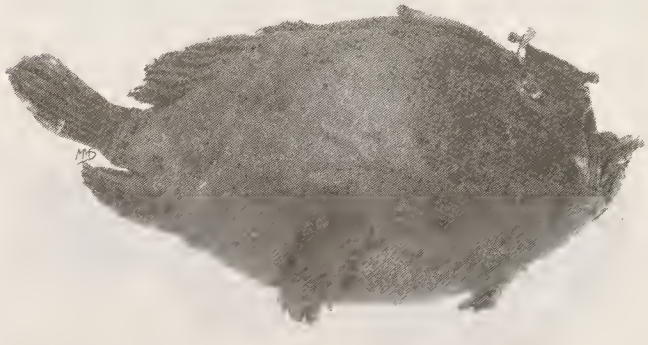
102.7 *Antennarius striatus*
(Shaw & Nodder, 1794)
PLATE 13

Striped angler — Streep-hengelaar

Lophius striatus Shaw & Nodder, 1794: Pl. 175 (coast of eastern Australia and neighbouring islands, i.e. Tahiti). *Antennarius pinniceps:* Gilchrist & Thompson, 1917: 418; Smith, **SFSA No. 1239***. *Antennarius striatus:* Barnard, 1927: 1001; Fowler, 1934: 513; Smith, **SFSA No. 1240***; Smith & Smith 1966: 151*. *Antennarius fuliginosus* Smith, 1957: 222, Fig. 5 (Durban); 1961: 573, **No. 1242a***.

D I+I+I,11-12; A 7; P 9-12. First D spine as long as 2nd; esca of 2-5 cylindrical appendages. Second D spine curved posteriorly with only a narrow membranous connection along posterior margin to surface of head. Pterygiophore supporting D spines extending slightly beyond upper jaw. C peduncle distinct.

Colour in preservative light yellow, to dark yellow-brown to black; lighter-colour phases everywhere (except on belly) covered with numerous, narrow, dark brown to black streaks or elongate blotches typically radiating outward from eye and extending posteriorly to level of P, more or less parallel and extending from P region onto soft D and A; C similarly banded; belly without markings or with scattered, dark, rounded spots. Occasional specimens uniformly coloured. Attains 22 cm. In weedy parts of estuaries along east coast of southern Africa south to Algoa Bay, throughout Indo-West Pacific to Hawaiian Ids. Also in western Atlantic ("*Antennarius scaber*" of various authors); and in eastern Atlantic ("*Antennarius occidentalis*" of various authors).



102.7 *Antennarius striatus:* 17.5 cm black variety, holotype of *A. fuliginosus* (Durban).

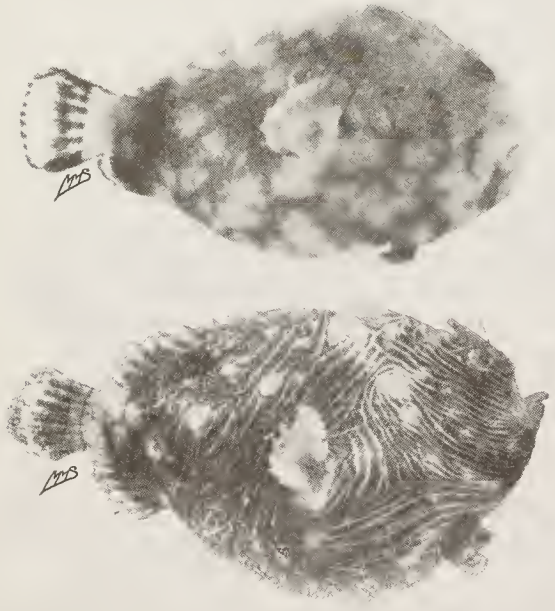
102.8 *Antennarius tuberosus*
(Cuvier, 1817)
PLATE 13

Pygmy angler — Hengelaartjie

?*Lophius bigibbus* Latreille, 1804: 73 (*nomen dubium*). *Chironectes tuberosus* Cuvier, 1817: 432 (Mauritius). *Antennarius bigibbus:* Regan, 1918: 77; Barnard, 1927: 1001; Smith, **SFSA No. 1235*.** *Antennarius tuberosus:* Smith, 1958: 60*.

D I+I+I,12; A 7; P 9-12. Illicium slightly longer than 2nd D spine, tapering to a fine point, without an esca. Second D spine more or less straight, tapering to a point, with only a tiny membranous connection to head. Third D spine immobile, tightly bound down to head by thick, spinulose skin. C peduncle absent or nearly so, the soft D and A connected to C base.

Colour in preservative white, yellow to brown, everywhere (but especially on belly and trunk) covered with a network of dark brown, interconnected blotches or fine, parallel, closely spaced lines; all fins with a dark brown bar. Attains 6.5 cm. Natal, Maputo, Madagascar, Aldabra Ids. and throughout Indo-West Pacific including Hawaiian and Line Ids., and Tuamotu Archipelago to Pitcairn Id.



102.8 *Antennarius tuberosus:* top: 3.5 cm (Seychelles); bottom: 6 cm (N. Mozambique).

Genus ***Histrio*** Fischer, 1813

A single species.

102.9 *Histrio histrio*
(Linnaeus, 1758)
PLATE 13

Sargassumfish — Sargassumvis

Lophius histrio Linnaeus, 1758: 237 (pelagic in *Fucus*). *Antennarius biocellatus* (*non* Bleeker): Smith, **SFSA No. 1237*** (figure only). *Histrio histrio:* Smith, **SFSA No. 1243*;** Smith & Smith 1966: 151*.

D I+I+I,11-13; A 7-8; P 9-11. First D spine considerably shorter than second, bearing a small, bulbose esca. Gill filaments present along entire length of ventral portion of 1st gill arch. Two dermal cirri on dorsal midline of snout just in front of base of illicium.

Colour and colour pattern highly variable, capable of rapid change from a pale grey, bleached-out appearance to a pattern of streaks and mottling of browns, olive and yellow, numerous small brown to black spots and occasionally narrow irregular white lines. Attains 19 cm. Pelagic in floating *Sargassum* weed; in tropical to temperate waters of all oceans, but apparently absent in the Pacific east of Guam.

102.9 *Histrio histrio:* 7 cm (Port Alfred).

Family No. 103: CHAUNACIDAE

by M.M. Smith

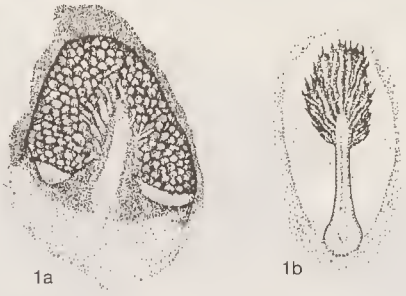
Coffinfishes — **Doodkisvisse**

Related to the Ogcocephalidae and Antennariidae, the Chaunacidae have large balloon-shaped flabby inflatable bodies, the rough loose skin is covered with small spine-like scales; mouth large, nearly vertical; teeth small, in bands on jaws, vomer and palatines. Spinous dorsal of 3 spines on head, the first is modified, bearing a bait or esca (cluster of short fleshy cirri) that fits into a scaleless U-shaped depression (illicial cavity) on snout; 2nd and 3rd dorsal spines require a radiograph to be counted as they are embedded behind the 1st; soft dorsal fin, of 10-12 soft-rays; anal fin of 5-7 rays; pelvics I,4 (rays unbranched); pectorals arm-like with 11-14 unbranched fin rays ending in pointed fleshy tips; gill opening behind and above pectoral, behind level of dorsal fin origin; caudal fin with 8 rays. Branchiostegal rays 2+4; vertebrae 19; gill filaments absent on 1st arch but present on 2nd to 4th; gill-rakers are clusters of small spines on pedicels. Lateral lines are open canals especially conspicuous on head, protected by enlarged spiny scales on either side of canal. Species inhabit continental slopes in all oceans.

A single genus, *Chaunax* Lowe, 1846, with about 12 species, although le Danois' world revision (1979) recognises only 9 species; 2 species from our area, but Caruso's world revision of *Chaunax* is awaited before the common South African species can properly be named. In the meantime it is referred to *C. pictus*.

KEY TO SPECIES

1a Front of large esca black; illicial cavity black and deep; stem of esca very short and thick so that esca cannot easily be manipulated outside the cavity; body with numerous definite dark lines and blotches ..... *C. pencillatus*



1a 1b

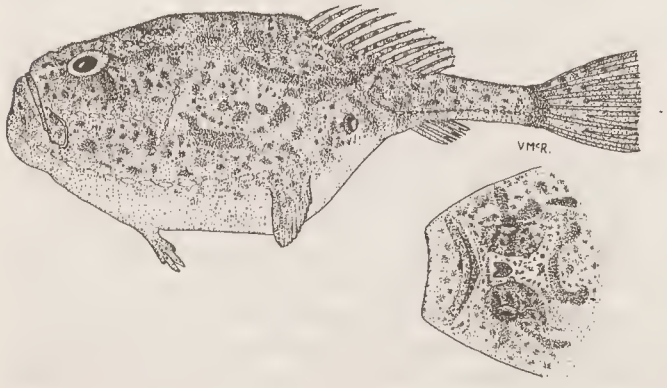
1b Front of small esca dark, but illicial cavity light in colour and shallow; stem of esca long and thin, easily able to be manipulated outside the cavity; only vague mottlings or dots on body. ..... *C. pictus*

103.1 *Chaunax pencillatus*
McCulloch, 1915

Chaunax pencillatus McCulloch, 1915: 167, Pl. 33, Fig. 2 (esca) (Victoria, Australia); le Danois, 1979: 34* (part).

D 12; A 6-7; P 13.

Rosy with dark lines and blotches; esca large, with at least front of tentacles and cavity black, indicating that this portion was probably luminous (McCulloch, 1915: 168). Attains at least 26 cm. Eastern Australia, Madagascar and Kenya. Le Danois records it from Natal, but the references of Barnard, Fowler & Smith belong to the next species. It is, however, found off southern Mozambique and Natal.



103.1 *Chaunax pencillatus:* 25.5 cm (off Durban).

103.2 *Chaunax pictus*
Lowe, 1846
PLATE 15

Chaunax pictus Lowe, 1846: 81 (also 339, Pl.) (Madeira); Smith, **SFSA No. 1233***; 1968: 21; le Danois, 1979: 29*. *Chaunax pencillatus* (*non* McCulloch): le Danois, 1979: 34 (part).

D 11-12; A 5-7; P 11-12.

Rosy with golden spots on head and body, fins uniform pink, front of esca dusky, stem uniform rosy (light when preserved). Attains 40 cm. Atlantic; trawled off continental shelf and often thrown up after storms between Knysna and Natal.

Family No. 104: OGCOCEPHALIDAE

by M.G. Bradbury

Seabats **Seekolwe**

Body and head markedly flattened as in rays, the head disc-shaped or triangular in outline. A horn-like rostrum projecting from front of head in some species. Conspicuous cavity in front of head containing a fleshy organ, the "esca", probably used as a lure. The esca may be extended in front of the mouth on a short rod called the "illicium", which is a highly modified dorsal fin spine. Remainder of dorsal fin small, comprising only soft-rays placed posteriorly on tail. Anal fin a small lappet some distance behind anus. Pectoral fins leg-like because of the remarkable elongation of the pectoral-fin lobes. Pelvic fins on ventral surface of head in advance of pectorals. Body well- armoured by scales shaped like tubercles or small pyramids drawn out so apex of each is a sharp spine; spines often multifid, especially those around edges of body. Teeth villiform, in bands or patches on jaws, tongue, and in some genera on palate. Gills reduced to 2½ or 2; gill filaments present on 2nd and 3rd arches but not on 1st arch, the variation occurring on the 4th arch, which has a hemibranch in some genera but entirely lacks filaments in others.

Mainly benthic fishes that walk on the bottom with their pectoral and pelvic fins; most species occur in rather deep water. Nine genera and about 60 species; 4 genera represented in our area.

KEY TO GENERA

1a Gills 2½ ..... *Halieutaea*
1b Gills 2 2

2a Esca with 2 ventral lobes and 1 dorsal lobe; scales stellate with 3-8 sides, the apex of each terminating in a spine, which may be multifid on scales of body edges 3
2b Esca a single ovoid lobe; scales in the form of bucklers with minute tubercles like bosses radiating in lines from centre of scale ..... *Malthopsis*

3a V greatly reduced, shorter than A; P with broad membranes connecting pedicel to tail ..... *Halieutopsis*
3b V longer than A; P distinctly elbowed with little or no membrane connecting pedicel to tail ..... *Dibranchus*

Genus ***Dibranchus*** Peters, 1876

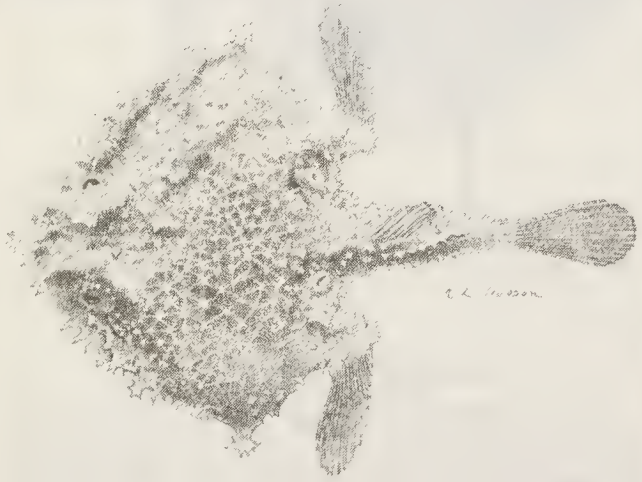
A worldwide genus with 12 or more species; 1 species in our area.

104.1 *Dibranchus stellulatus*
Gilbert, 1905

Dibranchus stellulatus Gilbert, 1905: 698, Fig. 276 (Hawaii); Smith, **SFSA No. 1228***.

D 6; A 4; P 14-15. Spine of front of rostrum notably multifid.

Colour in preservative: dorsal surface dusky tan, the stellate nature of the scales emphasised by pale ridges formed where 2 sides of a tubercle join. Centres of scales flecked with black around bases of apical spines. Ventral surface of body pale. Skin translucent, especially on belly. Attains 8 cm. Off Natal in 476 m, rare; 1 specimen from Hawaii.



104.1 *Dibranchus stellulatus*: 6.5 cm holotype (after Gilbert, 1905).

Genus ***Halieutaea*** Valenciennes, 1837

South Africa to Hawaii; about 7 or 8 species, 3 in our area.

KEY TO SPECIES

1a Scales of tail and dorsal surface of disc with relatively large stout spines; ventral surface of disc either lacking scales, or scales few and scattered 2
1b Scales present over entire body and so minute that dorsal and ventral surfaces of body appear granulated ..... *H. hancocki*

2a Scales absent from ventral surface of disc; spines of dorsal surface and edges of disc relatively long and thick; dorsal markings, when present, in the form of a ring or ocellus on either side of disc ..... *H. fitzsimonsi*
2b At least a few scales scattered on ventral surface of disc, sometimes restricted to V bases; spines of dorsal surface and edges of disc less robust but more numerous than in *fitzsimonsi*; dorsal markings in the form of an eccentric T or Y on each side of disc and a dark band around each gill opening ..... *H. spicata*

104.2 *Halieutaea fitzsimonsi*
(Gilchrist & Thompson, 1916)
PLATE 15

Circular seabat — Ronde seekolf

Halieutichthys fitzsimonsi Gilchrist & Thompson, 1916: 58, Fig. (Algoa Bay). *Halieutaea liogaster* Regan, 1921: 419 (Natal). *Halieutaea fitzsimonsi*: Smith, 1935: 233*; **SFSA No. 1226***; Smith & Smith, 1966: 152*.

D 4-5; A 4; P 12-15.

Ventral surface coral red in life, but fades to cream colour in preservative. Small juveniles resemble a round blob of jelly. Attains 30 cm. Known only from Plettenberg Bay to Tugela River, Natal in 20 - 120 m.

104.2 *Halieutaea fitzsimonsi*: 2 cm globular juvenile (Port Alfred).

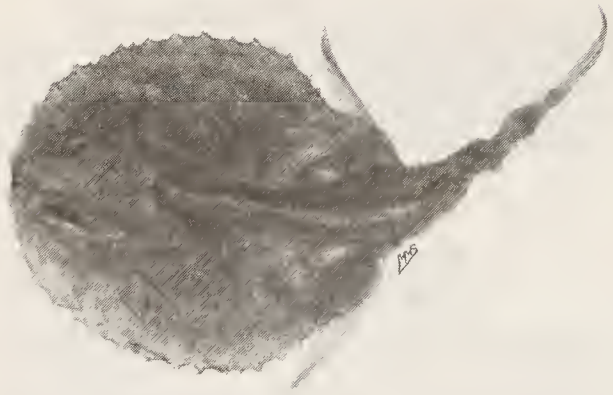
104.3 *Halieutaea hancocki*
Regan, 1908

Hairy seabat — Harige seekolf

Halieutaea hancocki Regan, 1908: 251, Pl. 31, Fig. 6 (Saya de Malha Bank, Indian Ocean). *Halieutaea hirsuta* Smith, 1965: 40, Pl. 11, B (Natal).

D 5; A 4; P 11-14.

Attains 13 cm. Tropical Indian Ocean; off Natal, generally from depths of 200 m or more.



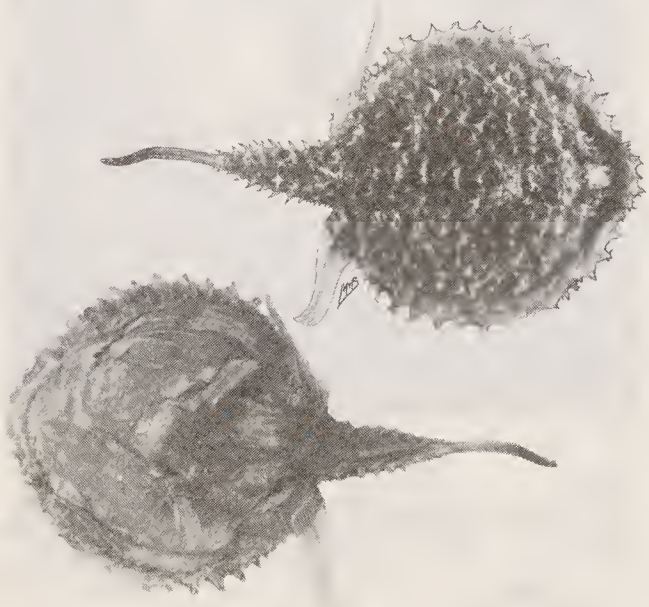
104.3 *Halieutaea hancocki:* 10 cm holotype of *H. hirsuta* (off Natal).

104.4 *Halieutaea spicata*
Smith, 1965

Spiny seabat — Stekel-seekolf

Halieutaea spicata Smith, 1965: 39, Pl. 11, A (Natal).
D 4; A 4; P 12-13.

Attains 10 cm. In our area, known only from a 7 cm specimen, washed up on the beach at Isipingo, Natal. May be the same as *Halieutaea coccinea* Alcock, 1889, from the Bay of Bengal, which is similar in squamation and markings.



104.4 *Halieutaea spicata:* 7 cm holotype, dorsal and ventral views (Natal).

Genus ***Halieutopsis*** Garman, 1899

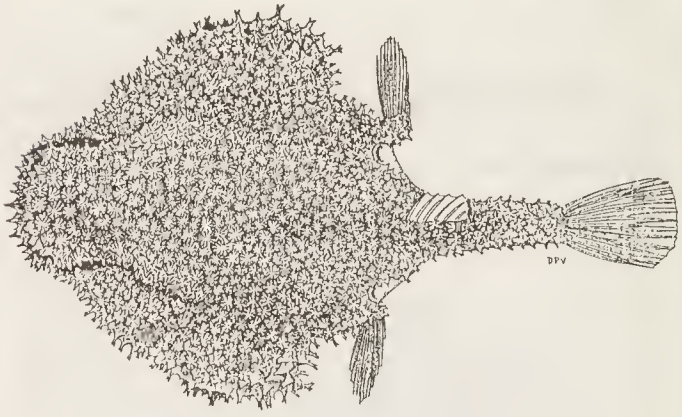
A deep-sea genus from South Africa to the Galapagos Ids. About 8 species, 1 in our area.

104.5 *Halieutopsis micropus*
(Alcock, 1891)

Dibranchus micropus Alcock, *in* Wood-Mason & Alcock, 1891: 25, Pl. 7, Figs. 2, 2a 2b (Bay of Bengal).

D 6; A 4; P 14-16. Body not strongly dorsoventrally flattened, the head nearly cube-like.

Colour in preservative: totally pale except for black tips on tiny V and black peritoneum. Attains nearly 8 cm. South Africa to the Philippines in depths of 500 m or more; 1 specimen (in poor condition, identification tentative) has been collected in 910 m off Durban.



104.5 *Halieutopsis micropus:* 7 cm SL (off Durban).

Genus ***Malthopsis*** Alcock, 1891

Disc markedly triangular. South Africa to Hawaii; about 6 species (this genus is currently being revised by J.H. Caruso), 2 in our area and *M. luteus* may also be found here.

KEY TO SPECIES

1a Buckler-shaped scales, with lines of bosses radiating from centre, present over entire body; bucklers in centre of ventral surface of disc as large as those of dorsal surface ..... *M. mitrigera*

1b Ventral surface of disc with scales in form of minute tubercles, giving skin a granular appearance; bucklers may be scattered over ventral surface of disc, but are smaller than dorsal bucklers 2

2a Eye diameter 1.5-2.0 times interorbital width; rostrum upturned but short relative to length of rostrum in *tiarella* ..... *M. luteus*

2b Eye diameter subequal to interorbital width; rostrum pointed forward or a little downward ..... *M. tiarella*

104.6 *Malthopsis luteus*
Alcock, 1891

Longnose seabat — Langneus-seekolf

Malthopsis luteus Alcock, *in* Wood-Mason & Alcock, 1891: 26, Pl. 8, Figs. 2, 2a (Andaman Sea).

D 5-6; A 4; P 11-13.

Attains 10 cm. Eastern Indian Ocean and Japan, generally in 100 - 200 m or more; recently taken off Kenya and considered likely to occur off southern Africa.

104.6 *Malthopsis luteus*: ca. 9 cm, dorsal and ventral views (after Alcock, 1891).

104.7 *Malthopsis mitrigera*
Gilbert & Cramer, 1897
PLATE 15

Malthopsis mitrigera Gilbert & Cramer, 1897: 434, Pl. 48, Figs. 1 & 2 (Hawaii). *Malthopsis triangularis*: Smith, **SFSA No. 1227*** (Natal).

D 4-6; A 3-4; P 13-15. Rostrum short and upturned as in *luteus*, but subopercular spines much longer so that triangular head seems to flare out to the sides.

Attains 75 mm. Natal to the Philippines, Japan and Hawaii; in 500 m or more.

104.8 *Malthopsis tiarella*
Jordan, 1902

Spearnose seabat — Speerneus-seekolf

Malthopsis tiarella Jordan, *in* Jordan & Sindo, 1902: 378, Fig. 7 (Suruga Bay, Japan). *Malthopsis lutea* (*non* Alcock): Smith, 1958: 223*; 1961: 573, **No. 1227a*.**

D 4-5; A 4; P 12.

Irregular dark spots present on dorsal surface of disc. Attains 6 cm. Natal and Japan from depths of 80 - 200 m.

104.8 *Malthopsis tiarella*: 7.5 cm, dorsal and ventral views (Natal).

Family No. 105: CERATIIDAE

by T.W. Pietsch

Seadevils — **Seeduiwels**

Females with body elongate, compressed; mouth nearly vertical with numerous teeth of moderate size. Bony support for fishing apparatus long, emerging anteriorly on snout from between eyes and, in larger specimens, extending out on back when retracted. Esca globular or pear-shaped, simple or with 1 or 2 distal filaments. Two or 3 globose caruncles (fleshy appendages) on back just anterior to soft dorsal fin. Soft dorsal and anal fin rays 3-5. Skin spinulose. Entire head, body and fins dark brown to black. Vertebrae 20-21.

Larvae epipelagic, juveniles and adults deep mesopelagic to bathypelagic. Attain a length of 145 cm. Dwarf males attaining a length of not more than 16 cm become parasitically attached to their much larger females. The relatively rare males have not been taken in our area, and are thus not included in the keys or descriptions below. No commercial value. Nearly cosmopolitan in the Atlantic, Pacific, Indian and southern oceans. Two genera and at least 3 species, 2 or 3 in our area.

KEY TO GENERA

1a Two bulbose caruncles on back just anterior to D; subopercle without spine on anterior margin ..... *Ceratias*

1b Three bulbose caruncles on back just anterior to D; subopercle with a conspicuous spine on anterior margin ..... *Cryptopsaras*

Genus ***Ceratias*** Kröyer, 1845

Bony support for fishing apparatus bearing a slender, elongate illicium with a globular or pear-shaped esca, simple in smaller specimens. Skin of juveniles covered with minute, close-set dermal spines; adults covered with large, conical, dermal spines, each with a broad, rounded base. Two or 3 species; possibly 2 in our area.

KEY TO SPECIES

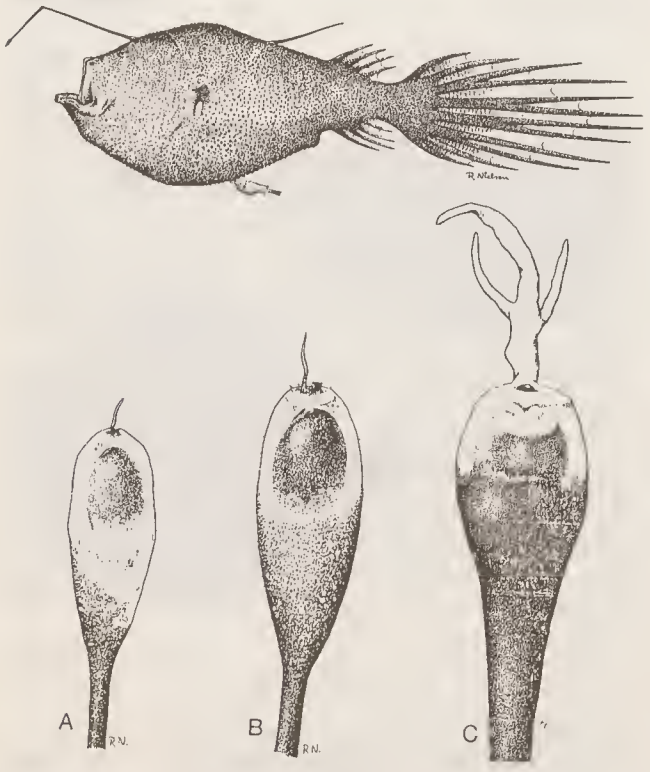
1a Esca with 1 main (branched or simple) filament ..... *C. holboelli*
1b Esca with 2 distal appendages, each simple or divided into 2-8 filaments ..... *C. tentaculatus*

105.1 *Ceratias holboelli*
Kröyer, 1845

Ceratias holboelli Kröyer, 1845: 638 (southern Greenland); Bertelsen, 1951: 133*; Bertelsen & Pietsch, 1984*.

D I,4 (rarely 3); A 4; P 16-19; C 9 (lowermost C ray reduced, closely associated with 8th ray and totally embedded in skin).

Attains 145 cm. In our area, known from a single specimen (without escal filament) taken off Cape Town at 34°12′S, 16°35′E. Nearly cosmopolitan in the world oceans.



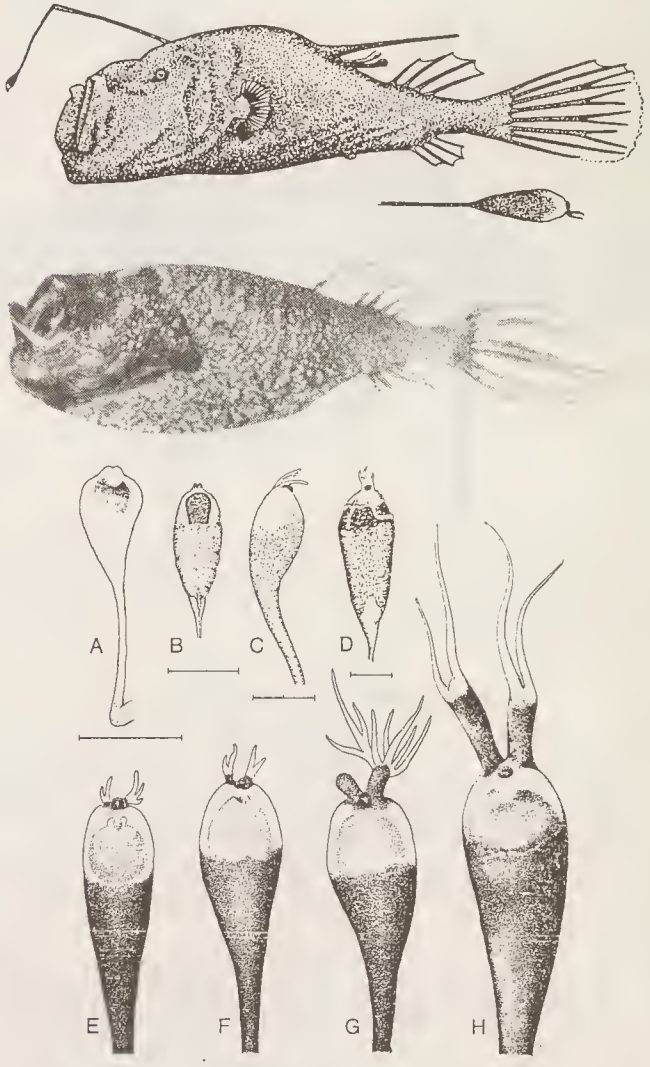
105.1 *Ceratias holboelli:* 104 cm female with parasitic male (drawn by R. Nielsen); escae of: A. 3 cm SL; B. 6.5 cm SL; C. 59 cm SL (after Bertelsen & Pietsch, 1984).

105.2 *Ceratias tentaculatus*
(Norman, 1930)

Mancalias tentaculatus Norman, 1930: 355, Fig. 45 (Southern Ocean, 52°25′S, 09°50′E). *Ceratias holboelli tentaculatus:* Bertelsen, 1951: 133 (footnote). *Ceratias holboelli* (*non* Kröyer): Penrith, 1967: 185. *Ceratias tentaculatus:* Bertelsen & Pietsch, 1984: 45*.

D I,4; A 4; P 16-19; C 9 (as in *C. holboelli*).

Attains 88 cm. Known from one specimen from off Delagoa Bay, one off southern Natal and a third off Saldanha Bay; throughout southern oceans.



105.2 *Ceratias tentaculatus:* top: 11 cm holotype and esca (after Norman, 1930), middle: 76.5 cm, probably *C. tentaculatus,* esca missing (off Saldanha Bay); escae of: A. 0.6 cm SL; B. 1.5 cm SL; C. 7.5 cm SL; D. 8 cm SL holotype; E. 9 cm SL; F. 12 cm SL; G. 26.5 cm SL; H. 36.5 cm SL (B & D after Clarke, 1950; C after Bertelsen, 1951, remainder after Bertelsen & Pietsch, 1984); scale = 0.1 cm.

Genus ***Cryptopsaras*** Gill, 1883

A single species.

105.3 *Cryptopsaras couesii*
Gill, 1883

Cryptopsaras couesii Gill, 1883: 284 (off Long Island, New York); Smith, **SFSA No. 1229***; Bertelsen, 1951: 139*; Penrith, 1967: 186.

D I,4 (rarely 5); A 4; P 14-18; C 8. Bony support for fishing apparatus bearing an extremely short illicium, nearly completely enveloped by the globular or pear-shaped esca with a single, distal filament. Skin covered with small, close-set dermal spines.

Attains 44 cm. Known from off Cape of Good Hope, as well as from all major oceans.

105.3 *Cryptopsaras couesii:* 44 cm holotype of *Paraceratias mitsukurii* with parasitic male attached to belly (drawn by R. Nelson after Tanaka, 1911).

Family No. 106: ONEIRODIDAE

by T.W. Pietsch

Oneirodids **Oneirodiede**

Females with body short, globose, oblique mouth with numerous short teeth arranged in several rows. Bony support for illicium emerging on snout from between eyes. Esca globular, simple to complex. Second dorsal spine a tiny remnant covered by skin of head. Dorsal fin rays 4-8; anal fin rays 4-7. Skin naked, or with scattered, microscopic dermal spines in some species.

Colour dark brown to black over entire body surface and mouth cavity. Males dwarfed, less than 25 mm in length, apparently do not become parasitically attached to females, relatively rare compared to females and, in fact, are unknown for *O. kreffti*. Larvae epipelagic, juveniles and adults deep mesopelagic to bathypelagic. Attains 30 cm. No commercial value. Nearly cosmopolitan in all three major oceans of the world. Fifteen genera and approximately 55 species; only 1 species has been taken in close proximity to our area. *Oneirodes cornutus* was inadequately described by Gilchrist & von Bonde (1924) from a 19 mm specimen; it was included by Smith (**SFSA No. 1231**), but as the type is no longer in existence, it is impossible to identify it.

Genus ***Oneirodes*** Lütken, 1871

Approximately 30 species; 1 taken in close proximity to our area.

106.1 *Oneirodes kreffti*
Pietsch, 1974

Oneirodes kreffti Pietsch, 1974: 57, Figs. 75, 76 (eastern South Atlantic); Bertelsen & Pietsch, 1977: 175*; 1983: 84*.

D I,5-6; A 4; P 17-18; C 9. Esca with a stout anterior appendage, a pair of long, branched medial filaments, and on each side, a long, tapering lateral appendage; anterolateral appendage absent. Teeth in upper jaw 31-46, in lower jaw 39-50.

Largest of 4 known specimens is 75 mm. Known from 2 localities in eastern South Atlantic (approximately 30°S, 5°E), a 3rd record from the southern Indian Ocean west of the Kerguelen Islands, and a 4th from off Sydney, Australia. Taken between the surface and 2 000 m.

106.1 *Oneirodes kreffti:* ca. 5 cm SL (drawn by EMT on author's instructions).

Family No. 107: MELANOCETIDAE

by T.W. Pietsch

Devil-anglers **Duiwel-hengelaars**

Females with body globose; mouth oblique to vertical with numerous, fang-like jaw teeth. Illicium bearing a simple, oval-shaped esca. Dorsal fin rays 12-17; anal fin rays 3-5. Skin smooth; microscopic dermal spines present in some species. Entire body surface and mouth cavity dark brown to black; all fins colourless in small specimens, darkly pigmented in larger specimens. Vertebrae 20.

Larvae epipelagic, juveniles and adults deep mesopelagic to bathypelagic. Attains 18 cm. Males dwarfed (not more than 43 mm); apparently do not become parasitically attached to females. They are relatively rare compared to females and are thus not included in the description below. No commercial value. A single genus (*Melanocetus* Günther, 1864) represented in all major oceans. Five species; 1 in our area.

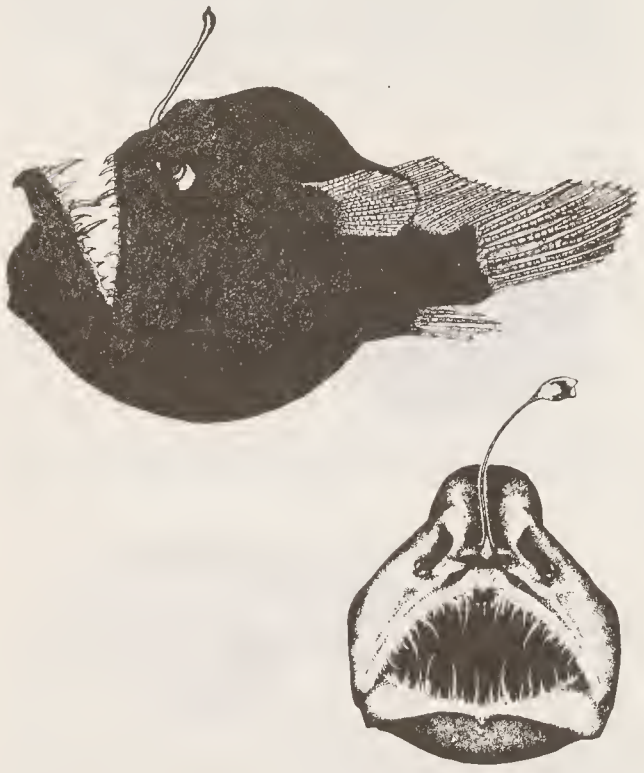
107.1 *Melanocetus johnsoni*
Günther, 1864

Melanocetus johnsoni Günther, 1864: 301, Pl. 25 (Madeira); Bertelsen, 1951: 48*; Pietsch & Van Duzer, 1980: 71*. *Melanocetus rotundatus* Gilchrist, 1903: 206, Pl. 15 (off Cape Point and Natal coast); Barnard, 1927:

1007*. *Melanocoetus rotundatus*: Smith, **SFSA No. 1232***; Penrith, 1967: 187.

D I,13-17; A 3-5; P 17-23; C 9. Esca slightly compressed with a low, rounded or conical distal prolongation nearly always darkly pigmented on tip; a compressed posterior crest and a considerably smaller, compressed anterior crest present in some specimens. Number of upper jaw teeth 48-134.

Attains 18 cm. Known from off all coasts of South Africa, as well as from all major oceans. Most commonly taken between 500 and 1 500 m.



107.1 *Melanocoetus johnsoni*: 4 cm holotype of *M. rotundatus* (after Gilchrist, 1903); front view of 8.5 cm fish (after Pietsch & van Duzer, 1980).

Family No. 108: HIMANTOLOPHIDAE

by T.W. Pietsch

Footballfish **Voetbalvis**

Females with body short, globose; mouth oblique with numerous small teeth arranged in several rows. Illicium emerging from head above eyes, bearing a large esca of several stout, branched tentacles. Dorsal fin rays 6 or fewer; anal rays 5 or fewer. Skin with numerous large dermal spines or plates, each with an expanded, more or less circular base. Entire body surface and mouth cavity brown, grey to black. Vertebrae 19.

Larvae epipelagic, juveniles and adults deep mesopelagic to bathypelagic. Attains at least 60 cm. Males dwarfed (not longer than 46 mm); apparently do not become parasitically attached to females, relatively rare and thus not included in the description below. A single genus represented in all major oceans of the world.

Genus ***Himantolophus*** Reinhardt, 1837

Approximately 15 species; 1 in our area.

108.1 *Himantolophus groenlandicus* Reinhardt, 1837

Himantolophus groenlandicus Reinhardt, 1837: 116, Pl. 4 (coast of West Greenland); Smith, **SFSA No. 1230**; Bertelsen, 1951: 60*.

D I,5-6; A 4; P 15-18; C 9. Esca with an elongate anterior tentacle, a pair of shorter, medial appendages arising from a prominence bounded by 4 divergent swellings, and a posterior tentacle, all arising from distal surface; 1-5 pairs of tentacles arising from base of esca or from illicium below esca.

Attains at least 60 cm. Known from specimens cast ashore on South African coasts, but also found in all major oceans.

108.1 *Himantolophus groenlandicus:* 45 cm (after Girard, 1893).

Family No. 109: DICERATIIDAE

by T.W. Pietsch

Horned anglers **Horinghengelaars**

Females with body short, globose; mouth oblique with numerous short teeth arranged in several rows. Illicium elongate; esca globular or with filaments. A second dorsal spine with esca immediately behind first. Dorsal fin rays 5-7; anal fin rays 4. Skin spinulose. Entire body and inside of mouth dark brown to black.

Larvae epipelagic, juveniles and adults deep mesopelagic to bathypelagic with some evidence that larger adults are associated with the bottom (Uwate, 1979). Attain 33 cm. No commercial value. Atlantic and Indian oceans, Indo-

Australian Archipelago. Two genera and 4 species; 1 species in our area.

Males unknown.

Genus ***Phrynichthys*** Pietschmann, 1926

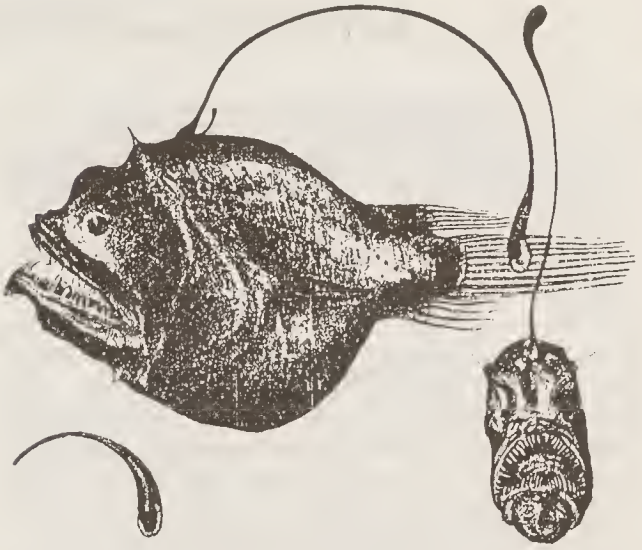
Two species; 1 in our area.

109.1 *Phrynichthys wedli* Pietschmann, 1926

Phrynichthys wedli Pietschmann, 1926: 88 (Madeira); Pietschmann, 1930: 419*; Uwate, 1979: 142*. *Paroneirodes wedli:* Bertelsen, 1951: 70; Trunov, 1974: 145*; Lloris, 1981*.

D I+I,5-7; A 4; P 13-16; C 9. Illicium length greater than 80% SL; distance from base of illicium to anteriormost tip of upper jaw greater than 30% SL. Esca with distinct anterior, posterior and lateral appendages.

Attains 25 cm. Both sides of tropical and subtropical Atlantic Ocean including Gulf of Mexico and Caribbean Sea; extends south of Walvis Bay (24°S). Most commonly taken between 300 and 1 500 m.



109.1 *Phrynichthys wedli:* 5.5 cm holotype (after Pietschmann, 1930).

Order GOBIESOCIFORMES

Springer and Fraser (1976) have demonstrated that the peculiar, eel-like *Alabes* (with 4 species endemic to southern Australia) are highly modified members of this order. They recommend that this genus (formerly the only genus of the Family Cheilobranchidae) be assigned to the Gobiesocidae. An alternative arrangement that would express the extremely specialised nature of *Alabes* would be to recognise the Cheilobranchidae as the second of two families in the Order Gobiesociformes. Fishes of this order are then characterised, not by the distinctive gobiesocid sucking disc that is formed by the modified pelvic fins (as the sucking disc and pelvic fins are vestigial or absent in *Alabes*), but by a unique joint between the supracleithrum and the cleithrum bones of the pectoral girdle. Lauder and Liem (1983) added two additional specialised features that link *Alabes* with the Gobiesocidae and will thus serve to characterise this order: (1) a joint between the interopercle and epihyal; and (2) a unique heart structure. These anatomical details are of interest to the ichthyologist concerned with the higher classification of the Gobiesociformes, but for all practical purposes (since no species of *Alabes* occurs in our area) we can continue to recognise a gobiesocid fish by its characteristic pelvic sucking disc.

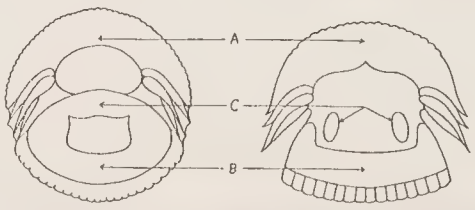
Family No. 110: GOBIESOCIDAE

by J.C. Briggs

Clingfishes **Suiervisse**

Anterior portion of head more or less depressed. Lateral line present with pores well developed on head but small and difficult to locate posteriorly. No scales. Anterior nostril tubular, posterior nostril usually so. One dorsal and one anal fin. Pelvic fins incorporated into a prominent, adhesive disc on ventral surface directly below junction of head and body. The 4 pelvic rays form lateral edge of disc, last ray with membranous attachment to lower portion of pectoral base. Surface of disc is divided into 3 different areas: Region A anterior portion, Region B posterior portion, Region C central. The discs are of 2 basic types; "double" with a small posterior disc separated from front portion by free, anterior edge; "single" with the 2 parts coalesced into 1 continuous structure.

Cosmopolitan in tropical and temperate waters. Six subfamilies, 7 genera and 9 species in southern African waters.



Disc regions: left: *Lepadogaster*, a double type disc, and right: *Gobiesox*, a single type disc. A, B & C regions as in text above.

KEY TO GENERA

1a Gills 3½; gill membranes attached to isthmus 2
1b Gills 3 4

2a Disc double.....(Subfamily LEPADOGASTRINAE) 3
2b Disc single...(Subfamily CHORISOCHISMINAE)...*Chorisochismus*

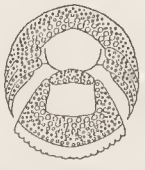
2a *Lepadogaster* sp.

2b *Chorisochismus dentex*

3a Anus surrounded by papillae; anus nearer to A origin than to sucking disc; small incisors at front of jaws followed by well-developed canines ..... *Apletodon*
3b No papillae around anus; anus nearer rear margin of sucking disc than to A origin; patches of small canines at front of jaws, but no incisors ..... *Diplecogaster*

4a Gill membranes free from isthmus 5
4b Gill membranes attached to isthmus 6

5a Disc double.....(Subfamily DIPLOCREPINAE) ..... *Pherallodus*
5b Disc single.....(Subfamily GOBIESOCINAE) ..... *Eckloniaichthys*



5a *Pherallodus smithi*

5b *Eckloniaichthys scylliorhiniceps*

6a Disc double.....(Subfamily ASPASMINAE) ..... *Lissonanchus*
6b Disc single...(Subfamily DIADEMICHTHYINAE)...*Lepadichthys*

6a *Lissonanchus lusheri*

6b *Lepadichthys* sp.

Genus ***Apletodon*** Briggs, 1955

Two species; 1 in our area.

110.1 *Apletodon pellegrini*
(Chabanaud, 1925)
PLATE 14

Chubby clingfish — Pokkel-suiervis

Lepadogaster (Mirbelia) pellegrini Chabanaud, 1925: 283, 286 (Senegal, Cape Blanco, Madeira, Cape Verde Ids.). *Apletodon pellegrini:* Briggs, 1955: 27*; M.L. Penrith, 1969: 125*; Penrith & Penrith, 1970. *Apletodon knysnaensis* Smith, 1964: 590, Pl. 93, Figs. B, C, Pl. 96, Figs. A-F, Pl. 97, Figs. B-F (Knysna); Smith & Smith, 1966: 114*.

D 5-6; A 5; P 22-25; C 10-12; GR 6-8. Head length 2.2-2.3, body depth 4.9-5.2 and disc length 3.2-3.5 in SL. Upper attachment of gill membrane opposite 3-4th P ray. Disc Region A with 5-6 rows of flattened papillae across its width; 7-8 rows across disc Region B; 5-6 rows across Region C.

Attains 50 mm. Ranges from Senegal, west Africa, to Port Alfred.

Genus ***Chorisochismus*** Brisout de Barneville, 1846

One endemic species.

110.2 *Chorisochismus dentex*
(Pallas, 1769)
PLATE 14

Rocksucker — Klipsuier

Cyclopterus dentex Pallas, 1769: 6, Pl. 1 (no locality). *Gobiesox gyrinus* Valenciennes, 1836: Pl. 108 (South Africa). *Gobiesox fimbriatus* Castelnau, 1861: 72 (Camps Bay). *Athaena fasciata* Castelnau, 1861: 72 (Green Point). *Chorisochismus dentex:* Smith, **SFSA No. 1086*;** Smith & Smith, 1966: 113*; Penrith, 1969: 129*; Stobbs, 1980: 146*.

D 7-9; A 6-7; P 21-24; C 8-10; GR 4. Head length 1.9-2.9, width 1.9-2.9, and disc 2.6-3.2 in SL. Teeth large, conical and slightly compressed at front of jaw. Disc Region A with 21 (18-25) rows of flattened papillae across its width; 10-11 rows across disc Region B; 19-24 across Region C.

One of the largest clingfishes, attains 30 cm. Stobbs (1980) has shown that adults feed on sea urchins and limpets. The limpets are removed by levering with the large upper incisiform teeth; undigested shells are passed whole encased in mucus capsules. Known only from Port Nolloth to northern Natal.

Genus ***Diplecogaster*** Fraser-Brunner, 1938

Three species; 1 in our area.

110.3 *Diplecogaster megalops*
Briggs, 1955
PLATE 14

Bigeye clingfish — Grootoog-suiervis

Diplecogaster megalops Briggs, 1955: 31, Fig. 84 (Durban); Smith, 1961: 572, **No. 1087a;** 1964: 299*; 1964: 593*; Penrith & Penrith, 1970: 392.

D 4-6; A 3-5; P 23-25; C 10; GR 6-7. C peduncle depth 1.0-1.2 in its length. Eyes 0.5-0.8 in bony interorbital space and 3.0-3.5 in head. Head length 2.6-2.8, disc length 3.2-3.6 in SL. Disc Region A with 3-5 rows of flattened papillae across its width; 5 rows across disc Region B; 3-4 rows across disc Region C.

Attains 34 mm. Known only from False Bay to Durban.

110.3 *Diplecogaster megalops:* 2.5 cm (False Bay).

Genus ***Eckloniaichthys*** Smith, 1943

One endemic species.

110.4 *Eckloniaichthys scylliorhiniceps*
Smith, 1943
PLATE 14

Weedsucker — Plantsuier

Eckloniaichthys scylliorhiniceps Smith, 1943: 67, Fig. 1 (East London); Smith, **SFSA No. 1087*;** Briggs, 1955: 72*; Smith, 1964: 584*; Smith & Smith, 1966: 115*; Penrith, 1969: 130*.

D 5-6; A 5-6; P 18-19; C 10-12; GR 4-5. Head length 3.6-4.0 and head width 5.7-6.2 in SL. Upper attachment of gill membrane opposite 2nd P ray. Disc length 6.5-6.7 in SL. Disc Region A with only 1 group of papillae in centre; disc Region B with 4-5 rows of flattened papillae across its width; 2 rows in centre of disc Region C.

Attains 35 mm. Lüderitz to Kei River mouth.

Genus ***Lepadichthys*** Waite, 1904

Nine species, 3 in our area.

KEY TO SPECIES

1a Snout depressed, produced, resembling a duck's beak; disc circular, its length much less than distance from middle of lower lip to disc; 11-16 GR on 2nd gill arch ..... *L. coccinotaenia*

1b Snout short, rounded, not resembling a duck's beak; disc oval, its length about equal to distance from middle of lower lip to disc; 8 GR on 2nd gill arch 2

2a Postdorsal-caudal distance (from base of last D ray to base of middle C rays) 2.0-2.5 in length of D base (distance between bases of 1st and last D rays); upper attachment of opercular membrane opposite 10th to 12th P ray ..... *L. lineatus*

2b Postdorsal-caudal distance 1.3-1.8 in D base; upper attachment of opercular membrane opposite 7th to 9th P ray ..... *L. earitus*

110.5 *Lepadichthys caritus*
Briggs, 1969

Pale clingfish — Bleek suiervis

Lepadichthys caritus Briggs, 1969: 464, Fig. 1 (Seychelles).

D 10-11; A 8-9; P 25-29; C 12-14; GR 8. Teeth in 1 row; upper jaw teeth, as in *L. coccinotaenia;* lower jaw teeth, incisors with irregular tips. Disc 5.9-6.0 in SL. Disc Region A with 3-5 rows of flattened papillae across its width; disc Region B with 5-6 rows across its width; no papillae in disc Region C.

Maximum known size 29.4 mm. Seychelles to Sodwana Bay, Natal.

110.5 *Lepadichthys caritus:* 3 cm (Natal).

110.6 *Lepadichthys coccinotaenia*
Regan, 1921
PLATE 14

Eyestripe clingfish — Oogstreep-suiervis

Lepadichthys coccinotaenia Regan, 1921: 2 (Durban); Smith, **SFSA No. 1088*;** Briggs, 1955: 138*; Smith, 1964: 586*; 1965: 324.

D 11-13; A 9-11; P 26-28; C 10-12; GR 11-16. Teeth in 1 row; those of upper jaw, incisors with sharp, recurved tips; conical teeth in lower jaw. Disc length 5.4-5.5 in SL. Disc Region A with 4 rows of flattened papillae across its width; disc Region B with 6 rows across its width; no papillae in disc Region C.

Attains 50 mm. Tanzania to southern Natal (31°S); also Pakistan.

110.7 *Lepadichthys lineatus*
Briggs, 1966
PLATE 14

Doubleline clingfish — Dubbellyn-suiervis

Lepadichthys lineatus Briggs, 1966: 37, Fig. 1 (Eilat, Gulf of Aqaba); 1969: 465; Smith, 1980: 185.

D 9-11; A 8-9; P 27; C 12; GR 8 (on 2nd arch). Teeth as in *L. coccinotaenia.* Disc length 5.5-5.7 in SL. Disc region A with 4 rows of flattened papillae across its width; region B with 5 rows across its width.

Maximum known size 31 mm SL. Colour in life: reddish brown with 2 bright yellow lines as shown on plate. Our 31 mm specimen has 5 or 6 small faint yellow spots on the operculum between the yellow lines; our smaller (25 mm SL) fish has small pale spots all over the head and body. Known only from the Red Sea and Sodwana Bay.

Genus ***Lissonanchus*** Smith, 1965

One endemic species.

110.8 *Lissonanchus lusheri*
Smith, 1965

Streaky clingfish — Strepie-suiervis

Lissonanchus lusheri Smith, 1965: 642, Fig. 1, Pl. 19 (Ponte Zavora, southern Mozambique).

D 5; A 5; P 16; C 10; GR 0. Head length 2.9 and width 3.8 in SL. Conical teeth in a cluster at front of each jaw. Upper edge of gill membrane attachment opposite 2nd or 3rd P ray. Disc length 3.8 in SL. Disc region A with 4-5 rows of flattened papillae across its width; 4-5 rows across disc region B; 4 across disc region C.

Only known specimen, 21 mm SL.

110.8 *Lissonanchus lusheri:* 2.5 cm holotype (S. Mozambique).

Genus ***Pherallodus*** Briggs, 1955

Two species; 1 in our area.

110.9 *Pherallodus smithi*
Briggs, 1955

Mini-clingfish — Mini-suiervis

Pherallodus smithi Briggs, 1955: 44, Figs. 24, 86 (Durban); Smith, 1961: 572, **No. 1086a;** Smith, 1964: 585*.

D 8; A 6; P 23; C 9; GR 6. A single row of small, incisor-like teeth with rounded tips in each jaw. Upper attachment of gill membrane opposite 5th P ray. Disc length 3.7 in SL. Disc Region A with 4 rows of flattened papillae across its width; disc Region B also with 4 rows across its width; Region C with 2 rows.

Only known specimen, 18.8 mm SL.

110.9 *Pherallodus smithi:* 2 cm holotype (Durban; after Briggs, 1955).

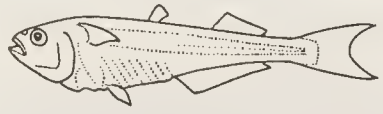
Order ATHERINIFORMES

This order is an ill-defined assemblage of 6 families that represents the residue after the Cyprinodontiformes and the Beloniformes are subtracted from the taxon Atherinomorpha. See Rosen and Parenti, 1981, for a discussion of the classification of these fishes.

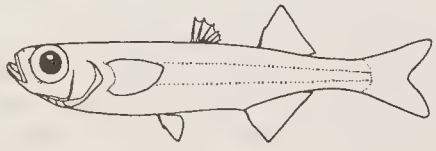
Two families occur in our area. They can be recognised by the following combination of characters: two dorsal fins, the first with 3 to 8 weak spines; anal fin with one weak spine and 11 to 28 soft-rays; pectoral fins inserted high on the body; pelvic fins with a spine and 5 soft-rays; pelvic fin origin between verticals at pectoral base and first dorsal fin origin; scales cycloid; lateral line absent; mouth small, terminal, not extending past vertical at middle of eye; rostral cartilage not attached to premaxillae; egg large, demersal, with adhesive filaments and many oil droplets that coalesce at the vegetative pole.

KEY TO FAMILIES

1a Body very compressed, forming a sharp keel ventrally, the greatest depth just behind the head; head length less than body depth; anal fin with 21 to 28 soft-rays ..... NOTOCHEIRIDAE (No. 112)



1b Body not much compressed, without a ventral keel, the greatest depth some distance behind head; head length equals or exceeds body depth; anal fin with 11 to 17 soft-rays ..... ATHERINIDAE (No. 111)



Family No. 111: ATHERINIDAE

by W. Ivantsoff

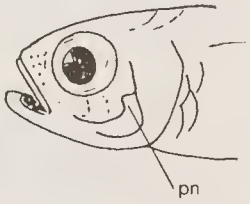
Silversides **Spierinkies**

Scales cycloid, usually peppered with small chromatophores. Lateral line absent. Mouth small to moderate, never extending past vertical through middle of pupil. Premaxilla protractile in many species. Teeth usually small, feeble and indistinct, but almost always present on both jaws, sometimes also on palatines, ectopterygoids, mesopterygoids, vomer and tongue. Minute denticles on head in some species. Gill-rakers on first gill arch relatively few in number, short and slender. First dorsal fin spinous, second with one spine, one unbranched ray and variable number of branched rays. Anal with one weak spine, one unbranched ray followed by branched rays. Pectorals inserted high on side of body.

Small silvery fishes; midlateral stripe extending from pectoral to caudal fin. Occurring in temperate and tropical waters of all oceans, usually in large schools. Of no great commercial value, but important as bait and forage fish for commercial species. Four genera and 6 species in vicinity of South Africa; total number of species around the world probably exceeding 120. Old World species presently being revised by Ivantsoff.

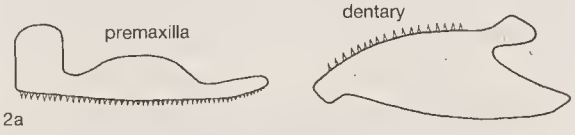
KEY TO GENERA

1a Preopercular notch present 2



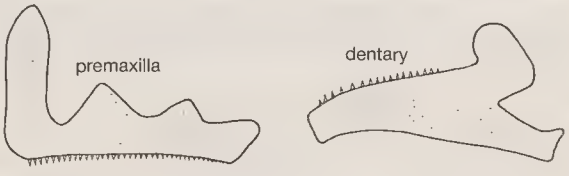
1b Preopercular notch absent 3

2a Ascending and lateral processes of premaxilla short and broad; dentary not elevated posteriorly or with a slight tubercle distally ..... *Atherinomorus*



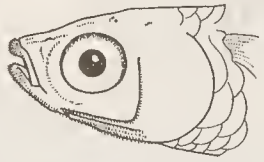
2a

2b Ascending premaxillary process moderately high and narrow, its height usually more than twice its width; lateral processes of premaxilla low and triangular; dentary distinctly elevated posteriorly ..... *Hypoatherina*



2b

3a Minute denticles on external surface of jaws and front of head; 1st D behind vertical at tips of V; maxillary shelf absent ..... *Atherion*



3b No minute denticles on external surfaces of jaws or head; 1st D origin on or in front of vertical at tips of V; maxillary shelf present ..... *Atherina*

Genus ***Atherina*** Linnaeus, 1758

Five species, 1 in our area.

111.1 *Atherina breviceps*
Valenciennes, 1835
PLATE 16

Cape silverside — Kaapse spierinkie

Atherina breviceps Valenciennes, *in* Cuv. & Val., 1835: 445 (Cape of Good Hope); Smith, **SFSA No. 893*;** Blanc & Hureau, 1971: 704. *Atherina parvipinnis* Valenciennes, *in* Cuv. & Val., 1835: 446 (Cape of Good Hope); Blanc & Hureau, 1971: 708. *Hepsetia breviceps:* Smith, 1965: 626*; Smith & Smith, 1966: 96*.

D V-VIII+I,11-15; A I,15-18; P 13-16. Midlateral scales 44-50; GR (5-6)+(17-20). Depth 4.7-6.3; head 3.7-5.0. Anus near tips of V.

Body translucent, silvery, with brilliant midlateral band; upper surface dusky, dorsum of head dark. Preserved specimens yellow or brown; scales outlined by fine chromatophores on back. Midlateral band may remain silvery or become dark with time. Abdomen almost devoid of pigment. Cheeks dark or silvery. Attains 11 cm. Schools in bays and estuaries, especially in spring. Appears to have a restricted distribution from Lüderitz, Namibia to northern Natal.

Genus ***Atherinomorus*** Fowler, 1903

Apart from the presence of scaly fin sheaths and unfused hypurals 3 and 4 in *Atherinomorus stipes,* a Caribbean species, there are no other differences that justify the recognition of *Pranesus* Whitley (1930) as a separate genus. Eight species; 2 species relatively common in western Indian Ocean.

KEY TO SPECIES

1a Midlateral scale count 33-37; dentary with small tubercle at posterior end; midlateral band less than 1 scale width ..... *A. duodecimalis*

1b Midlateral scale count 39-44; dentary flat or gently sloping upwards towards posterior end; midlateral band 1-1½ scales wide ..... *A. lacunosus*

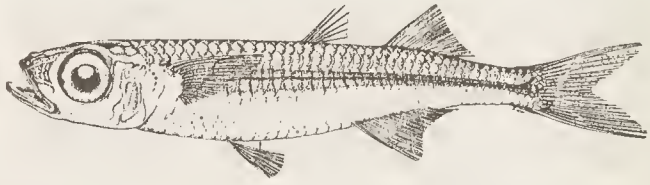
111.2 *Atherinomorus duodecimalis*
(Valenciennes, 1835)

Tropical silverside — Tropiese spierinkie

Atherina duodecimalis Valenciennes, *in* Cuv. & Val., 1835: 458 (Ceylon); Blanc & Hureau, 1971: 705. *Pranesus duodecimalis:* Schultz et al., 1953: 306. *Allanetta duodecimalis:* Smith, 1965: 620.

D IV-VI+I,9-10; A I,12-13; P 14-17; GR 6+1+(21-25).

Preserved specimens yellow-green or brownish; head, base of fins and midlateral stripe either silvery or dark brown. Rows of spots frequently present below midlateral band. Attains 9-10 cm. Recent collections suggest that this species is common at Aldabra, Comores and Madagascar. It is likely, therefore, that *A. duodecimalis* also occurs in our area.



111.2 *Atherinomorus duodecimalis:* 6.5 cm (drawn by Betty Thorn).

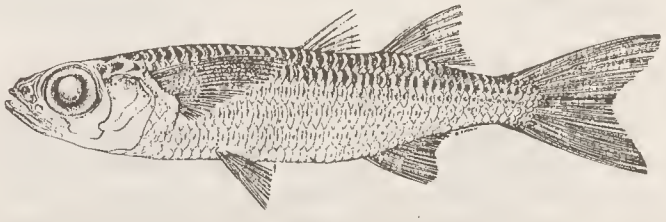
111.3 *Atherinomorus lacunosus*
(Forster, 1801)

Hardyhead silverside — Klipkop-spierinkie

Atherina lacunosa Forster, *in* Bloch & Schneider, 1801: 112 (New Caledonia); Blanc & Hureau, 1971: 706; Whitehead & Ivantsoff, 1983: 358*. *Atherina pinguis* Lacepède, 1803: 372 (Mauritius). *Hepsetia pinguis:* Smith, **SFSA No. 894*.** *Pranesus pinguis:* Smith, 1965: 616*.

D IV-VII+I,8-11; A I,12-17; P 14-17; GR (5-6)+1+(18-25).

In life, body blue-green or grey; sides and cheeks silvery and often iridescent. Midlateral stripe silvery or black. Upper half of body heavily speckled with chromatophores. Pectoral blotch usually distinct, but often fading when preserved. Preserved specimens yellow-brown. Top of head, snout, cheeks and midlateral band dark. Attains 14 cm. Ubiquitous in Indo-West Pacific; to East London but rare south of Natal; Red Sea and eastern Mediterranean. Frequently found in large schools just offshore.



111.3 *Atherinomorus lacunosus:* 12.5 cm (composite).

Genus ***Atherion*** Jordan & Starks, 1901

Three species; 1 in our area. The Pacific species, *A. elymus* Jordan & Starks, 1901, has A I,12-15.

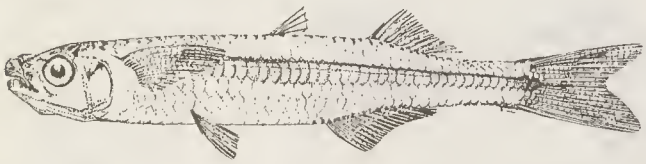
111.4 *Atherion africanus*
Smith, 1965

Pricklenose silverside — Stekelneus-spierinkie

Atherion africanus Smith, 1965: 607, Fig. 2 (Inhaca Id., Mozambique); Blanc & Hureau, 1971: 714.

D IV-V+I,10-12; A I,16-17; P 10-13; LL 41-44; GR (2-3)+1+(10-11). Depth 6.2-6.6; head 4.3-5.0. Eye in head 2.9-3.1. Head with numerous denticles.

Live fish blue-green and translucent. Preserved: yellow-brown or brown-green; midlateral stripe silvery or brown. Top of head dark. Upper part of body dusky, with scales well outlined by chromatophores. Abdomen may be brown if peritoneum shows through. Pigmentation on body and head variable, ranging from spots on chin, cheeks and lower half of body to little or no pigmentation in those areas. Attains 55 mm. Natal to India.



111.4 *Atherion africanus*: 5 cm holotype (Inhaca Id.).

Genus ***Hypoatherina*** Schultz, 1948

A number of species referred to the genus *Allanetta* by Schultz (1948), Schultz et al., (1953), Smith (1965) and others are considered to belong to genus *Hypoatherina*. *Allanetta* Whitley, 1943, is a monotypic genus closely related to *Craterocephalus* McCulloch (Taylor, 1964). The type-species of *Allanetta* has no preopercular notch, a character which has been used as a diagnostic feature for the genus by Schultz (1948) and subsequent workers. Seven species, 2 in our area.

KEY TO SPECIES

1a P 12-15; lower GR 15-19; palatines edentate ..... *H. barnesi*
1b P 14-18; lower GR 21-25; palatines dentate ..... *H. temminckii*

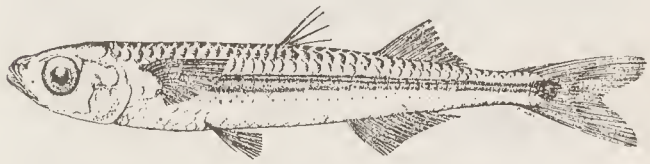
111.5 *Hypoatherina barnesi*
Schultz, 1953

Slender silverside — Slank spierinkie

Hypoatherina barnesi Schultz, *in* Schultz et al., 1953: 304, Fig. 47 (Marshall Ids.). *Atherina afra* (*non* Peters): Smith, SFSA No. 892*. *Allanetta klunzingeri* Smith, 1965: 623, Fig. 6, Pl. 100, Fig. D (Inhaca Id., Mozambique).

D V-VII+I,8-11; A I,12-17. Depth 5.7-7.8; midlateral band width 2.3-3.3 in body depth.

Live fish translucent; midlateral stripe and abdomen silvery. Preserved specimens milky yellow, green-brown or brown. Top of head, snout and cheek dark. Midlateral band dark, often becoming wider towards A origin. Scales on upper half of body outlined by chromatophores. Mid-dorsal band may be well developed. Bases of fins may also be pigmented. Apparently not exceeding 75 mm. Specimens from Natal to Comores are not distinguishable from western Pacific populations. Occurs in large schools during the day, but apparently dispersing at night.



111.5 *Hypoatherina barnesi*: 3.5 cm (drawn by Betty Thorn).

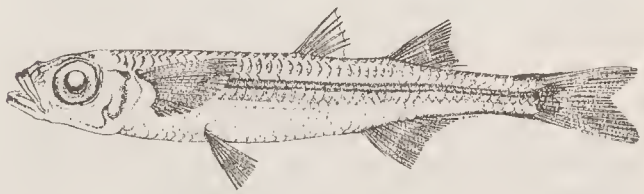
111.6 *Hypoatherina temminckii*
(Bleeker, 1853)

Whitebait — Witaas

Atherina temminckii Bleeker, 1853: 506 (Java); Blanc & Hureau, 1971: 711. *Atherina afra* Peters, 1855: 244 (Mozambique). *Allanetta afra:* Smith, 1965: 621*.

D V-VII+I,8-10; A I,11-14. Depth 5.6-6.9; midlateral band width in body depth 2.8-4.7.

Live fish translucent, blue-green, with silvery midlateral stripe and abdomen. Preserved specimens brown, green-yellow or pale yellow. Midlateral band, dorsum of head, snout usually dark brown or black. Upper half of body with many more pigment spots than lower half; 2 rows of pigment spots may be present below lateral band. Bases of fins usually dark and P may be blotched. Attains 12 cm. Common in South Pacific, northern Australia, Indian Ocean and Red Sea; south to Delagoa Bay.



111.6 *Hypoatherina temminckii:* 5 cm.

Family No. 112: NOTOCHEIRIDAE

by W. Ivantsoff

Surf sprites **Branderfeetjie**

Body very compressed, forming a sharp keel ventrally; greatest body depth just behind head, then tapering rapidly backwards to caudal peduncle. Protrusibility of premaxilla restricted by frenum; ascending process of premaxilla short. Slit present behind last gill. Anal fin with 20-28 branched rays. Cleithrum long, extending downwards to keel. Scales small and numerous, absent on head and front part of body in *Iso*.

Two genera; *Iso* in our area and *Notocheirus* Clark, 1937 from Chile. The name Notocheirinae of Schultz (1950) has priority over Isonidae of Rosen (1964).

Genus *Iso* Jordan & Starks, 1901

Five species; 1 in our area.

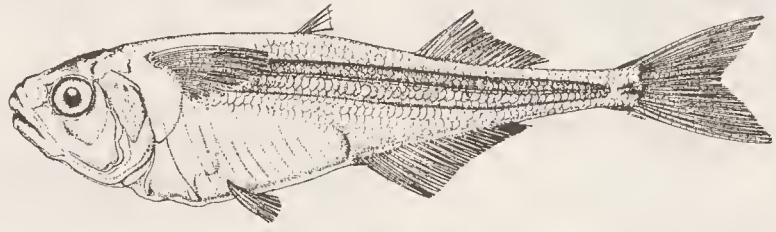
112.1 *Iso natalensis*
Regan, 1919
PLATE 16

Surf sprite Branderfeetjie

Iso natalensis Regan, 1919: 200, Fig. 3 (Durban, Natal); Smith, **SFSA No. 891*;** 1965: 604*; Smith & Smith, 1966: 96*.

D III-VI+I,12-17; A I,21-28; P I,12-14; lower GR 10-12. Scales approximately 40-60. Depth 3.3-3.4; head 4.2-5.5. Eye 2.5-3.6 in head. Numerous specimens from Africa, Comores, Pakistan and India (including the types of *I. natalensis* and *I. flosindicus* Herre, 1944) have been examined and found to be indistinguishable from one another.

Translucent with silver lower head and band along side to silver spot on C peduncle and viscera enclosed in silver; difficult to observe when in water. Preserved specimens milky, yellow or yellow brown. Midlateral stripe, opercle, eye and abdomen either silvery or brown. Interdorsal space black. Attains 8 cm. Frequently found in large numbers in boiling surf, close to shoreline. Widely distributed in Indian Ocean; extends south to Cape Agulhas.



112.1 *Iso natalensis:* 6.5 cm (Port Alfred).

Order BELONIFORMES

Body elongate; dorsal and anal fins on rear half of body; pelvic fins abdominal, with 6 soft-rays; fin spines absent; scales thin, cycloid; lateral line running along ventral edge of body; lower pharyngeal bones fused into a triangular plate; the first and fourth pharyngobranchials, interhyal and all infraorbital bones except the first are absent.

The Beloniformes is one of the three orders that constitute the Atherinomorpha (Rosen & Parenti, 1981); the other two orders are the Atheriniformes and the Cyprinodontiformes. The atherinomorph fishes are distinguished by the unique structure of their upper jaw, which has the rostral cartilage separate from the premaxillae, crossed palatomaxillary ligaments and a maxillary ligament to the cranium; the eggs are large, demersal, provided with adhesive filaments (lacking in *Exocoetus* and in most scomberesocids) and have many oil droplets at the vegetative pole; (Collette et al., 1984; Rosen & Parenti, 1981). Atherinomorphs are further characterised by a unique structure of their testes in which the spermatogonia are confined to the terminus of the tubules (Grier, 1981).

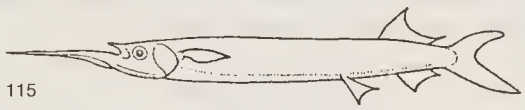
Rosen and Parenti (1981) recognise 5 families in the Order Beloniformes; the Family Adrianichthyidae is restricted to brackish and freshwaters of Asia. The Suborder Exocoetoidei is divided into the Superfamily Exocoetoidea (Hemiramphidae + Exocoetidae) and the Superfamily Scomberesocoidea (Belonidae + Scomberesocidae).

KEY TO FAMILIES

1a Lower jaw elongated or not; pectoral and/or pelvic fins often enlarged; rostral bones separate 2

1b Both jaws elongated; paired fins not enlarged; rostral bones joined by sutures 3

2a Lower jaw elongated (except in adults of *Oxyporhamphus*); upper jaw triangular, projecting forward from snout; pectoral fins shorter than head measured from tip of upper jaw (except in *Euleptorhamphus*) ..... HEMIRAMPHIDAE (No. 115)



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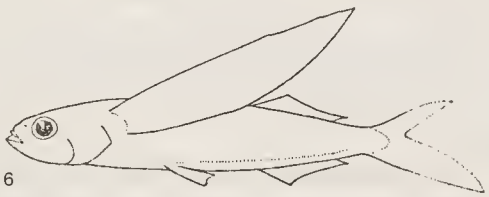
2b Jaws not elongated or projecting forward from snout; pectoral fins longer than head ..... EXOCOETIDAE (No. 116)



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3a Dorsal and anal fins with 4-6 separate finlets behind; jaws subequal to or shorter than head measured from corner of mouth ..... SCOMBERESOCIDAE (No. 114)

114

3b No finlets behind dorsal and anal fins; jaws longer than head measured from corner of mouth ..... BELONIDAE (No. 113)

113

Family No. 113: BELONIDAE

by B.B. Collette

Needlefishes **Naaldvisse**

Body elongate, subcylindrical or laterally compressed. No spines in fins; dorsal and anal fins posterior in position; their bases opposite. Pelvic fins abdominal, with 6 soft-rays. Pectoral fins high on sides, short. Caudal fin forked or emarginate. Both upper and lower jaws extended into long beaks. Teeth moderate to large, needle-like. Lower pharyngeal bones fused into a triangular plate; third pair of upper pharyngeal bones separate. Gill-rakers present or absent. Nasal organ a pit with protruding tentacle. Lateral line beginning on throat, running along ventral margin of body with a branch to pectoral fin origin. Scales small, cycloid, easily detached. Vertebrae 51-97.

Epipelagic, most species marine (mostly neritic), but in tropics some occur in freshwater. Carnivorous, feeding largely on small fishes which they catch sideways in their beaks. Eggs have sticky filaments which attach to floating or anchored vegetation; larvae pelagic. Needlefishes tend to

leap and skitter at the surface; at night they are attracted by lights. Minor commercial importance; flesh excellent in flavour although some people have misgivings about eating it owing to the green bones. Maximum size ranges from 4 cm body length for some freshwater species to over 90 cm body length in some marine species (over 125 cm standard length). Body length (BL), the distance from the posterior opercular margin to the caudal base, is used as the base measurement instead of standard length because the beaks are broken on many specimens. Ten genera, with a total of 32 species. There have been extensive changes since the family was reviewed by Mees (1962, 1964). Indo-West Pacific species were reviewed by Parin (1967) and eastern Atlantic species by Collette and Parin (1970).

KEY TO GENERA

1a GR well-developed, 27-35 on first gill arch . . . . . *Petalichthys*
1b GR absent 2

2a D rays 18-21; P rays 11-12; predorsal scales 120-160 . . *Strongylura*
2b D 21-24; P rays 13-15; predorsal scales 270-400 3

3a Head and body strongly compressed; several prominent black vertical bars present on body; A rays 25-27 . . . . . *Ablennes*
3b Head and body not compressed; no prominent black bars on body; A rays 19-24 . . . . . *Tylosurus*

Genus ***Ablennes*** Jordan & Fordice, 1886

Monotypic.

113.1 *Ablennes hians*
(Valenciennes, 1846)
PLATE 16

Barred needlefish — Balk-naaldvis

Belone hians Valenciennes, *in* Cuv. & Val., 1846: 432, Pl. 548 (Bahia, Brazil). *Ablennes hians:* Smith, **SFSA No. 226***; Collette & Parin, 1970: 37*; van der Elst, 1981: 107*.

D 22-25; A 25-27; P 13-15; vertebrae 87-93. Depth 9.1- 10.3; head about 2.4 in BL.

Generally dark bluish above, silvery white below with variable number of elongate black blotches on middle of body. Attains 90 cm BL (over 120 cm SL). Previously reported from Natal, now known to occur south to Algoa Bay. Worldwide in tropical and subtropical waters; in the Atlantic, extending south to Mocamedes, southern Angola.

Genus ***Petalichthys*** Regan, 1904

Monotypic.

113.2 *Petalichthys capensis*
Regan, 1904

Cape needlefish — Kaapse naaldvis

Petalichthys capensis Regan, 1904: 129 (Port Elizabeth); Smith, **SFSA No. 225***; Smith & Smith, 1966: 86*; Day, Field & Penrith, 1970: 91. *Belone megalolepis, nom. nov.,* Mees, 1962: 51.

D 16-19; A 21-23; P 10-12; GR (4-5)+(24-30) = 27-35; vertebrae (45-46)+(26-27) = 71-73. Depth 9.1-12.6, head 2.0-2.6 in BL.

Bluish above, silvery below. Attains 26 cm BL (35 cm SL). South African endemic, found shoaling offshore from False Bay to Pondoland.

Genus ***Strongylura*** van Hasselt, 1823

Fourteen species; 1 in our area. *S. senegalensis* (Valenciennes, 1846): Smith, **SFSA No. 227** is found along the coast of west Africa south to Angola. The types of a synonym, *Belone capensis* Günther, 1866 were supposed to have come from the Cape of Good Hope; but as there are no subsequent records south of Angola, the locality data for these specimens is likely in error. *S. senegalensis* differs from *S. leiura* in having fewer fin rays (D 13-16, A 15-18) and vertebrae (62-67).

113.1 *Ablennes hians:* 45 cm (drawn by Mildred H. Carrington).

113.2 *Petalichthys capensis:* 28 cm (Knysna).

113.4 *Tylosurus crocodilus:* 54 cm (drawn by Mildred H. Carrington).

113.3 *Strongylura leiura*
(Bleeker, 1851)
PLATE 16

Yellowfin needlefish — Geelvin-naaldvis

Belone leiurus Bleeker, 1851: 94 (Java). *Belone natalensis* Günther, 1866: 243 (Durban). *Tylosurus leiurus:* Smith, **SFSA No. 228***. *Strongylura leiura leiura:* Parin, 1967: 31*; Cressey & Collette, 1970: 401; van der Elst, 1981: 108*.

D 18-21; A 22-26; P 11-12; predorsal scales 121-152; vertebrae (49-52)+(30-32) = 80-83. Depth 8.9-12.2, head 1.8-2.1 in BL. Parin (1967) recognised the Australian population as a separate subspecies, *S. leiura ferox* (Günther) based on its higher counts of D & A rays.

Back greenish, sides silvery, grading into white ventrally. A black bar on cheek between opercle and preopercle. D and A lobes yellowish with some melanophores along middle of rays. P dark distally, the tip yellow. Attains 46 cm BL (73 cm SL) in the Indian Ocean; 56 cm BL (79 cm SL) in Australia. Inshore and in estuaries from Durban to Persian Gulf and east through Indian waters to Philippines, southern China, Australia and Fiji.

Genus ***Tylosurus*** Cocco, 1833

Five species; 1 in our area. *Tylosurus acus melanotus* (Bleeker, 1850) may extend south into our area. It differs from *T. crocodilus* in having more fin rays (D 24-27, A 22-24) and vertebrae (90-95), relatively low D and A lobes (10.5-13.3 and 9.7-11.7 times in BL respectively vs. 5.4-10.6 and 5.5-8.0), and shorter P and V (8.0-12.4 and 10.0-14.1 times in BL respectively vs. 6.6-8.3 and 7.3-10.6). Fowler's record (1925) of *Strongylura melanotus* from Delagoa Bay (see Smith, **SFSA No. 230**) is based on a specimen of *T. crocodilus*.

113.4 *Tylosurus crocodilus crocodilus*
(Peron & LeSueur, 1821)

Crocodile needlefish — Krokodil-naaldvis

Belone crocodila Peron & LeSueur *in* LeSueur, 1821: 129 (Mauritius). *Belone robusta* (*non* Günther): Regan, 1908: 243. *Tylosurus choram* (*non* Rüppell): Gilchrist & Thompson, 1908: 200. *Tylosurus crocodilus:* Smith, **SFSA No. 229;** Collette & Parin, 1970: 52*. *Tylosurus crocodilus crocodilus:* Parin, 1967: 58*.

D 21-24; A 19-22; P 14-15; predorsal scales 271-340; vertebrae (54-57) +(29-30) = 82-86. Depth 8.8-14.1, head 2.1-2.5 in BL. C lower lobe much longer than upper.

Back dark bluish, sides silvery, grading into white ventrally. A black spot sometimes present distally in P. Juveniles and subadults with enlarged melanistic posterior lobe in D. Prominent raised black keel on caudal peduncle. Attains at least 86 cm BL (125 cm SL). Previously reported south to Durban, but now known to occur south to Knysna. This subspecies is widely distributed in the Atlantic and Indo-West Pacific in tropical and subtropical waters. It is replaced in the eastern tropical Pacific by *T. c. fodiator* Jordan & Gilbert, 1881.

Family No. 114: SCOMBERESOCIDAE

by M.M. Smith

Sauries — **Sauries**

Body elongate, compressed, covered with small, thin scales. Dorsal and anal fins set far back on the body with 4-6 finlets behind. Lower jaw longer (adults of the 2 species in our area have jaws produced to form long slender beaks).

Four monotypic genera; the 2 from the Pacific, *Cololabis* Gill, 1896 and *Elassichthys* Hubbs & Wisner, 1980 have jaws little produced into blunt beaks. Recent revision of family by Hubbs & Wisner, 1980.

KEY TO GENERA

1a GR less closely spaced, 19-26; P 10-11; C peduncle depth about ½ its length; attains 13 cm SL ..... *Nanichthys*
1b GR close together, 34-51; P 12-15; C peduncle depth about equal to its length; large, attains 50 cm SL ..... *Scomberesox*

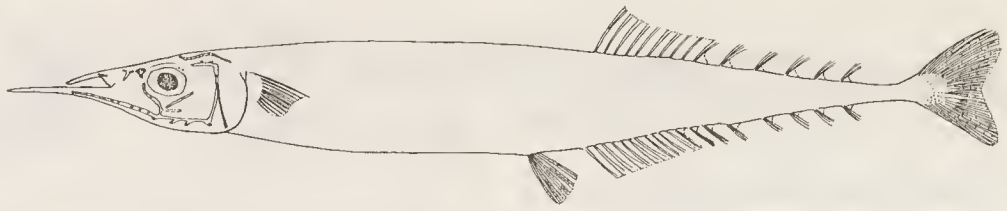
Genus ***Nanichthys*** Hubbs & Wisner, 1980

Teeth in upper jaw biserial in front, uniserial behind; in lower jaw uniserial in front and biserial behind; gasbladder absent; single median ovary with relatively large eggs. Monotypic.

114.1 *Nanichthys simulans*
Hubbs & Wisner, 1980

Dwarf saury — Dwerg-saurie

Nanichthys simulans Hubbs & Wisner, 1980: 531, Fig. 5 (south central Atlantic Ocean; 24°02.5'S, 15°32.0'W).



114.1 *Nanichthys simulans:* 9 cm SL holotype (drawn after Hubbs & Wisner, 1980).

114.2 *Scomberesox saurus scomberoides:* 35 cm (Kei Mouth).

D rays + finlets = 14-16; A rays + finlets = 17-20; P 8-11; total GR 19-26; LS 77-91, very caducous; LL developed only anteriorly, extends to slightly past V base; vertebrae 58-62; procurrent C rays 3-5 (generally 4); jaws slender, about half as long as those of *S. saurus*.

Attains 126 mm SL; the dwarf saury has been mistaken for juveniles of *S. saurus;* too small to be of commercial interest. Known from warm temperate waters of the Atlantic and southern Indian oceans; in our area from the Cape up the west coast.

Genus ***Scomberesox*** Lacepède, 1803

Teeth biserial on beak, uniserial behind; gasbladder present; ovaries paired. Monotypic; 2 subspecies: *S. saurus saurus* Walbaum, 1792 of the North Atlantic and Mediterranean differs from *S. s. scomberoides* of the southern hemisphere in the average number of GR being about 41 instead of about 45.

114.2 *Scomberesox saurus scomberoides*
(Richardson, 1842)
PLATE 16

Saury — Saurie

Esox saurus Schneider, *in* Bloch & Schneider, 1801: 399 (part referring to J.R. Forster's MS pertaining to New Zealand). *Sauris scomberoides* Richardson, 1842: 26 (on *Esox saurus* above and G. Foster's illustration of New Zealand specimen). *Scomberesox saurus:* Smith, **SFSA No. 224***. *Scomberesox saurus scomberoides:* Hubbs & Wisner, 1980: 535*.

D (9-12)+(5-6) = 14-18; A (11-14)++(6-7) = 17-21; P 12-15; GR 39-51; LS 107-128, firmly attached, LL extending to over anal finlets; vertebrae 64-70; procurrent C rays 5-7; gasbladder with thin walls.

Attains 50 cm SL. Skims along the surface in short "skips". Jaws of prejuveniles are normal and elongate with growth, the lower always longer than the upper. Difficult to catch; flesh delicate, good eating, excellent bait. Circumglobal in southern hemisphere; known along most of our coast.

Family No. 115: HEMIRAMPHIDAE

by B.B. Collette

Halfbeaks — **Halfbekke**

Body elongate, almost round to laterally compressed. No spines in fins; dorsal and anal fins posterior in position, their bases about opposite. Pelvic fins abdominal, with 6 soft-rays. Pectoral fins high on sides, short to long. Caudal fin forked or emarginate, lower lobe slightly to greatly longer than upper lobe. Lower jaw extended into a long beak except in a few genera, only *Oxyporhamphus* in this area. Upper jaw short and usually triangular in shape. Teeth in several rows, tricuspid or unicuspid. Lower pharyngeal bones fused into a plate; 3rd pair of upper pharyngeal bones also fused into a plate. Gill-rakers well developed on 1st and 2nd gill arches. Nasal organ a pit with a protruding tentacle. Scales large, cycloid, easily detached. Lateral line beginning on throat, extending along ventral margin of body, with a branch to pectoral fin origin. Vertebrae 37-73.

Most halfbeaks are marine and epipelagic, but some inhabit freshwaters. They are prone to leap and skitter at the surface, and one offshore species, *Euleptorhamphus viridis,* leaps out of the water and glides like a flying fish. Halfbeaks can usually be distinguished from flying fishes (Exocoetidae) by having an elongate lower jaw, premaxillae forming a triangular projection of the upper jaw, and in having short or moderate length pectoral fins. One genus in our waters, *Oxyporhamphus,* has an elongate lower jaw only as a juvenile, premaxillae with straight anterior margin, and longer pectoral fins than most halfbeaks. This genus has been placed in a separate family Oxyporhamphidae by some workers but, based on osteological characters (Parin, 1961), seems best considered as a highly specialised halfbeak. Some species are herbivores, feeding on floating sea grasses; others are omnivores or carnivores, feeding on crustaceans and small fishes. Eggs have fila-

ments which attach to floating or anchored vegetation; larvae are pelagic. Locally abundant in warm waters. The flesh is excellent and halfbeaks are utilised as food in some parts of the world.

Twelve genera and about 80 species. Maximum size 5-40 cm. No recent revision of entire family, but the eastern Atlantic species were treated by Collette (1965) and the Indo-West Pacific marine species were reviewed by Parin, Collette & Shcherbachev (1980). GR_1 is the count of gill-rakers on the 1st gill arch, and GR_2 those on the 2nd arch.

KEY TO GENERA

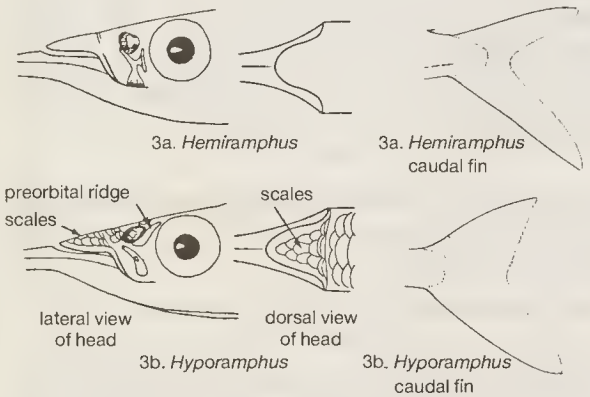
1a Front margin of upper jaw straight, not forming a prominent triangular projection; P long (30-33% SL) ..... *Oxyporhamphus*

1b Front margin of upper jaw forming prominent triangular projection; P not more than 28% SL 2

2a Body highly compressed, ribbon-shaped; teeth present on vomer and tongue; D 20-25 ..... *Euleptorhamphus*

2b Body not much compressed; no teeth on vomer or tongue; D 13-18 3

3a Preorbital ridge absent; upper jaw naked; swimbladder alveolar ..... *Hemiramphus*



3b Preorbital ridge present; upper jaw covered with scales; swimbladder simple (single-chambered) ..... *Hyporhamphus*

Genus ***Euleptorhamphus*** Gill, 1860

Two species. The Atlantic species *E. velox* Poey, 1868 has 7 or 7½ P rays; it may extend south to Walvis Bay, but the identification of the specimen is not certain.

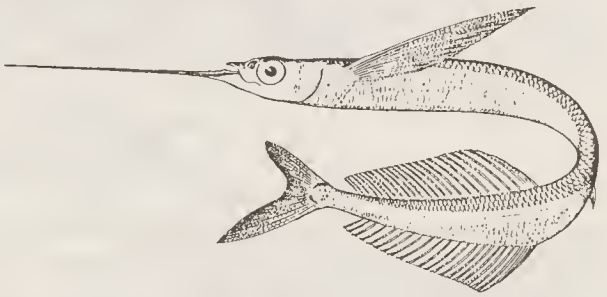
115.1 *Euleptorhamphus viridis*
(van Hasselt, 1823)

Ribbon halfbeak — Lint-halfbek

Hemiramphus viridis van Hasselt, 1823: 131 (based on the figure and description of "Kuddera C" Russell, 1803: 62, Pl. 178; Vizigapatam, India). *Hemiramphus longirostris* Cuvier, 1829: 286 (also based on "Kuddera C" of Russell, 1803: 62). *Euleptorhamphus longirostris:* Barnard, 1937: 50; Smith, **SFSA No. 216***. *Euleptorhamphus viridis:* Parin, 1964: 185; Parin et al., 1980: 140*.

D 21-25, rarely 20; A 20-24, rarely 25; P 8 (not counting short ray that is sometimes present); predorsal scales 48-72; GR_1 (6-9)+(18-23) = 25-32; GR_2 (3-5)+(13-19) = 16-24; vertebrae (44-46)+(26-29) = 70-75. Depth 16.1-23.5; head 6.3-7.4; P 3.6- 4.0. Lower jaw 2.2-2.7 in SL and 0.3-0.4 in head length.

Fins unpigmented. Fold of skin at edges of lower jaw grey with transverse black bands. Attains 40 cm. Previously reported from Table Bay; additional specimens now known from Algoa Bay and Kei River mouth. Tropical and temperate waters of Indo-Pacific.



115.1 *Euleptorhamphus viridis:* 43 cm (after Jordan & Evermann, 1905).

Genus ***Hemiramphus*** Cuvier, 1816

At least 10 species; 1 in our area. Fowler's 1934 report of *He. marginatus* (Forsskål) from Lake St. Lucia is based on a juvenile specimen of *He. far.* Other reports of *He. marginatus* from east Africa are based on specimens of *He. lutkei* Valenciennes; *He. marginatus* is restricted to the Red Sea and Persian Gulf.

115.2 *Hemiramphus far*
(Forsskål, 1775)
PLATE 16

Spotted halfbeak — Gevlekde halfbek

Esox far Forsskål, 1775 (Lohajae, Red Sea). *Hemiramphus commersoni* Cuvier, 1829: 286 (Indian Ocean). *Hemirhamphus obesus* Castelnau, 1861: 64 (Natal). *Hemiramphus commersonii:* Gilchrist & Thompson, 1909: 266. *Hemirhamphus far:* Smith, 1933: 132*; Smith, **SFSA No. 222***; Day, Field & Penrith, 1970: 90. *Hemiramphus marginatus* (*non* Forsskål): Fowler, 1934: 432*; Smith, **SFSA No. 223.** *Hemiramphus far:* Smith & Smith, 1966: 85*; Parin et al., 1980: 133*.

D 13-15; A 11-13; P 11-12; predorsal scales 36-41; GR_1 (6-8)+(17-23) = 24-31; GR_2 (3-5)+(15-20) = 12-25; vertebrae (39-40)+(15-17) = 54-57. Depth 5.7-7.3; head 2.7-5.0. Lower jaw 2.6-4.3 in SL and 0.7-0.95 in head; P 5.3-7.1 in SL, usually reaching forward to nasal fossa but not beyond it.

Traces of 4 spots on body, at tip of P, mid-body, over base of V and under front of D base. Juveniles 6-9 cm SL with 4-6 dark vertical bars on body extending on to belly; 2-3 transverse stripes on lower lobe of C, 1 on upper lobe; V of juveniles (7-13 cm SL) blackish; some pigment remaining distally on middle 4 rays to 20 cm SL.

Attains 35 cm. Common from Knysna to Delagoa Bay with a few records west to False Bay. Breeds in Knysna and

other estuaries. Widespread throughout tropical and subtropical waters of Indo-West Pacific.

Genus ***Hyporhamphus*** Gill, 1859

Two subgenera were recognised by Parin, Collette & Shcherbachev (1980): *Hyporhamphus* for inshore and estuarine species with a simple preorbital canal and an emarginate C, and *Reporhamphus* Whitley for more strictly marine species with a posterior branch to the preorbital canal and a deeply forked C. There are about 23 species in the subgenus *Hyporhamphus,* with 2 endemic to southern Africa. Of the 11 species in the subgenus *Reporhamphus,* 1 extends into the northern part of our area.

KEY TO SPECIES

1a Preorbital canal simple, without posterior branch; C emarginate or weakly forked.....(Subgenus *Hyporhamphus)* 2
1b Preorbital canal with posterior branch; C forked, lower lobe longer than upper lobe ..... *Hy. (Reporhamphus) affinis*

2a Preorbital distance short, 1.9-2.0 in orbit; teeth mostly tricuspid; 24-30 GR on 1st arch ..... *Hy.(Hy.) improvisus*
2b Preorbital distance longer, 1.5-1.7 in orbit; teeth mostly unicuspid, except for a few tricuspid teeth near base of upper jaw; 30-37 GR on 1st arch ..... *Hy. (Hy.) capensis*

115.3 *Hyporhamphus (Reporhamphus) affinis*
(Günther, 1866)
PLATE 16

Tropical halfbeak — Tropiese halfbek

Hemirhamphus affinis Günther, 1866: 267 (South Seas). *Hemirhamphus (Hyporhamphus) delagoae* Barnard, 1925: 498 (Delagoa Bay, Mozambique); 1925: 263*; Smith, 1933: 139*; Barnard, 1937: 1022. *Hemirhamphus dussumieri* (*non* Valenciennes): Smith, 1933: 138. *Hemirhamphus balinensis* (*non* Bleeker): Smith, 1933: 141. *Hyporhamphus dussumieri* (*non* Val.): Smith, **SFSA No. 219.** *Hyporhamphus delagoae:* Smith, **SFSA No. 220*;** Collette, 1982. *Hyporhamphus balinensis* (*non* Bleeker): Smith, **SFSA No. 221.** *Hyporhamphus affinis:* Parin et al., 1980: 73*.

D 15-17; A 15-17; P 11-13; predorsal scales 38-41; GR_1 (8-10)+(22-27) = 31-36; GR_2 (3-6)+(19-23) = 23-28; vertebrae (17-18)+(37-39) =54-57. Depth 8.8-11.6; head 4.3-4.8. Lower jaw 3.5-5.1 in SL and 0.8-1.2 in head. Upper jaw width 0.6-0.85 in its length. V closer to C base than to P origin (P-V/V-C = 1.05-1.2). Teeth mostly tricuspid, in 3-5 rows in both jaws. Front part of D and all of A covered with scales.

Body deep blue dorsally, silvery stripe on sides, silvery white ventrally. Fins unpigmented except for bluish caudal. Tip and distal half of underside of lower jaw bright carmine red. Attains 26 cm. Inhabits clear waters, particularly around reefs. Range extends south to Sodwana Bay. Widely distributed in tropical Indo-West Pacific from east coast of Africa and Red Sea through Indian Ocean islands to Western Australia, New Guinea, Philippines and islands of Oceania. Not found at Hawaiian Islands, and apparently absent from inner waters of Indo-Malayan Archipelago.

115.4 *Hyporhamphus (Hyporhamphus) capensis*
(Thominot, 1886)
PLATE 16

Cape halfbeak — Kaapse halfbek

Hemiramphus capensis Thominot, 1886: 166 (Cape of Good Hope). *Hemirhamphus calabaricus* (*non* Günther): Barnard, 1925: 262. *Hemiramphus unifasciatus* (*non* Ranzani): Fowler, 1929: 250. *Hemirhamphus knysnaensis* Smith, 1933: 144, Pl. 11, Fig. 2 (Knysna). *Hyporhamphus knysnaensis:* Smith, **SFSA No. 218*;** Day, Field & Penrith, 1970: 90; Coetzee, 1981: 14. *Hyporhamphus capensis:* Parin et al., 1980: 46.

D 14-17; A 15-16; P 10-12; predorsal scales 31-38; GR_1 (8-11)+(22-27) = 30-37; GR_2 (3-6)+(17-23) = 21-27; vertebrae (30-34)+(16-18) = 46-52. Depth 10.1-10.9 in adults, 8.7-9.4 in specimens 5-8 cm SL, head 4.3-4.8. Lower jaw 2.9-4.4 in SL and 0.7-0.9 times in head length. Upper jaw width in length 1.0-1.1 in specimens greater than 8 cm SL, shorter in smaller specimens. Preorbital distance 1.5-1.7 times in orbit and 1.4-1.8 times in upper jaw length. V closer to P origin than to C base (P-V/V-C = 0.9-1.0). Teeth arranged in 2-4 rows. No scales on D; a maximum of 2-3 scales on anterior 2 membranes of A. Scales on upper jaw in 1 row on either side of median ridge.

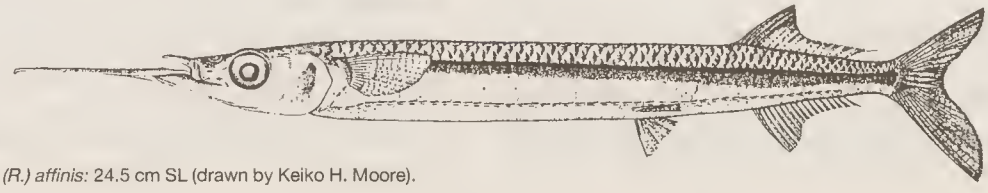
Attains 16 cm. A southern African endemic confined to coastal and estuarine waters from False Bay to Lake Piti in southern Mozambique.

115.5 *Hyporhamphus (Hyporhamphus) improvisus*
(Smith, 1933)
PLATE 16

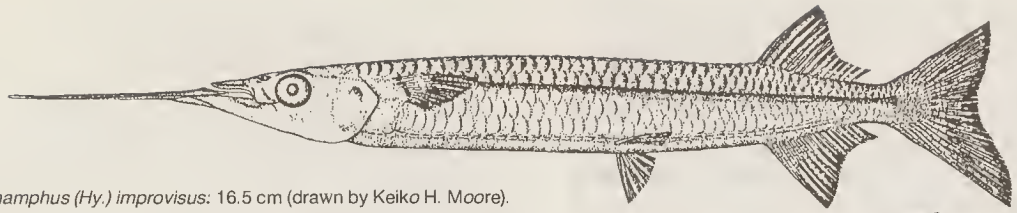
Shortfin halfbeak — Kortvin-halfbek

Hemiramphus dussumieri (*non* Valenciennes): Fowler, 1925: 201. *Hemirhamphus improvisus* Smith, 1933: 142* (Delagoa Bay). *Hyporhamphus improvisus:* Smith, **SFSA No. 217*;** Collette, 1982: 720. *Hyporhamphus delagoae* (*non* Barnard): Parin et al., 1980: 40*.

D 12-14; A 13-15; P 11-12; predorsal scales 31-36; GR_1 (6-10)+(18-21) = 24-30, usually 25-28; GR_2 (3-5)+(15-17) = 18-22; vertebrae 31+(16-17) = 47-48. Depth 6.7-9.3; head 3.4-4.8. Lower jaw 3.4-4.4 in SL, 0.7-1.3 in head. Upper jaw length slightly less than width. Preorbital distance about 1.9 times in upper jaw length. V about equidistant between opercle and base of C. Teeth in 2-4 rows in both jaws. Scales on upper jaw extend over



115.3 *Hyporhamphus (R.) affinis:* 24.5 cm SL (drawn by Keiko H. Moore).



115.5 *Hyporhamphus (Hy.) improvisus:* 16.5 cm (drawn by Keiko H. Moore).

115.6 *Oxyporhamphus m. micropterus:* top: 18 cm adult; bottom: 4 cm juvenile (drawn by Mildred H. Carrington).

median ridge instead of being arranged in rows on either side of the ridge as in *Hy. capensis* and most other members of the subgenus *Hyporhamphus*.

Attains 18 cm. A southern African endemic; occurs from Delagoa Bay to Quelimane, Mozambique. Most closely related to *Hy. sindensis* Regan, 1905, known only from Persian Gulf and Arabian Sea.

Genus ***Oxyporhamphus*** Gill, 1863

Two species, each with 2 subspecies; 1 subspecies in our area.

115.6 *Oxyporhamphus micropterus micropterus*
(Valenciennes, 1846)

Shortwing flyingfish — Kortvlerk-vlieënde vis

? *Hemiramphus argenteus* Bennett, 1840: 269, Fig. (Pacific Ocean "in lats. 3°S and 5°N"). *Exocoetus micropterus* Valenciennes, *in* Cuv. & Val., 1846: 127 (Australia; New Ireland; Buru Id., Indonesia; Malabar coast of India). *Hemiramphus cuspidatus* Valenciennes, *in* Cuv. & Val., 1846: (Indian Ocean). *Oxyporhamphus micropterus micropterus:* Bruun, 1935: 19; Parin et al., 1980: 149*.

D 13-15; A 14-16; P 11-13; predorsal scales 28-33; GR_1 (7-9)+(21-26) = 28-34; GR_2 (3-5)+(16-18) = 20-23; vertebrae (30- 32)+(17-19) = 47-50. Head 4.0-4.6; P 2.6-3.2. Lower jaw in adult fish 12-14 in SL and 3.1-3.2 in head. V about midway between P origin and C base (P-V/V-C = 0.95-1.2). Swimbladder single-chambered.

Attains 185 mm. An offshore species previously unknown from southern African waters or south of 20°S in western Indian Ocean (Parin et al., 1980: Fig. 47), but now known from 2 stations of the R/V "Meiring Naude" at 31°56′S, 29°24.6′E and 29°49.6′S, 32°24.7′E. Widespread throughout Indo-West Pacific between 20°S and about 30°N. Replaced in the Atlantic by *O. micropterus similis* Bruun, 1935.

Family No. 116: EXOCOETIDAE

by P.C. Heemstra & N.V. Parin

Flyingfishes — **Vlieënde visse**

Body elongate, subcylindrical to laterally compressed, usually flattened ventrally. No spines in fins; dorsal and anal fins posterior in position; their bases opposite. Pelvic fins abdominal, with 6 soft-rays. Pectoral fins high on sides, very long, extending beyond dorsal-fin origin. Caudal fin deeply forked; lower lobe longer than upper. Jaws short, the upper rounded; teeth absent or very small. Lower pharyngeal bones fused; third pair of upper pharyngeal bones not fused. Gill-rakers well developed. Nasal organ a pit with protruding lobate tentacle. Scales large, cycloid, easily detached. Lateral line runs along ventral margin of body. Vertebrae 35-52. Juveniles often with single or paired chin barbels and usually quite unlike the adults in colour pattern and relative size of the fins.

Flyingfishes are typical members of the epipelagic fish community that inhabits surface waters of the open ocean. They are prone to emerge rapidly from the water and glide over fairly long distances by means of their expanded pectoral fins. In the water, the pectoral fins are usually held flat against the body; but when the fish leaps into the air the pectorals are quickly erected and held perpendicular to the body. The pectoral fins are not flapped during the flight, but are designed to function like the wings of an airplane. Flyingfishes feed mostly on crustaceans and other planktonic animals, and are often attracted to lights at night. The eggs of most species are demersal, with sticky filaments that attach to floating or anchored vegetation; larvae pelagic. Locally abundant in warm seas and used for food in some areas. Six or 7 genera (*Cheilopogon* included in *Cypselurus* by some authors); a total of about 60 species, 12 in our area.

Maximum sizes range from 11 to 38 cm. No recent revision of entire family, but Atlantic species reviewed by Bruun (1935; for additions see Gibbs & Staiger, 1970) and western Pacific species by Parin (1960, 1961); generic classification revised by Parin (1961). The taxonomy of the Indo-Pacific species is in need of revision, and the account given here must be considered provisional.

KEY TO GENERA

1a P not reaching past A base; LL with a branch extending upwards to P base; upper jaw protrusile ..... *Parexocoetus*
1b P reaching past A base; LL without a branch to P origin; upper jaw not protrusile 2

2a V not reaching A origin (barely reaching in juveniles); V origin closer to P base than to A origin ..... *Exocoetus*
2b V reaching beyond A origin; V origin closer to A origin than to P base 3

3a A origin anterior to 3rd D ray; D rays usually fewer or the same number (rarely with 1 or 2 more) as in A; no chin barbels in juveniles ..... *Hirundichthys*
3b A origin under or behind 3rd D ray; D rays usually 2-4 (rarely 1) more than in A; juveniles with or without chin barbels 4

4a First 2-4 P rays unbranched; no chin barbels in juveniles ..... *Prognichthys*
4b Only 1st P ray unbranched; juveniles with or without chin barbels 5

5a Lower jaw usually a little shorter than upper; at least some jaw teeth tricuspid; juveniles with single chin barbel or without barbels ..... *Cypselurus*
5b Jaws subequal, or lower a little longer than upper; jaw teeth mostly unicuspid or with smaller supplementary cusps laterally; juveniles with 2 barbels (fused into a napkin-like fringed appendage in *Ch. pinnatibarbatus*) ..... *Cheilopogon*

Genus ***Cheilopogon*** Lowe, 1840

About 25-30 species; 4 species in our area. Two Indo-Pacific species, *Ch. atrisignis* (Jenkins, 1904) and *Ch. suttoni* (Whitley & Colefax, 1938), recorded from the western Indian Ocean just to the north of our area, and *Ch. milleri* (Gibbs & Staiger, 1970) from off Baia dos Tigres, Angola (17°S) may also extend into our area; these 3 extralimital species are thus included in the following Key.

KEY TO SPECIES

1a Predorsal scales 39-45; head 4.5-5.0 in SL; juveniles with wide, napkin-like, fringed chin barbel ..... *Ch. pinnatibarbatus altipennis*
1b Predorsal scales 24-45; head 4.0-4.6 in SL; juveniles with a pair of chin barbels 2

2a Predorsal scales 24-33; P dark with pale, triangular cross band 3
2b Predorsal scales 33-45; P not as above 4

3a D with prominent black spot; palatine teeth present; jaw teeth noticeable (with magnification); juveniles with a fold of barbels with flap-like appendage proximally ..... *Ch. nigricans*
3b D uniformly pale; palatine teeth absent; jaw teeth barely visible; juveniles with a fold of chin barbels without flap-like appendage ..... *Ch. furcatus*

4a P of adults (> 20 cm SL) uniformly dark 6
4b P of adults with small dark spots on pale background 5

5a Head distinctly shorter than distance from D origin to C base; V origin nearer head than C base; D 12-14 ..... *Ch. atrisignis*
(Tropical Indo-West Pacific, not yet known south of 20°S)
5b Head subequal to distance from D origin to C base; V origin midway between head and C base; D 12-14 ..... *Ch. suttoni*
(Tropical Indo-West Pacific, not yet known south of 20°S)

6a D of adults low (longest ray 8.4-11.2% SL), without black spot; juveniles at 7 cm SL with chin barbels shorter than head and dark blotches on body ..... *Ch. milleri*
(Tropical eastern Atlantic)

6b D of adults high (longest ray 10.1-14% SL), with a prominent black spot; juveniles without dark blotches on body and chin barbels usually much longer than head ..... *Ch. cyanopterus*

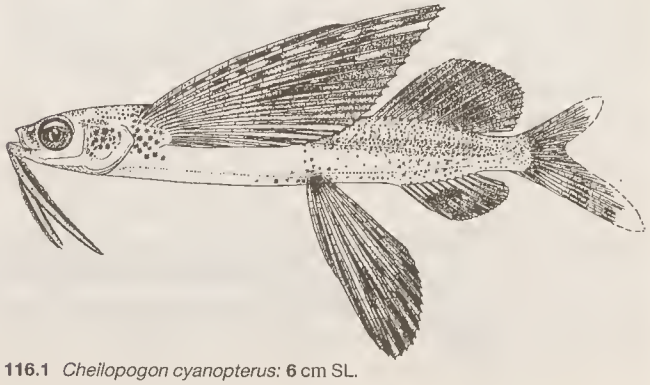
116.1 *Cheilopogon cyanopterus*
(Valenciennes, 1846)

Blackwing flyingfish Swartvlerk-vlieënde vis

Exocoetus cyanopterus Valenciennes, *in* Cuv. & Val., 1846: 97 (Brazil). ?*Cypselurus hewitti* Smith, 1935: 181 (Port Alfred); **SFSA No. 214.** *Cypselurus cyanopterus*: Parin, 1960: 44; Gibbs & Staiger, 1970: 449*; Gibbs, 1981: Cyp 2*. *Cheilopogon cyanopterus*: Parin, 1984: 7*.

D 12-14; A 9-11; P i,12-14; predorsal scales 33-41; vertebrae 42-46; total GR 21-28. Head 4.0-4.5, P length 1.3-1.5 in SL. Palatine teeth usually present. A origin below 4th to 6th D rays; V reaching beyond middle of A base, their origin much nearer than to C.

Body dark, iridescent blue dorsally, silvery white ventrally; P uniformly bluish black; D with a prominent black spot. Attains 34 cm SL. Tropical and subtropical waters of Atlantic, Indian and western Pacific oceans; one juvenile, 175 mm SL (probably this species) from Port Alfred and another, 63 mm SL from Natal.



116.1 *Cheilopogon cyanopterus*: **6** cm SL.

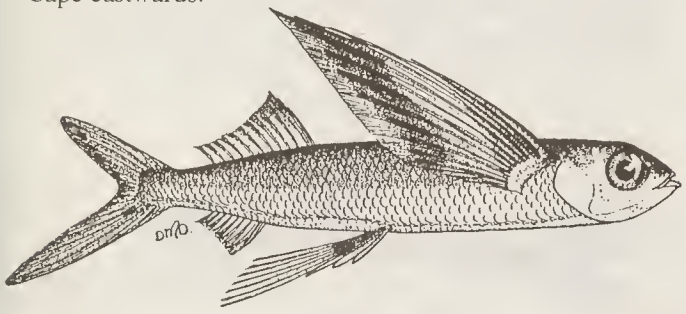
116.2 *Cheilopogon furcatus*
(Mitchill, 1815)

Spotfin flyingfish — Kolvin-vlieënde vis

Exocoetus furcatus Mitchill, 1815: 449 (New York, U.S.A.). *Cypselurus furcatus*: Smith, **SFSA No. 211*;** Parin, 1960: 35; Staiger, 1965: 697*; Gibbs, 1981: Cyp 4*. *Cheilopogon unicolor*: Parin, 1961: 82*; Kovalevskaya, 1980: 237*. *Cheilopogon furcatus:* Parin, 1984: 9*.

D 12-14; A 9-11; P i,13-16; predorsal scales 26-33; vertebrae 44-46; total GR 18-24. Depth 5.4-6.1, head 4.3-4.5, P 1.4-1.7 in SL. A origin below 5th to 7th D rays; V reaching well past middle of A base, their origin much nearer head than to C.

Body dark iridescent blue dorsally, silvery white ventrally; P dark grey, with a broad pale margin, the central portion crossed by pale stripe becoming narrower toward anterior fin margin; V pale. In small juveniles, body with 6 dark bars and the paired fins variegated; chin barbels paired, tapering, with a pale fleshy shaft and dark membrane, retained up to 10-19 cm SL. Attains 30 cm SL. An offshore species in all tropical seas; off our coast from the Cape eastwards.



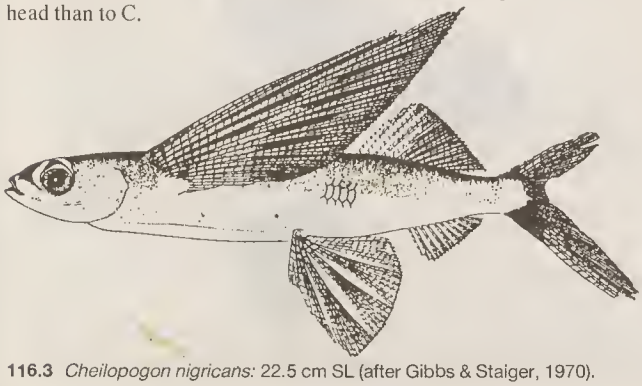
116.2 *Cheilopogon furcatus:* 25 cm (off South Africa).

116.3 *Cheilopogon nigricans*
(Bennett, 1840)

Blacksail flyingfish — Swartseil-vlieënde vis

Exocoetus nigricans Bennett, 1840: 287 ("Atlantic and Pacific oceans in lat. 5°N). *Cypselurus nigricans:* Gibbs & Staiger, 1970: 443*; (neotype: off Baia dos Tigres, Angola); Gibbs, 1981: Cyp 8*; Parin, 1984: 11*.

D 13-15; A 8-11; P i,13-14; predorsal scales 24-28; vertebrae 42-44; total GR 20-27. Depth 5.3-6.4, head 4.0-4.4, P 1.4-1.5 in SL. A origin below 5th to 7th D rays; V reaching well past 5th A ray, their origin much nearer head than to C.



116.3 *Cheilopogon nigricans:* 22.5 cm SL (after Gibbs & Staiger, 1970).

Body dark iridescent blue dorsally, silvery white ventrally; P black with pale margin, the central portion crossed by a yellowish stripe becoming narrower toward anterior fin margin; V usually with a prominent black spot. In juveniles, body with dark bars (up to 6 in smallest specimens). Attains 24 cm SL. Tropical eastern Atlantic (to 17°S) and Indo-West Pacific; possibly a complex of related taxa. One specimen, a juvenile (SAM 23328), known from our area.

116.4 *Cheilopogon pinnatibarbatus altipennis*
(Valenciennes, 1846)
PLATE 16

Smallhead flyingfish — Kleinkop-vlieënde vis

Exocoetus altipennis Valenciennes, *in* Cuv. & Val., 1846: 109 (Cape of Good Hope; syntype MNHN A.9920 is here designated as the lectotype). *Exocoetus longipinnis* Castelnau, 1861: 64 (Agulhas Bank). *Cypselurus bahiensis* (*non* Ranzani): Smith, **SFSA No. 212*** (in part). *Cypselurus pinnatibarbatus:* Gibbs & Staiger, 1970: 457* (in part).

D 12-14; A 9-12; P i,13-15; predorsal scales 39-45; vertebrae 49-51; total GR 20-25. Depth 5.7-7.5, P 1.3-1.5 in SL. Palatine teeth usually present. A origin below 4th to 6th D rays; V reach last A ray, their origin nearer head than to C. Juveniles elongate, with high D like that of *Parexocoetus*.

Body dark iridescent blue dorsally, silvery white ventrally; D with or without black spot; P dark brownish grey (with narrow, pale, transverse stripe in fishes 20-30 cm SL). Attains 38 cm SL. A neritic species occurring from the Cape to Kosi Bay, also on Agulhas Bank; other subspecies in most subtropical areas.

Genus ***Cypselurus*** Swainson, 1838

About 12 species (17-24 cm SL); Fowler (1934) recorded *Cy. nigripennis* (Val.) from Natal (Smith, **SFSA No. 213),** but the figure of the juvenile with 3 unbranched P rays appears to be *Prognichthys brevipinnis*. Although no species of *Cypselurus* (in the restricted sense used here) is definitely known from southern Africa, there are 4 Indo-West Pacific species in the northwestern Indian Ocean that may be found in our area. These 4 species can be distinguished by the following Key.

KEY TO SPECIES FROM THE NORTHWESTERN INDIAN OCEAN

1a V origin much nearer head than to C; juveniles without barbels 2
1b V origin about midway between head and C; juveniles with single barbel 3

2a P pale, with numerous dark spots; D 11-13; predorsal scales 24-28 ..... *C. poecilopterus* (Valenciennes, 1846)
2b P not pale with numerous dark spots; D 10-12; predorsal scales 23-27 ..... *C. oligolepis* (Bleeker, 1866)

3a Predorsal scales 27-32; D 10-12; chin barbel of juveniles triangular in cross-section ..... *C. naresii* (Günther, 1889)
3b Predorsal scales 24-28; D 12-14; chin barbel of juveniles broadly flattened ... *C. angusticeps* (Nichols & Breder, 1935)

Genus ***Exocoetus*** Linnaeus, 1758

Three species; *E. obtusirostris* Günther, 1866 of the tropical Atlantic and off the coast of Angola may occur in our area. It has 24-29 GR; juveniles are easily separated from *E. monocirrhus* by the absence of a chin barbel, but no characters have been found to distinguish adults.

KEY TO SPECIES

1a GR 21-29; usually 7 rows of scales between D origin and LL; body depth 3.5-5.1 in SL; juveniles (1-9 cm SL) hump-backed, with a chin barbel ..... *E. monocirrhus*
1b GR 29-37; usually 6 rows of scales between D origin and LL; body depth 5.1-6.0 in SL; juveniles elongate, without chin barbel ..... *E. volitans*

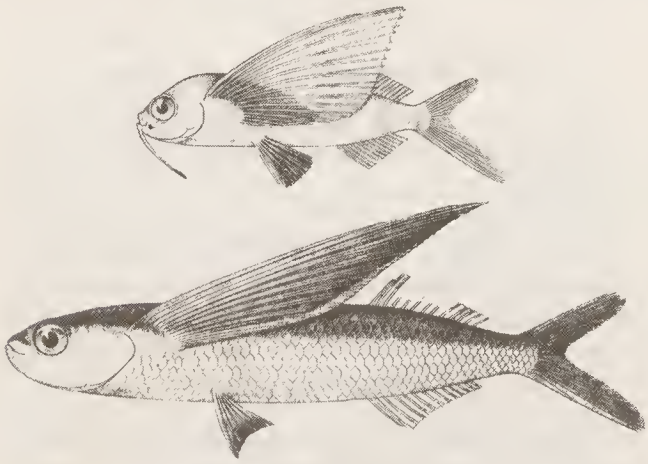
116.5 *Exocoetus monocirrhus*
Richardson, 1846

Two-wing flyingfish — Tweevlerk-vlieënde vis

Exocoetus monocirrhus Richardson, 1846: 265 (China); Parin, 1960: 218*; Kotthaus, 1969: 8*; Kovalevskaya, 1980: 219*; Parin, 1984: 23*.

D 12-14; A 12-14; P i,14-16; predorsal scales 17-21; vertebrae 40-43. Head 3.6-3.8, P 1.3-1.4 in SL. V not reaching A (except in small juveniles), their origin nearer P base than to A.

Body dark iridescent blue dorsally, silvery white ventrally; P and C greyish or brownish, other fins unpigmented. Juveniles often with black bars. Attains 20 cm SL. An offshore species throughout Indo-West Pacific tropical waters; extends south to Durban.



116.5 *Exocoetus monocirrhus:* top: 6.5 cm juvenile; bottom: ca. 16.5 cm adult (after Abe, 1955).

116.6 *Exocoetus volitans*
Linnaeus, 1758

Tropical two-wing flyingfish — Tropiese tweevlerk-vlieënde vis

Exocoetus volitans Linnaeus, 1758: 316 (open ocean off Europe and America); Smith, **SFSA No. 210*;** Parin, 1960: 215*; Kotthaus, 1969: 9*; Kovalevskaya, 1980: 217*; Gibbs, 1981: Exoc 2*; Parin, 1984: 21*.

D 13-15; A 12-15; P i,13-15; predorsal scales 17-21; vertebrae 42-46. Head 3.5-3.9, P 1.3-1.4 in SL. V not reaching A, their origin nearer P base than to A.

Body dark, iridescent blue dorsally, silvery white ventrally; P and C greyish, other fins unpigmented. Juveniles sometimes with black bars. Attains about 18 cm SL. An offshore species, worldwide in tropical waters; occasionally found in our area.

116.6 *Exocoetus volitans:* 19 cm (after Abe, 1957).

Genus ***Hirundichthys*** Breder, 1928

About 7 species; 2 subgenera recognised by Parin (1961).

KEY TO SPECIES

1a One unbranched ray in P; palatine teeth present; P dark, with pale basal triangle and wide pale margin ..... *H. (Hirundichthys) speculiger*
1b Two unbranched rays in P; palatine teeth absent; P dark, without pale basal triangle and with narrow pale margin ..... *H. (Danichthys) rondeletii*

116.7 *Hirundichthys rondeletii*
(Valenciennes, 1846)

Subtropical flyingfish — Subtropies vlieënde vis

Exocoetus rondeletii Valenciennes, *in* Cuv. & Val., 1846: 115 (Mediterranean). *Hirundichthys rondeletii:* Kovalevskaya, 1980: 244*; Gibbs, 1981: Hir 2*; Parin, 1984: 25*.

D 10-12; A 11-12; P ii,15-18; predorsal scales 27-32; vertebrae 45-47; GR 24-31. Depth 5.8-6.7, head 4.3-4.9, P 1.2-1.4 in SL. A origin before 2nd D ray; V reach well past A origin.

116.7 *Hirundichthys rondeletii:* 10 cm (after Abe, 1956).

Body dark iridescent blue dorsally, silvery white ventrally; D and C greyish, other fins hyaline. Juveniles elongate, without chin barbels, paired fins black. Attains about 25 cm SL. An oceanic species widely distributed in southern and northern subtropical waters of all oceans, absent in tropics; common off the Cape.

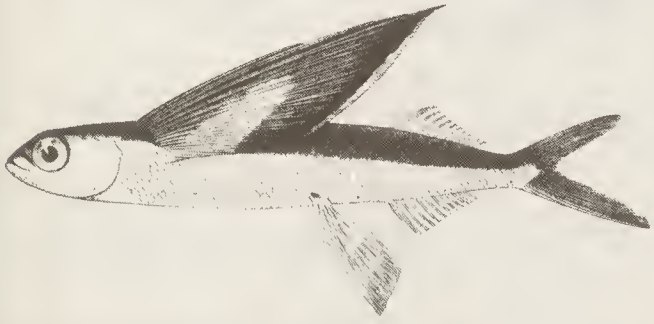
116.8 *Hirundichthys speculiger*
(Valenciennes, 1846)

Mirrorwing flyingfish Spieëlvlerk-vlieënde vis

Exocoetus speculiger Valenciennes, *in* Cuv. & Val., 1846: 94 (Mauritius). *Hirundichthys speculiger:* Kovalevskaya, 1980: 240*; Gibbs, 1981: Hir 3*; Parin, 1984: 27*.

D 10-12; A 11-13; P i,15-18; predorsal 30-34; vertebrae 45-47; GR 23-29. Depth 5.6-6.3, head 4.0-4.4, P 1.3-1.5 in SL. A origin before 2nd D ray; V reach well past A origin.

Body dark, iridescent blue dorsally, silvery white ventrally; D and C greyish, other fins hyaline. Juveniles elongate, without chin barbels, the paired fins mottled. Attains about 25 cm SL. An oceanic species, worldwide in tropical waters. One juvenile found on beach at Mbibi, Zululand (RUSI 5894); another from False Bay (SAM 25639).



116.8 *Hirundichthys speculiger:* 26 cm (after Abe, 1956).

Genus ***Parexocoetus*** Bleeker, 1866

Middle D rays distinctly longer than anterior rays; V reach past A origin, their origin nearer A than to P base. Two species.

KEY TO SPECIES

1a D rays 9-12, longest rays scarcely reaching origin of upper C lobe; predorsal scales 16-20; A rays 10-12 ..... *Pa. mento*
1b D rays 12-14, longest rays reach well past origin of upper C lobe; predorsal scales 20-24; A rays 12-14 ..... *Pa. brachypterus brachypterus*

116.9 *Parexocoetus brachypterus brachypterus*
(Richardson, 1846)

Sailfin flyingfish Seilvin-vlieënde vis

Exocoetus brachypterus Richardson, 1846: 265 (Tahiti). *Parexocoetus brachypterus:* Gibbs, 1981: Par 1*; Parin, 1984: 33*.

D 12-14; A 12-14; P ii,11-12; vertebrae 39-40; GR 23-30. Depth 5.0-6.5, head 4.1-4.5, P 1.7-2.0 in SL. Juveniles with 2 short chin barbels.

Body dark, iridescent greenish blue dorsally, silvery white ventrally; D base and posterior rays pale, rest of fin black; V greyish, the other fins transparent. Attains 14 cm SL. A tropical, Indo-Pacific neritic species, extends south to Natal; other subspecies in tropical Atlantic.

116.9 *Parexocoetus brachypterus brachypterus:* 16 cm; bottom left: ventral view of 12 cm specimen showing black barbels; right: ventral view of 15.5 cm specimen showing light-coloured, extremely small barbels (after Abe, 1955).

116.10 *Parexocoetus mento*
(Valenciennes, 1846)
PLATE 16

African sailfin flyingfish Afrikaanse seilvin-vlieënde vis

Exocoetus mento Valenciennes, *in* Cuv. & Val., 1846: 124 (Pondicherry, India). *Parexocoetus brachypterus* (*non* Valenciennes): Smith, **SFSA No. 215***. *Parexocoetus mento:* Kotthaus, 1969: 7*; Parin, 1984: 35*.

D 9-12; A 10-12; P i,12-13; vertebrae 35-37; GR 25-30. Depth 4.5-5.0, head 3.7-4.0, P 1.8-2.1 in SL. Juveniles with a bony knob at front of lower jaw.

D mostly blackish; P and C greyish, the other fins transparent. Attains about 11 cm SL. A neritic species of the tropical Indo-West Pacific and Red Sea; common north of Delagoa Bay; invaded the Mediterranean via Suez Canal.

Genus ***Prognichthys*** Breder, 1928

V reach well past A origin, their origins much nearer head than to C. Juveniles robust, without chin barbels. At least 4 species, 2 in our area.

KEY TO SPECIES

1a P with 3 unbranched rays ..... *Pr. brevipinnis*
1b P with 4 unbranched rays ..... *Pr. sealei*

116.11 *Prognichthys brevipinnis*
(Valenciennes, 1846)

Shortfin flyingfish Kortvin vlieënde vis

Exocoetus brevipinnis Valenciennes, *in* Cuv. & Val., 1846: 125 (New Ireland). ?*Cypselurus nigripennis* (*non* Val.): Fowler, 1934: 432*; Smith,

SFSA No. 213. *Prognichthys brevipinnis:* Parin, 1960: 271; Kotthaus, 1969: 21*; Parin, 1984: 37*.

D 10-11; A 8-10; P iii,13-15; predorsal scales 25-28; vertebrae 41-45; GR 26-31. Depth 5.1-6.3, head 4.0-4.3, P 1.4-1.5 in SL. A origin below 3rd to 5th D ray.

P grey, ventral rays and tip transparent; D and C grey, the other fins hyaline. Paired fins of juveniles black. Attains 19 cm SL A neritic species of the tropical Indo-West Pacific; recorded from Lake St. Lucia, Zululand (SAM 27758) and Indian Ocean off South Africa (RUSI 4861).

116.11 *Prognichthys brevipinnis:* 12 cm (after Parin, 1984).

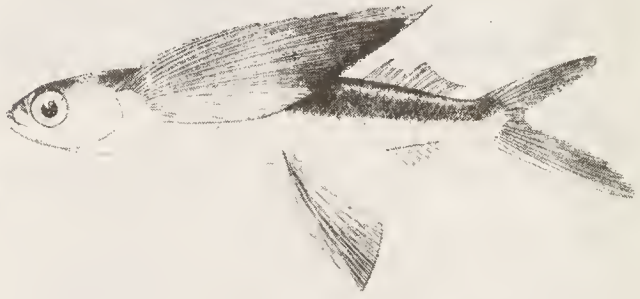
116.12 *Prognichthys sealei*
Abe, 1955

Shortnose flyingfish — Kortneus vlieënde vis

Prognichthys sealei Abe, 1955: 185, Figs. 1-3 (Miyako Id., Ryukyu Ids., Japan); Parin, 1960: 269*; 1984: 39*.

Similar to *Pr. brevipinnis,* except P iv,12-14.

A common, oceanic species of the tropical Indo-West Pacific; one adolescent from off Cape St. Lucia (SAM 27739) and a small juvenile from Port Elizabeth (RUSI 10687).



116.12 *Prognichthys sealei:* 24 cm holotype (after Abe, 1955).

Order LAMPRIFORMES

A motley assemblage of uncertain relationships. The great diversity of body shape and fin development of the lampriforms makes it difficult to diagnose this order.

Pelvic fins, if present, thoracic or jugular; caudal fin well developed or rudimentary to absent; dorsal fin base elongated or short; anal fin present or absent; no fin spines (except in the dorsal fin of Veliferidae). Scales, if present, small, cycloid and deciduous.

KEY TO FAMILIES

1a Body elongate; caudal fin well developed; dorsal fin on rear half of body opposite anal fin ..... MIRAPINNIDAE (No. 125)

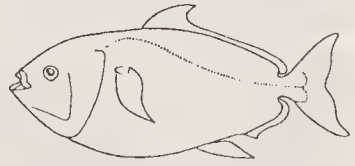
125

1b Body elongate or not; caudal fin present or absent; dorsal fin origin over head or front half of body 2

2a Body oval; all fins well developed, the caudal fin forked 3

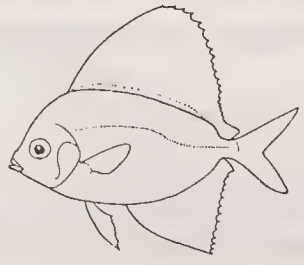
2b Body elongate; pelvic, anal and caudal fins present or absent 4

3a Pectoral fins longer than head; dorsal fin origin behind head; anterior anal fin rays short ..... LAMPRIDAE (No. 117)



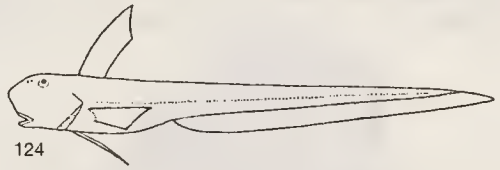
117

3b Pectoral fins not longer than head; dorsal fin origin over operculum; anterior anal fin rays elongated, much longer than posterior rays ..... VELIFERIDAE (No. 118)



118

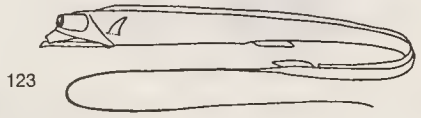
4a Dorsal fin base shorter than head; anal fin base elongated, united with reduced caudal fin ..... ATELEOPODIDAE (No. 124)



124

4b Dorsal fin base extends from head to caudal fin; anal fin rudimentary or absent 5

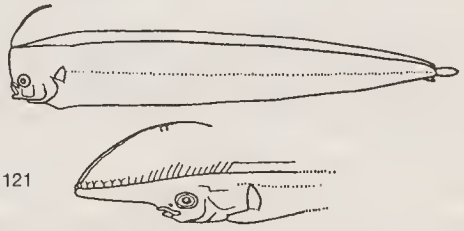
5a Eyes tubular, directed forward; mouth greatly protrusile; lower jaw length equals head length ..... STYLEPHORIDAE (No. 123)



123

5b Eyes not tubular; mouth more or less protrusile; lower jaw shorter than head length 6

6a Anus near caudal fin; maxilla slender, its width less than ½ eye diameter; upper jaw slightly protrusile ..... LOPHOTIDAE (No. 121)



121

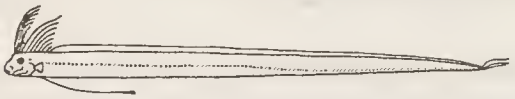
6b Anus near middle of body; maxilla width more than ½ eye diameter; upper jaw very protrusile 7

7a Anal fin rudimentary, about halfway between anus and last vertebra; lateral line continued past last vertebra where the canals of either side are joined to form a large, thin-walled tube carried on the greatly elongated "rays" that emanate from the ventral surface of the last 3 vertebrae ..... RADIICEPHALIDAE (No. 120)

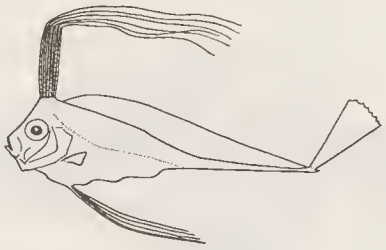
120

7b Anal fin absent; lateral line ends at last vertebra 8

8a Body greatly elongated, depth 15 to 60 times in SL; dorsal fin with about 400 rays, the rays smooth (without minute spines or prickles along their lateral edges) ..... REGALECIDAE (No. 122)



8b Body less elongated, depth 4 to 10 times in SL; dorsal fin with 120-200 rays, the rays with minute spines or prickles along their lateral edges ..... TRACHIPTERIDAE (No. 119)



Family No. 117: LAMPRIDAE

by P.C. Heemstra

Opahs **Opahs**

Body somewhat compressed; scales minute, cycloid, deciduous. Upper jaw protrusile; juveniles with a few minute teeth, none in adults. Nostrils small, close together. Pectoral and pelvic fins well developed; branched caudal rays 17. Branchiostegal membranes with 6 rays. Gill-rakers well developed. Vertebrae 43-46. Swimbladder large, anteriorly bifurcate. One genus, *Lampris* Retzius, 1799 with two species. Parin and Kukuyev (1983) have re-established the validity of *L. immaculatus*, a rare species of the southern oceans.

KEY TO SPECIES

1a Greatest body depth (of fish >50 cm SL) 58-68% SL; body purple or pink, with prominent pale spots; V origin under P origin ..... *L. guttatus*

1b Greatest body depth (of fish >50 cm SL) 43-53% SL; body bluish or reddish dorsally, silvery below; no pale spots on body; fins bright red; V origin well behind P origin ..... *L. immaculatus*

117.1 *Lampris guttatus*

(Brünnich, 1788)

PLATE 15

Spotted opah Gespikkelde opah

Zeus guttatus Brünnich, 1788: 398, Pl. A (North Sea). *Lampris regius:* Smith, **SFSA No. 262** (in part, not illustration). *Lampris guttatus:* Palmer, 1973: 328; Palmer & Oelschlager, 1976: 366; Rosenblatt & Johnson, 1976: 367*.

D 49-55; A 38-41; P 22-25; V 13-17; GR 2+14.

Body pink to purple with numerous white spots; fins and front of snout red; small juveniles without white spots on body. Attains 180 cm and 100 kg. Flesh excellent; the enormous pectoral fin muscles are dark red and resemble a fine beef-steak in texture and flavour. A member of the lower epipelagic community, the opah feeds on squid and fishes (including some benthic species) and is usually found well offshore. It is a swift swimmer, flapping its strong pectoral fins in the manner of a penguin to "fly" through the water. The opah is found in all oceans, including the Mediterranean and Caribbean seas, but not in polar waters; occurs throughout our area.

117.1 *Lampris guttatus:* 68 cm (Plettenberg Bay).

117.2 *Lampris immaculatus*

Gilchrist, 1904

PLATE 15

Southern opah Suidelike opah

Lampris immaculata Gilchrist, 1904: 4, Pl. 22 (False Bay); Parin & Kukuyev, 1983: 1*. *Lampris lunula* (*non* Gmelin): Barnard, 1925: 351*. *Lampris regius* (*non* Bonnaterre): Smith, **SFSA No. 262*** (in part; illustration is of *L. immaculatus*, but description and synonymy includes *L. guttatus*).

D 55-56; A 36-40; P 24; V 13-15; GR 13-14. Body depth of juveniles (<40 cm SL) 50-60% SL.

Attains 110 cm. Feeds on krill, squid and fishes. Circumglobal in southern oceans south of 30°S.

Family No. 118: VELIFERIDAE

by P.C. Heemstra

Velifers **Velifers**

Body deep, compressed. Dorsal fin long (total spines + rays 33-44); total anal spines + rays 25-35; dorsal and anal fins with well-developed basal scaly sheath. Pelvic-fin rays

7-9 (no spine). Caudal fin forked; 19 principal, 17 branched rays. Upper jaw very protrusile; maxillae bound to ascending processes of premaxillae and move with them; no supramaxilla. Teeth absent. Gills 4, a slit behind the last; gill-rakers very short; branchiostegals 6, the membranes narrowly joined to isthmus. Scales cycloid, deciduous, covering body and most of head; lateral line distinct. Vertebrae 16+(17-18). Gasbladder well developed, bifurcate posteriorly, the 2 horns extending well past anal fin origin.

Rare fishes of the Indo-Pacific region; taken in depths of 40 - 110 m. Two widely distributed species in separate genera: *Velifer* Bleeker, 1879 and *Metavelifer,* Walters, 1960.

KEY TO SPECIES

1a D XXI-XXII,20-23; A XVII-XVIII, 16-18; ..... *Metavelifer multiradiatus*
1b D I-II,33-34; A I,24-25; ..... *Velifer hypselopterus*

118.1 *Metavelifer multiradiatus*
(Regan, 1907)

Spinyfin velifer — Stekelvin-velifer

Velifer multiradiatus Regan, 1907: 633 (northwest coast of Australia). *Velifer multispinosus* Smith, 1951: 504, Pls. 11 & 12 (not far from Maputo, in about 50 fms); 1953: 515, **No. 262b***. *Metavelifer multiradiatus:* Walters, 1960: 246; Stephenson, 1977: 143.

D XXI-XXII,20-23; A XVII-XVIII,16-18; P 15-16; V 9 (all rays branched except the 1st); LL 40-42; GR 3+9. Depth 1.6- 1.8, head 3.4 in SL; eye 2.9-3.1 in head. Preorbital bone with notch posteriorly. Anterior D & A rays of juveniles (<13 cm SL) are segmented, but at 17 cm SL, only the distal parts of the 6th, 7th & 8th D rays are segmented.

Attains 28 cm. One specimen from off Maputo; also known from Australia, New Zealand and Hawaii.

118.1 *Metavelifer multiradiatus:* 20.5 cm holotype of *V. multispinosus* (Mozambique Channel).

118.2 *Velifer hypselopterus*
Bleeker, 1879

Sailfin velifer — Seilvin-velifer

Velifer hypselopterus Bleeker, 1879: 16 (Japan; on "*Velifer*" Temminck & Schlegel, 1850); Smith, 1951: 500*; Walters, 1960: 246. *Velifer africanus* Smith, 1953: 7, Pl. 1, Fig. 2 (off south end of Madagascar, about 26°S, 44°E; in about 60 fms); 1953: 515, **No. 262a*.**

D I-II,33-34; A I,24-25 (spine minute, concealed by scaly sheath at base of fin); P 15-16; V 7-8 (all rays branched except 1st); LL about 72; GR 4+(11-12). Depth 2.1-2.2, head 3.0-3.3 in SL; eye 3.0-3.7 in head. Preorbital bone without notch posteriorly. Anterior D & A rays much longer than head; length of rays gradually decreasing posteriorly.

Attains 40 cm. Two specimens taken in 110 m off southern Madagascar; also reported from India, Vietnam and Japan.

118.2 *Velifer hypselopterus:* 15 cm holotype of *V. africanus* (Mozambique Channel).

Family No. 119: TRACHIPTERIDAE

by P.C. Heemstra & S.X. Kannemeyer

Ribbonfishes — **Lintvisse**

Body elongate, more or less compressed. Upper jaw very protrusile. Posterior vertebrae of adults elongate. Ribs and anal fin absent; swimbladder and pelvic fins rudimentary or absent in adults. Snout-to-anus distance ⅓ to ⅔ SL. Skin of adults with bony or cartilaginous tubercles and pierced by numerous pores. Dorsal fin origin above or slightly behind eye; ventral rays of caudal fin reduced (rudimentary or absent in some species).

Like the oarfish (Family Regalecidae), the ribbonfishes are members of the offshore epipelagic community; they probably maintain a head-up position by means of undulations of the long dorsal fin. The peculiar skin tubercles and pore system are supposed to reduce drag when the fish is swimming (Walters, 1963). Three genera; although more than 30 species have been named, it seems likely that there are fewer than 10 valid species in this family. South African species reviewed by Heemstra and Kannemeyer (1984).

KEY TO GENERA

1a C comprises 4-10 dorsal rays approximately parallel to long axis of body; ventral C rays absent; no elongate spiny plates or bony tubercles along ventral edge of tail ..... *Desmodema*

1b C of two parts: 6-12 dorsal rays often raised to nearly a right angle above long axis of body, and 1-5 ventral rays (rudimentary spiny nubbins in *Trachipterus*); elongate spiny plates or bony tubercles along ventral edge of tail 2

2a LL runs along ventral edge of tail as a row of elongate spiny plates; subadults (<80 cm SL) with ventral edge of body distinctly scalloped; body depth 1.5-2.9 in distance from snout to anus ..... *Zu*

2b LL well above ventral edge of tail; bony tubercles, but no elongate spiny plates along ventral edge of tail; ventral edge of body straight; body depth 3.7-4.1 in distance from snout to anus ..... *Trachipterus*

Genus ***Desmodema*** Walters & Fitch, 1960

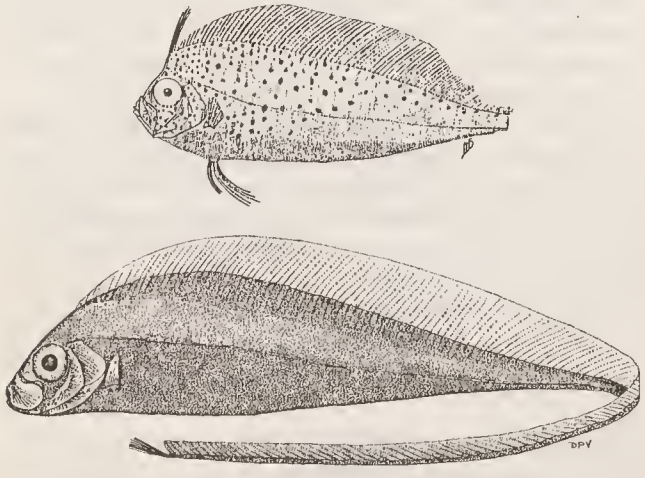
Seven dorsal pterygiophores before 1st neural spine; no predorsal bones; V well developed in young, absent in adults. Two nostrils in prejuveniles; posterior one just before margin of eye, becomes obliterated in juveniles and adults. Two species, one in our area. *D. lorum* Rosenblatt & Butler, 1977 occurs in the North Pacific.

119.1 *Desmodema polystictum*
(Ogilby, 1897)
PLATE 17

Polka-dot ribbonfish — Gespikkelde lintvis

Trachipterus jacksoniensis polystictus Ogilby, 1897: 649 (Newcastle, New South Wales, Australia). *Trachipterus* species: Smith, **SFSA No. 264b** (p. 504). *Trachipterus woodi* Smith, 1953: 504, Fig. **No. 264b** (Xora River mouth, Transkei); King & Ikehara, 1956: 22*; Smith 1966: 83*. *Desmodema polystictum:* Rosenblatt & Butler, 1977: 848*; Heemstra & Kannemeyer, 1984: 15*.

D 120-128; P 12-14; C 7-10; GR (2-3)+(9-10). Vertebrae: 71-74 total, 18-20 precaudal, 37-42 before anus. Eye diameter greater than snout length (including upper jaw). Tail greatly prolonged in adults; snout to anus distance about ⅓ SL in adults and about ⅔ SL in prejuveniles.



119.1 *Desmodema polystictum:* top: 9 cm (tail missing) holotype of *Trachipterus woodi* (Transkei); bottom: 104 cm SL adult (drawn after Rosenblatt & Butler, 1977).

Prejuveniles (< 10 cm, snout to anus) silvery with numerous dark spots; attains 104 cm SL. Rare; known in our area from 1 juvenile specimen washed ashore at Xora River and 1 found in a tide pool at Simonstown, False Bay; also reported from Japan, Philippines, Australia, eastern tropical Pacific, and Florida (U.S.A.).

Genus ***Trachipterus*** Goüan, 1770

No membranous flaps on D and V rays. One pterygiophore before 1st neural spine and 9 between 1st and 2nd neural spines. Scales absent; tubercles along ventral edge of body and tail enlarged and pointed. Nostrils single. About 5 species, 2 in our area. The description of "*Trachipterus articus*" given by Smith (**SFSA No. 265**) could apply to either of our species.

KEY TO SPECIES

1a P rays 8-11; eye diameter 1.4-1.6 in lower jaw length; tubercles indistinct except along ventral edge of body and tail, not arranged in a row along each side of D pterygiophores ..... *T. trachypterus*

1b P rays 13-14; eye 1.9-2.2 in lower jaw length; tubercles distinct, those along ventral edge of body and tail enlarged, pointed, and slightly curved; tubercles in a row along each side of D pterygiophores ..... *T. jacksonensis*

119.2 *Trachipterus jacksonensis*
(Ramsay, 1881)

Blackflash ribbonfish — Swartstraal-lintvis

Regalaecus jacksonensis Ramsay, 1881: 631, Pl. 20 (Manly, near Sydney, Australia). *Trachipterus nigrifrons* Smith, 1956: 449, Fig. & Pl. 12 (East London); 1961: 566, **No. 264c;** 1965: 18. *Trachipterus jacksonensis:* Heemstra & Kannemeyer, 1984: 17*.

D 166-173; P 13-14; GR (3-5)+8. Vertebrae: 81-83 total, 31-34 precaudal, 44-48 before anus. Eye diameter 6.0-7.3% distance from snout to anus; 5 slender canines on each side at front of lower jaw and 6 on each side of upper jaw; 1 large canine on vomer and a smaller one at front of each palatine.

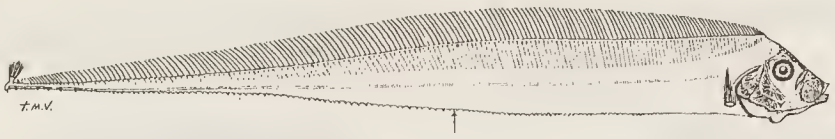
Head and body silvery; front of head, interorbital area, dorsal part of upper jaw, and tip of lower jaw are black. Attains 200 cm. Rare; known from Australia, East London and off Cape Town.

119.3 *Trachipterus trachypterus*
(Gmelin, 1789)

Peregrine ribbonfish — Rondswerwer-lintvis

Cepola trachyptera Gmelin, 1789: 1187 (Adriatic Sea). *Trachipterus arcticus* (*non* Brünnich); Barnard, 1948: 359*. ?*Trachipterus iris:* Smith, **SFSA No. 264*.** *Trachipterus trachypterus:* Palmer, 1961: 342*; Heemstra & Kannemeyer, 1984: 20*.

D 145-184; P 9-11; GR (3-5)+10. Vertebrae: 84-96 total, 35-39 precaudal, 49-57 before anus. Eye diameter 8.4-8.9% distance from snout to anus.



119.2 *Trachipterus jacksonensis:* 21 cm holotype of *T. nigrifrons* (East London); arrow indicates anus.

Head and body silvery; front of head, interorbital area, dorsal part of upper jaw, and tip of lower jaw are black; young with 3-5 dark blotches on sides of body; dusky blotch usually visible on body at bases of 20-28th D rays. Attains 213 cm. Rare, but widely distributed from Mediterranean Sea to South Africa (off Table Bay), Japan and New Zealand.

119.3 *Trachipterus trachypterus:* 212.5 cm SL (off Cape Town; after Barnard, 1948).

Genus *Zu* Walters & Fitch, 1960

Young with V and anterior 6 D rays greatly prolonged, bearing membranous flaps. Anterior D pterygiophores and neural spines as in *Trachipterus*. Scales present, though very deciduous, and not apparent in prejuveniles. Body of juveniles compressed, belly distinctly scalloped; belly of adults nearly straight, but with a low fleshy keel from V rudiments to anus. Body of adults fairly robust (less compressed than other trachipterids), dorsal C rays 6-12, 1-5 lower rays. Vertebrae 63-69 or 85-86. The very long V of the prejuvenile stage become shorter with growth and are represented by tiny rudiments in the adult. The spiny LL scales along the tail resemble the bucklers (dermal denticles) of some skates. Zu was the Babylonian God of Storms and is a fitting name for a trachipterid, since these fishes are known mainly from individuals found thrown ashore in the wake of storms. Two species, both in our area.

KEY TO SPECIES

1a Body depth 12-16% SL; prejuveniles with body not abruptly constricted behind vent; eye 9-10% of distance from snout to anus; LL plates 126-130 ..... *Zu elongatus*

1b Body depth 20-26% SL; prejuveniles with body abruptly constricted behind vent; eye 13-16% of distance from snout to anus; LL plates 99-106 ..... *Zu cristatus*

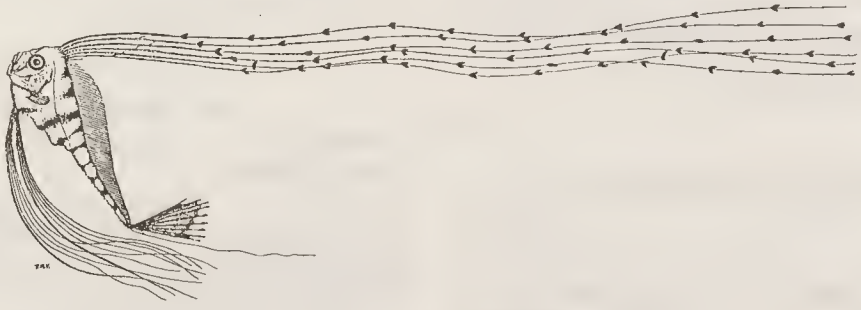
119.4 *Zu cristatus*
(Bonelli, 1820)
PLATE 17

Scalloped ribbonfish — Skulprand-lintvis

Trachypterus cristatus Bonelli, 1820: 487 (Gulf of Spezia, Mediterranean); Smith, **SFSA No. 264a***. *Zu cristatus:* Walters & Fitch, 1960: 445; Palmer, 1961: 346; Fitch, 1964: 229*; Karrer, 1975: 72; Heemstra & Kannemeyer, 1984: 23*.

D 120-150; P 10-12; V 5-7; GR (2-3)+(8-9); LL 99-106. Vertebrae: 63-69 total, 22-24 precaudal, 32 before anus. Eye diameter 1.3-1.7 in length of lower jaw. Upper jaw with 12-18 slender canines, 8-16 in lower jaw; vomer with 1-4 and palatines with 1-3 canines.

Young silvery, with about 6 wavy dark vertical bars on dorsal part of body and 4 on ventral part; tail with about 6 complete black bars; C mostly blackish, base of fin pale. Adults silvery grey, paler ventrally; D scarlet; C reddish black, darker distally. Attains 118 cm SL. Reported from Atlantic, Mediterranean Sea, and Pacific Ocean; known in



119.4 *Zu cristatus:* ca. 10 cm juvenile swimming in ocean (Durban; based on sketch by Len Jones).

119.5 *Zu elongatus:* 113.5 cm SL paratype (off Cape Town).

our area from prejuveniles collected off Lüderitz, Algoa Bay and Durban.

119.5 *Zu elongatus*
Heemstra & Kannemeyer, 1984

Taper-tail ribbonfish — Spitsstert-lintvis

Zu elongatus Heemstra & Kannemeyer, 1984: 29, Figs. 9-11 (off Cape Columbine, western Cape Province).

D 142-147; P 11-12; V 7; GR (2-3)+(7-9); LL 127-130. Vertebrae: 84-87 total, 29-31 precaudal, 38-40 before anus. Eye diameter 1.7-2.0 in length of lower jaw.

Colour in alcohol: (Adult) body tan; front of head with triangular dark area extending onto lips and gular region; posterior D rays black; C black, base of fin pale. (Prejuvenile, 48 cm SL) body silvery, with 3 incomplete dark crossbars; 5 dark bars on tail; front of head with dark area as in adult. Attains at least 120 cm. Known from 4 specimens trawled off the western Cape coast; also reported from New Zealand.

Family No. 120: RADIICEPHALIDAE

by P.C. Heemstra & S.X. Kannemeyer

Tapertail — **Spitsstert**

Body elongate, strongly compressed, the depth decreasing gradually from head to tail. Dorsal fin origin over front of eye. Anus well before midpoint of body. Anal fin rudimentary, about halfway between anus and last vertebra. Pelvic fins rudimentary in adults. Lateral line continued past last vertebra where the canals of either side are joined to form a large, thin-walled tube carried on the greatly elongated "rays" that emanate from the ventral surface of the last 3 vertebrae. Upper jaw very protrusile. Skin with scattered soft papillae and numerous pores. Swimbladder well developed; ink sac empties into cloaca.

A single species is known.

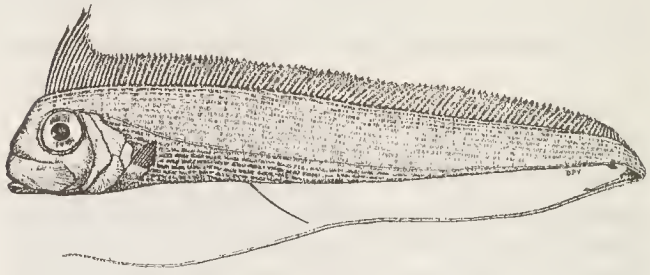
120.1 *Radiicephalus elongatus*
Osorio, 1917

Tapertail — Spitsstert

Radiicephalus elongatus Osorio, 1917: 114, Figs. 2-4; Walters, 1963: 456; Harrisson & Palmer, 1968: 185*; Karrer, 1976: 179*; Heemstra & Kannemeyer, 1983: 35.

D 150-160; A 7; P 10; GR 3+8. Body depth 8-10, head length 6-7 in SL; eye 3.4-4.0 in head. Total vertebrae 119-121, precaudal 38-39, preanal 44-45. Several small sharp teeth at front of jaws, 3 on vomer and 2 or 3 on each palatine.

Body and tail silvery in life; D base blackish. Attains 70 cm. Known from a few specimens collected in the Atlantic, from the Azores and Morocco south to 70 miles SW of Cape Point; also reported from off New Guinea.



120.1 *Radiicephalus elongatus*: 31 cm SL (off Cape Point).

Family No. 121: LOPHOTIDAE

by P.C. Heemstra

Crestfishes — **Kuifvisse**

Body very elongate, ribbon-like; scales small, deciduous. Pelvic fins rudimentary or absent; anal fin small or minute, near caudal and just behind cloaca. Jaws with small teeth; upper jaw slightly protrusile. Swimbladder present; ink sac posterior to swimbladder, empties into cloaca.

Two monotypic genera, *Eumecichthys* Regan, 1907 and *Lophotus* Giorna, 1809; both occur in our area.

KEY TO SPECIES

1a Top of head greatly produced forwards as a long rostrum in front of mouth; body depth 19-30 in SL; A rudimentary ..... *Eumecichthys fiski*

1b Head not greatly produced forwards; body depth 5-8 in SL; A small, but distinct ..... *Lophotus lacepede*

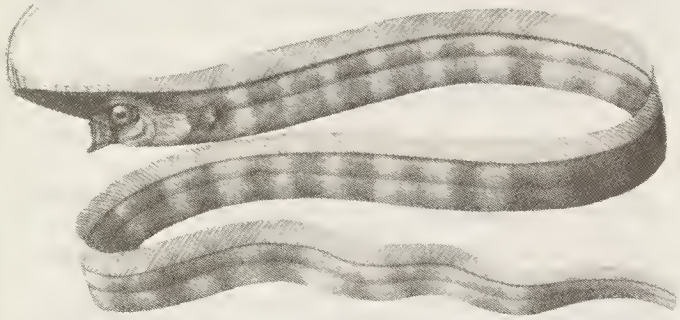
121.1 *Eumecichthys fiski*
(Günther, 1890)

Unicorn crestfish — Eenhoring-kuifvis

Lophotes fiski Günther, 1890: 246, Pls. 19 & 20 (Kalk Bay, False Bay); Smith, **SFSA No. 267***. *Eumecichthys fiski:* Walters & Fitch, 1960: 444; Parin & Pokhil'skaya, 1968: 808*.

D 310-392; A 5-9; P 13-15; C 12-13. First 3 or 4 D rays produced into a long pennant; A minute, split longitudinally in adults into 2 rows of nubbins; ventralmost C ray enlarged, bony; V absent.

Head and body silvery, with 24-60 dark sub-vertical bands; D and C crimson. Attains 130 cm. Rare, but widely distributed from South Africa to India, Japan, Hawaii and Mexico; in our area, known only from the holotype taken in False Bay.



121.1 *Eumecichthys fiski:* 125+ cm holotype (after Günther, 1890).

121.2 *Lophotus lacepede*
Giorna, 1809
PLATE 17

Crestfish — Kuifvis

Lophotus lacepede Giorna, 1809: 179, Pl. II, Fig. 1 (probably Mediterranean); Walters & Fitch, 1960: 444; Palmer, 1973: 334. *Lophotes capellei* Temminck & Schlegel, 1845: 143, Pl. 121 (Nagasaki); Smith & Smith, 1966: 117*; Smith, 1975: 25. *Lophotes cepedianus:* Smith, **SFSA No. 266*.**

D 220-263; A 12-20; P 14-17; GR (3-4)+(7-9). First D ray produced; V minute, located on sides of body below and behind P. Single nostril at front of snout. Anterior head profile vertical or inclined forward. Vertebrae 124-152.

Head and body silvery, sometimes with silvery spots; fins red. Attains 200 cm. Rare; widely distributed in all oceans. Six species have been named, but they appear to be synonyms of one somewhat variable species. Our specimens were collected from the Cape to Plettenberg Bay.

Family No. 122: REGALECIDAE

by P.C. Heemstra

Oarfishes — **Sneesvisse**

Body very elongate and compressed. Dorsal fin very long. Caudal fin rudimentary, absent in adults of *Regalecus*, represented by 2 elongated rays in *Agrostichthys*. Anal fin absent. Upper jaw very protrusile; maxilla broad. Scales absent. Gasbladder absent.

Rare fishes of open ocean habitat, occasionally found stranded on the beach. Represented in all oceans. Two monotypic genera, both in our area.

KEY TO GENERA

1a D origin before centre of eye; total GR 38-58 ..... *Regalecus*
1b D origin behind centre of eye; total GR 8-10 ..... *Agrostichthys*

Genus *Agrostichthys* Phillipps, 1924

Two species have been described, but the validity of *A. benhami* Scott, 1934 is doubtful.

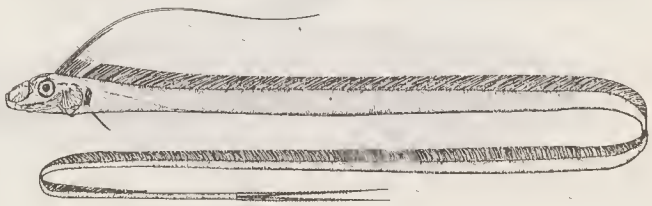
122.1 *Agrostichthys parkeri*
(Benham, 1904)

Streamer fish — Wimpelvis

Regalecus parkeri Benham, 1904: 198, Pl. 9 (Otago Harbour, New Zealand). *Agrostichthys* cf. *parkeri:* Trunov, 1982: 1*.

Body extremely elongated, the depth immediately behind the head 40 to 60 times in SL. Head length 2-3 times greatest body depth. Eye diameter about 4 in head length. D origin over rear ½ of eye; total rays 400+; anterior D rays elongate. P rays 8-11; V of 1 thick ray or absent; C of 2 elongated, thick rays bearing small spines.

Body silvery; D rose-coloured. Attains 3 m. Of the 7 known specimens, only 1 was intact. Southeast Atlantic, New Zealand and Tasmania.



122.1 *Agrostichthys parkeri:* 58 cm SL (drawn after Trunov, 1982).

Genus *Regalecus* Ascanius, 1772

Although several species have been described, it seems likely that there is only a single, valid species of worldwide distribution.

122.2 *Regalecus glesne*
Ascanius, 1772
PLATE 17

Oarfish — Sneesvis

Regalecus glesne Ascanius, 1772: 5, Pl. 11; Smith, **SFSA No. 263*;** Hulley & Rau, 1969*; Karrer, 1975: 72; Trunov, 1982: 4.

D 10-12+ about 400 (or less, depending on injury); P 13; GR 7+36. V (in adults) represented by a single, prolonged, ribbon-like ray. C of juveniles with 4 rays. Single nostril on each side of snout just behind maxillary symphysis. Mouth toothless or with a few teeth at front of lower jaw and a small tuft of bristle-like teeth on vomer. Head and body brilliant silver, with bluish streaks when alive; body with various blackish streaks and spots; D and V crimson.

Attains 8 m. Normally inhabits depths of 20 - 200 m where it swims vertically by means of undulating waves of the D. Feeds on planktonic crustaceans. Flesh unpalatable, soft and watery even after prolonged cooking.

Family No. 123: STYLEPHORIDAE

by P.A. Hulley

Tube-eye **Pypoog**

Body elongate, moderately compressed. Head with large telescopic eyes, directed forward or upward; interorbital extremely narrow; nasal rosettes small, immediately anterior to eyes. Jaws strongly protrusible, with lower jaw extending in front of upper jaw; mouth small with minute teeth. Opercle small and thin; preopercular ridge oblique, terminating in a posteriorly-directed ventral spine. Dorsal fin extending from nape almost to caudal, the 1st 2 rays longer than the rest; anal fin short; pectoral fins lateral; ventral fins with only 1 ray, below base of pectoral; caudal fin in 2 parts: upper with 5 rays; lower with 2 extremely elongate rays. Lateral line simple, segmented tube, arching sharply downward from behind base of pectoral fin and running ventrally along entire length of body, continuing posteriorly between the 2 elongate caudal rays.

Swims in a vertical position, with head uppermost. Worldwide, bathypelagic; uncommon. One genus with 1 species.

123.1 *Stylephorus chordatus*
Shaw, 1791
PLATE 15

Stylephorus chordatus Shaw, 1791: 90, Pl. 6 (West Indies); Nielsen, 1973: 335; Pitsch, 1978: 255*.

D 119-124; A 14-16; P 10-11; V 1; GR (3-5)+(4-6). Depth 19-23; head 6.3-6.7.

Body silvery, head dark violet. Attains 28 cm SL. Three specimens (158-209 mm SL) taken off the east coast between 31°51′S-33°10′S, 28°17′E-30°01′E, all below 585 m, represent the 1st record in our region (SAM data). Tropical and subtropical waters of Atlantic, Pacific and Indian oceans.

123.1 *Stylophorus chordatus:* 35+ cm.

Family No. 124: ATELEOPODIDAE

by M.M. Smith

Tadpole fishes **Paddavis-visse**

Body without or with very small scales; short dorsal fin near head above pectoral fin; caudal fin reduced, united with long anal fin. Skeleton mainly cartilaginous. Branchiostegals 7. Lateral line indistinct, mucous canal can be traced by series of shallow depressions, only dissection shows solitary (non-imbricating) scales beneath surface. Small villiform teeth present or absent on one or both jaws.

A bathybenthic family; at present 4 genera containing 8-12 species, 3 nominal genera and 3-4 species from our area. The single specimen of the genus *Parateleops* Radcliffe, 1912 from Hawaii differs from *Ateleopus* by having only 3 dorsal rays and a pointed snout but this may be an abnormality. This family is in need of revision.

KEY TO GENERA

1a D rays 11-13; V of 3 separate rays followed by conventional fin of 6-7 rays ..... *Guentherus*
1b D rays 9-11; no conventional V 2

2a An elongate V ray followed by skinny flap; pelvic girdle with 2 foramina and 2 ossified lamina ..... *Ateleopus*
2b 1st V ray short followed by 3 minute, rudimentary rays; pelvic girdle with 1 central foramen and no ossified parts ..... *Ijimaia*

Genus ***Ateleopus*** Schlegel, 1846

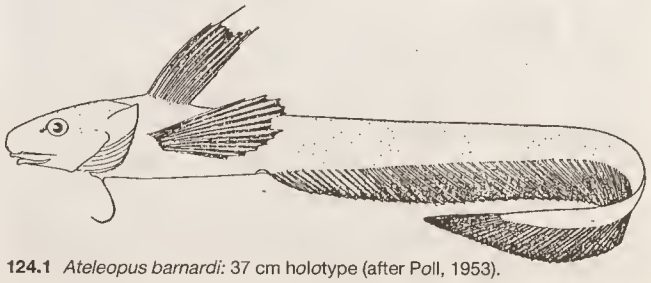
About 7 nominal species, 2 described from our area.

KEY TO SPECIES

1a Fewer than 100 rays in A ..... *A. barnardi*
1b More than 100 rays in A ..... *A. natalensis*

124.1 *Ateleopus barnardi*
Poll, 1953

Ateleopus barnardi Poll, 1953: 109, Fig. 43 (11°53′S, 13°20′E in 480 - 510 m); Stauch & Blache, 1964: 48*.



124.1 *Ateleopus barnardi:* 37 cm holotype (after Poll, 1953).

D 10-11; A+C 85-94; P 11-14 reaches beyond A origin; V 3, 1st ray elongate, followed by 2 minute rays; GR (0-1)+(9-11); vertebrae 132-133. Teeth in upper jaw only; body 9.3, head 6.6 in SL. A origin about 1 head length behind head. Eye 6.1; interorbital 6.5 in head. (Not seen, compiled.) Possibly a synonym of *Ijimaia loppei*.

Attains 1.5 m. Brownish transparent; fins dusky with margin darker. West coast from the equator to Angola and down to 567 m.

124.2 *Ateleopus natalensis*
Regan, 1921

Ateleopus natalensis Regan, 1921: 414 (Natal); Barnard, 1948: 350*; Smith, **SFSA No. 188***; Pfaff, 1953: 151*.

D 9-10; A+C 104-108; P 12-13; V 1 (looks like 1 long ray with small skinny projection behind; dissection shows 2 minute spines in front of this ray, with a variable number of vestigial spines and rays in the skinny projection). GR (0-1)+(7-9). No teeth in lower jaw. Stauche & Blache (1964) suggest that *A. natalensis* could be the same as *A. japonicus* Bleeker, 1853, and that the large adult is *Ijimaia dofleini* Sauter, 1905. Franca & Ferreira (1967), however, disagree that *Ijimaia* and *Ateleopus* can be the same.

Attains 60 cm. Cape to Red Sea; down to 660 m. Colour greyish, fins blackish.

Genus ***Guentherus*** Osorio, 1917

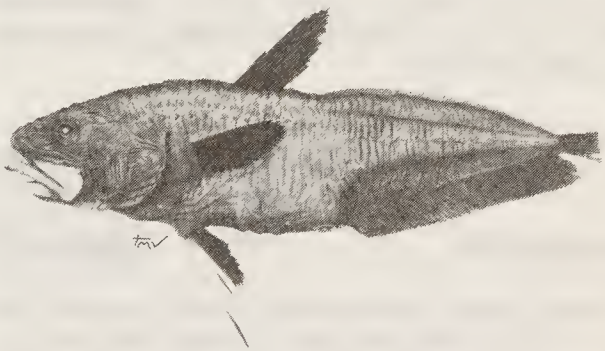
Much shorter body and anal fin than other 2 genera in our area. No teeth; whole fish very gelatinous; mouth subinferior, large. Monotypic.

124.3 *Guentherus altivela*
Osorio, 1917

Güntherus altivela Osorio, 1917: 117 (off Cabo Blanco, Spanish Sahara in 260 m). *Guentherus altivelis:* Walters, 1963: 456; Penrith, 1969: 71; Trunov & Isarev, 1971: 115*; Karrer, 1973: 215*. *Melanogloea ventralis* Barnard, 1941: 10, Fig. on Plate (NW of Table Bay and W of Saldanha Bay in 550 m); 1948: 356*; Smith, **SFSA No. 188b**; Franca & Ferreira, 1967: 2*; Blache, Cadenat & Stauch, 1970: 191*.

D 11-13; A 69-80; P 11-14; V 1+1+1+(6-7), 1st and 3rd free rays probably tactile organs; C 9-11; GR (4-6)+(17-22) = 23-27; LL about 35, straight, series of small pores from gill opening to C base; LL canal passes through embedded tubular scales only visible on dissection; adipose fin (or fold of skin) about as long as A, from behind D to C base. Vertebrae 78-80. Head wider than body, 2.9-3.2 in SL.

Attains 2 m. Whole fish including margin of inner surface of operculum uniform dark brown except white mouth cavity and concealed parts of maxilla when mouth closed, free V rays white in young adults; juveniles transparent with black blotches along body and fins. West coast of Africa from Cabo Blanco to the Cape, not uncommon off Lüderitz; also found in eastern Pacific; down to 700 m.



124.3 *Guentherus altivela:* 48 cm (Walvis Bay).

Genus ***Ijimaia*** Sauter, 1905

According to Stauche & Blache (1964) *Ijimaia* may be the large adult of *Ateleopus*, as the main difference is the size of

124.2 *Ateleopus natalensis:* 34 cm (off Algoa Bay).

124.4 *Ijimaia loppei:* 116.5 cm composite (partly after Blache, Cadenat & Stauch, 1970, and Roule, 1922).

the eye and the length of the V. If this proves to be correct, then our species would be called *Ateleopus loppei* with *A. barnardi* a synonym. Three nominal species, 1 in our area.

124.4 *Ijimaia loppei*
Roule, 1922

Ijimaia loppei Roule, 1922: 641 (off Agadir, Morocco in 350 - 400 m); 1928: 14, Fig; Barnard, 1948: 353*; Smith, **SFSA No. 188a;** Stauche & Blache, 1964: 48; Franca & Ferreira, 1967: 15*; Penrith, 1969: 72; Karrer, 1975: 70.

D 9-10; A 78-85; A+C = 84-92; P 12-14; V 1(+3); GR (0-1)+10; LL 38-40, scales only visible when skin removed; adipose D ridge from above anus to C base; conical knob behind eye, P about as long as D, does not reach A origin.

Attains about 2 m. Dark brown to black generally, slightly lighter ventrally; lining of mouth dark; V ray and fold of skin at angle of mouth pale, iris greyish brown. Morocco to Cape Peninsula, down to 460 m; common from Lüderitz northwards.

Family No. 125: MIRAPINNIDAE

by E. Bertelsen

Mirapinnids **Mirapinniede**

Body elongate. Fins soft-rayed. Dorsal fin opposite anal fin with origin behind mid-standard length. Pelvic fins jugular with laterally projecting lobes. Cleft of mouth oblique to sub-vertical. Upper jaw slightly protrusible. Maxilla broad; one supramaxilla. Teeth tiny. Skin without scales. Vertebrae 42-55.

Very few post-metamorphic specimens known, the largest 4-6 cm. Larvae epipelagic in tropical and subtropical parts of all oceans; adults may be mesopelagic. Three genera with a total of 4 species (Bertelsen & Marshall, 1956, 1984).

KEY TO GENERA

1a Body moderately elongate; head 3.7 in SL; skin covered with hair-like filaments; no appendage on C ..... *Mirapinna*
(Eastern North Atlantic, a single specimen)

1b Body very elongate; head 6-10 in SL; skin smooth (except for microscopic papillae); C prolonged into a ribbon-like streamer, reaching a length of 2-3 times SL 2

2a V rays 4-5 ..... *Eutaeniophorus*
2b V rays 8-10 ..... *Parataeniophorus*

Genus *Eutaeniophorus* Bertelsen & Marshall, 1958

Single species; assumed to occur in our area.

125.1 *Eutaeniophorus festivus*
(Bertelsen & Marshall, 1956)

Taeniophorus festivus Bertelsen & Marshall, 1956: 6, Figs. 3, 4, 8 & 9 (Indian Ocean). *Eutaeniophorus festivus:* Bertelsen & Marshall, 1958: 9.

D 16-20; A 15-18; P 19-24; V 4-5; GR 2+8. Vertebrae 47- 55. Depth 11.5-12.5 (with filled stomach about 4); head 7.7-10 in SL. Stomach extremely distensible (food: copepods). Caudal streamer less than 25% SL in larvae less than 10 mm, broken in most larger specimens, but complete and 2-3 times SL in 3 specimens 12-35 mm.

Colour in life purple. Largest preserved specimens brownish. Largest recorded specimen 53 mm (holotype). Observed hovering in vertical position. Caught in pelagic nets in 0 - 200 m. Recorded from all oceans between ca. 20°S and 35°N. Several records from Mozambique Channel, the southernmost at 24°57′S, 40°18′E.

Genus *Parataeniophorus* Bertelsen & Marshall, 1956

Two species, 1 in our area, the other assumed to occur here.

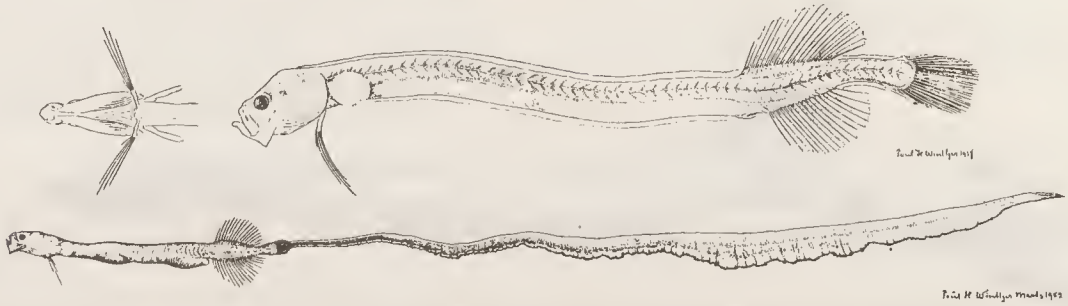
KEY TO SPECIES

1a D 15-20; A 14-17 ..... *P. brevis*
1b D 28-33; A 23-29 ..... *P. gulosus*

125.2 *Parataeniophorus brevis*
Bertelsen & Marshall, 1956

Parataeniophorus brevis Bertelsen & Marshall, 1956: 10, Fig. 7 (southern Mozambique Channel).

D 15-20; A 14-17; P ca. 16-18; V 8-9; GR 3+9. Vertebrae 42-46. Depth 5-7; head 6-10 in SL. Caudal streamer broken in all specimens, length of remainder subequal to SL in a fish of 29 mm.



125.1 *Eutaeniophorus festivus:* top: 5.5 cm SL, and ventral view of head; bottom: 3.5 cm SL, 14 cm TL with complete caudal streamer.

Largest preserved specimen 46 mm, dark brown. Holotype, a larva, 13.5 mm, caught in pelagic net in about 100 m at 24°33′S, 38°26′E; another larva, 10 mm, at 21°13′S, 42°26′E. Also reported from Australia and California.

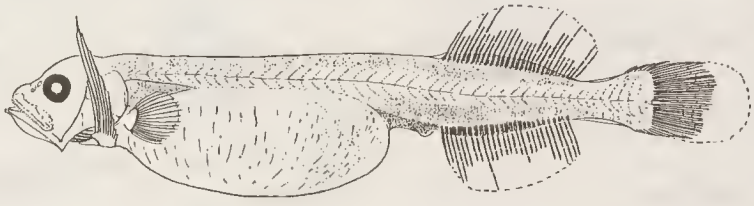
125.3 *Parataeniophorus gulosus*
Bertelsen & Marshall, 1956

Parataeniophorus gulosus Bertelsen & Marshall, 1956: 8, Figs. 5, 6 & 10 (Equatorial western Indian Ocean).

D 28-33; A 23-29; P 19-20; V 9-10; GR 3+8. Vertebrae 49. Depth 7 (with filled stomach 4.5); head 5.2-6.5 in SL. Stomach extremely distensible (food: copepods). Caudal streamer broken in all specimens except youngest larvae; according to remains it is of similar size as in *Eutaeniophorus*.

Largest preserved specimen, the holotype of 35 mm, pale yellow to light brown, caught in closing net between 700 and 1 400 m; all smaller specimens in 0 - 200 m. Recorded from North Atlantic between 20° and 42°N and western Indian Ocean between equator and 21°30′S.

125.2 *Parataeniophorus brevis:* 3 cm SL, caudal streamer incomplete.



125.3 *Parataeniophorus gulosus:* 3.5 cm SL, caudal streamer lost.

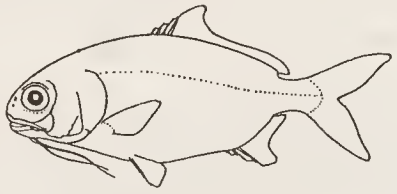
Order BERYCIFORMES

Body oblong to circular. Fin spines usually well developed (rudimentary or absent in anoplogasterids, in stephanoberycids and in the dorsal and anal fins of diretmids); pelvic fins with 5 soft-rays only (Stephanoberycidae) or with a strong spine and 6-12 soft-rays (only 3 or 4 rudimentary rays in Monocentridae); caudal fin with true (unpaired) procurrent spines and 18 or 19 principal caudal fin rays. Orbitosphenoid present (absent in Melamphaidae and Stephanoberycidae).

An ill-defined group of primitive acanthopterygians (Rosen, 1973; Zehren, 1979; Lauder & Liem, 1983). The inclusion or exclusion of certain families in this order is based on the presence or absence of apparently primitive characters, and such criteria are of dubious value in the recognition of natural (monophyletic) taxa. Ten families are represented in our area. The Melamphaidae and Stephanoberycidae are put in a separate order by some authors (Ebeling & Weed, 1973).

KEY TO FAMILIES

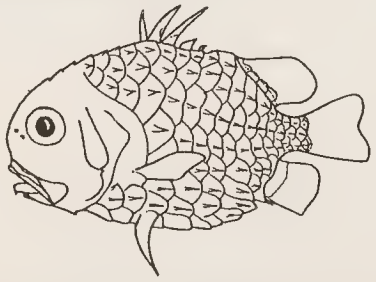
1a A pair of long barbels on underside of lower jaw; branched caudal fin rays 16 ..... POLYMIXIIDAE (No. 134)



134

1b No barbels on lower jaw; branched caudal fin rays 17 2

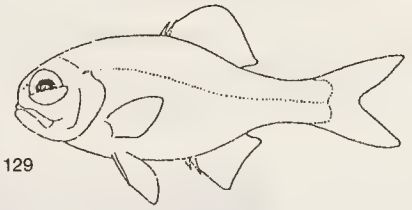
2a Pelvic fins with 1 huge spine (which can be locked erect) and 3 or 4 rudimentary rays; scales enlarged, with sharp ridges and spines, forming a bony armour resembling a pinecone .... MONOCENTRIDAE (No. 128)



128

2b Pelvic fins with 1 spine and 6-12 soft-rays or just 5-7 soft rays; body not encased in armour resembling a pinecone 3

3a A prominent luminous organ immediately below eye ..... ANOMALOPIDAE (No. 129)



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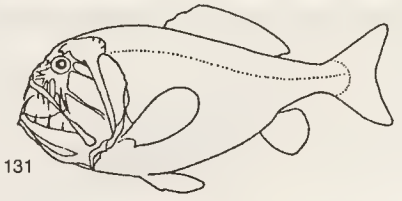
3b No luminous organ immediately below eye 4

4a Pelvic fin spine absent 5

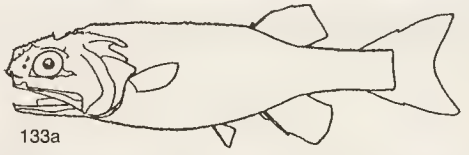
4b Pelvic fin spine present 6

5a Jaws with large fang-like teeth; dorsal fin base 2 to 4 times longer than anal fin base ..... ANOPLOGASTERIDAE (No. 131)



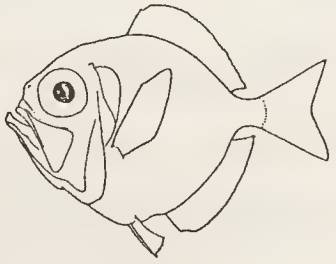
131

5b Jaws with minute teeth; dorsal and anal fin bases subequal ..... STEPHANOBERYCIDAE (No. 133a)



133a

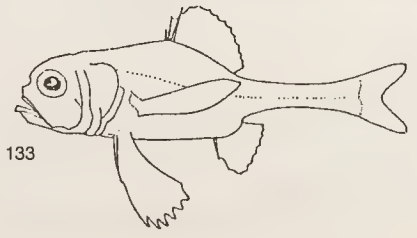
6a No dorsal or anal fin spines; no lateral line ..... DIRETMIDAE (No. 130)



130

6b Dorsal and anal fin spines present 7

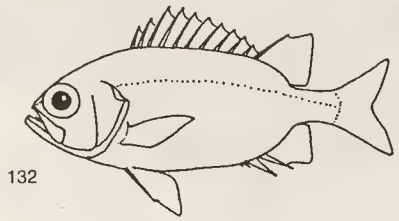
7a Lateral line reduced to 1 or 2 pored scales behind upper edge of operculum; dorsal fin with 1-3 weak spines ..... MELAMPHAIDAE (No. 133)



133

7b Lateral line complete, distinct; dorsal fin with 3-13 spines 8

8a Dorsal fin with 10-13 strong spines ..... HOLOCENTRIDAE (No. 132)



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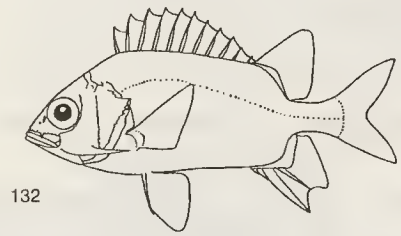
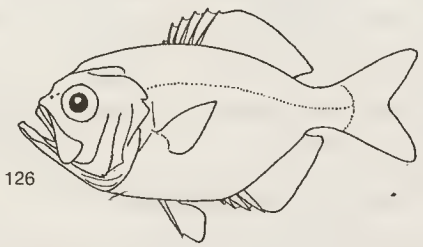


132

8b Dorsal fin with 3-8 spines 9

9a Anal fin with 4 spines and 12-30 soft-rays; each maxilla with 2 supramaxillae ..... BERYCIDAE (No. 126)



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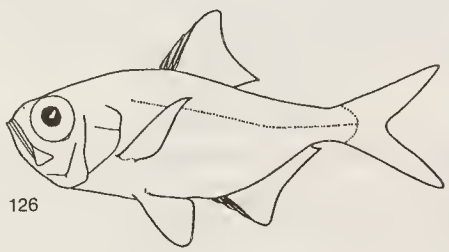
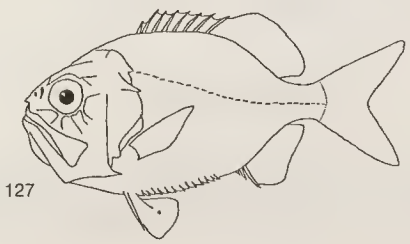


126

9b Anal fin with 2 or 3 spines and 8-12 soft rays; each maxilla with only 1 supramaxilla ..... TRACHICHTHYIDAE (No. 127)



127

Family No. 126: BERYCIDAE

by P.C. Heemstra

Berycids **Berikiede**

Body oblong, oval, compressed. Scales ctenoid; lateral-line scales not enlarged; cheeks and operculum scaly. Preopercle serrate, but no single large spine; opercle with low ridge or keel ending in a spine; 2 supramaxillae. Dorsal fin with 4-7 closely set spines and 12-20 branched soft-rays. Anal fin with 4 spines and 12 to 30 branched soft-rays; pelvic fins with 1 spine and 7 or 10-12 branched rays. Villiform teeth in bands on jaws, vomer and palatines. Branchiostegal rays 8. Vertebrae 10+(14-15); predorsal bones 3.

Berycids are found worldwide (but not in eastern Pacific Ocean) in depths of 200 - 600 m; they are of commercial importance in some areas. Two genera with 7 species.

KEY TO GENERA

1a D base longer than A base; A soft-rays 12-16; V I,7 ..... *Centroberyx*

1b D base shorter than A base; A soft-rays 25-30; V I,10-12 ..... *Beryx*

Genus ***Beryx*** Cuvier, 1829

Dorsal-fin spines 4; V fins I,10-12. Inner surface of each scale with a small, deciduous, cartilaginous disc at rear edge. Retrorse spine on preorbitals in front of eye, reduced or absent in large adults. Peritoneum black. Vertebrae 24. Two species, both in our area. The genus *Actinoberyx* Roule (type-species *A. jugeati* Roule, 1923) is a synonym.

KEY TO SPECIES

1a Body depth 44-50% SL; D IV,16-20; LL 56-61 (not counting scales on C) ..... *B. decadactylus*

1b Body depth 36-42% SL; D IV,13-15; LL 65-70 ..... *B. splendens*

126.1 *Beryx decadactylus* Cuvier, 1829

PLATE 18

Beryx Beryx

Beryx decadactylus Cuvier, *in* Cuv. & Val., 1829: 222 (Lisbon?); Krefft, 1961*; Penrith, 1967: 528; Abe & Maruyama, 1971*; Woods & Sonoda, 1973: 282*; Krefft, 1976: 73; Busakhin, 1982: 4*. *Actinoberyx jugeati* Roule, 1923: 1027; 1924: 68*. *Beryx longipinnis* Barnard, 1925: 504 (Saldanha Bay & Natal); 1927: 363*. *Actinoberyx longipinnis:* Smith, **SFSA No. 287*.**

D IV,16-20; A IV,25-29; P 15-17; V I,10; LL 56-61; GR (6-7)+(17-19). Body depth 2.0-2.3, head length 2.8-3.0 in SL. Eye 2.3-2.9 in head. Preorbital spine with a smaller accessory spine on its anterior margin; 2 short spines on front of snout between preorbital spines, another 2 on interorbital area and at rear end of lower jaw. Spines on head become reduced with growth. Some specimens with 1st to 3rd D ray elongate and/or V greatly produced.

Head and body scarlet dorsally, silvery white below; fins scarlet. Attains 60 cm. Both sides of Atlantic, also Australia, Japan and Hawaii; in our area from Saldanha Bay to Natal.

126.2 *Beryx splendens*
Lowe, 1834

Slender beryx — Slank beryx

Beryx splendens Lowe, 1834: 142 (text only, Fig. is *B. decadactylus;* Madeira); Krefft, 1961*; Smith, **SFSA No. 286*;** Karrer, 1973: 221; Woods & Sonoda, 1973: 286*; Krefft, 1976: 74*; Busakhin, 1982: 6*. *Beryx mollis* Abe, 1959: 157, Pls. 4-6 (Sagami Bay, Japan).

D IV,13-15; A IV,25-30; P 16-18; V I,10-12; LL 65-70 (+10-12 on C); GR (6-7)+(18-20). Body depth 2.4-2.6, head length 2.7-2.9 in SL. Eye 2.5-3.1 in head. No accessory spine on preorbital spine of adults. Some specimens with 1st D soft-ray greatly prolonged.

Attains 45 cm. Colour and distribution as for *B. decadactylus*.

126.2 *Beryx splendens:* 24 cm (off Cape Town).

Genus ***Centroberyx*** Gill, 1862

D spines 6 or 7. Vertebrae 24 or 25. Midventral scales of belly V-shaped, forming a more or less distinct ventral keel. Three species in Australia and an undescribed species in Japan. *Trachichthodes* Gilchrist, 1903 is a synonym of *Centroberyx*.

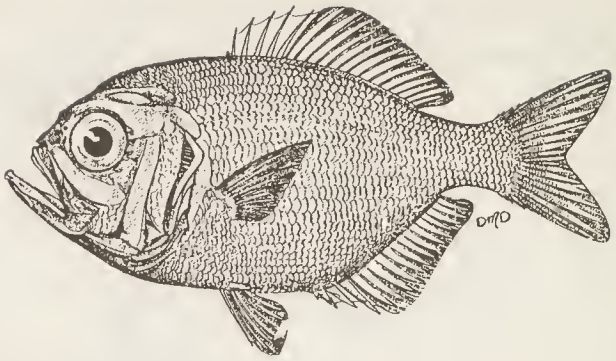
126.3 *Centroberyx spinosus*
(Gilchrist, 1903)
PLATE 18

Short alfonsino — Kort alfonsino

Trachichthodes spinosus Gilchrist, 1903: 204, Pl. 13, Fig. 1 (off Cape Morgan, 32°42'S, 28°22'E; 45 fms); Smith, **SFSA No. 293*.** *Centroberyx spinosus:* Busakhin, 1982: 14*.

D V-VI,14-15; A IV,14-16; P 13; V I,7; LL 43-47; GR (10-11)+(20-22); vertebrae 10+15. Body depth 1.9-2.0, head length 2.6-2.7 in SL. Eye 2.9-3.0 in head.

Head and body reddish orange dorsally; body below LL golden; C reddish with a narrow bluish white margin. Attains 20 cm. Known only from off Storms River to Durban.



126.3 *Centroberyx spinosus:* 6 cm (off Port Alfred).

Family No. 127: TRACHICHTHYIDAE

by P.C. Heemstra

Slimeheads — **Slymkoppe**

Body oval, compressed. Head with large, skin-covered mucous cavities, the walls between these cavities often with serrated crests; preopercle with a prominent spine at the angle; one supramaxilla; jaws with bands of minute teeth. Dorsal fin with 3-8 striated spines and 10-19 soft-rays, its base about twice length of anal-fin base. Anal fin with 2 or 3 spines and 8-12 soft-rays. Lateral-line scales more or less enlarged; scales along midventral part of belly enlarged, forming a row of well-developed scutes in most species.

Medium-sized fishes (to about 60 cm total length) occurring near the bottom in depths of 100 to 1 000 m. Several species of slimeheads are worldwide in distribution and some are reported to be common in certain areas. Five genera with about 30 species. *Trachichthodes spinosus* Gilchrist was assigned to this family by Smith (**SFSA No. 293**), but this species is here placed in the Berycidae.

KEY TO GENERA

1a D spines 7 or 8; spinous D base not shorter than A base ..... *Gephyroberyx*
1b D spines 4-7; spinous D base shorter than A base ..... *Hoplostethus*

Genus ***Gephyroberyx*** Boulenger, 1902

Scutes along ventral midline of belly well developed; LL scales with a median spine. Vomer and palatine teeth well developed. Two or 3 species, 1 in our area.

127.1 *Gephyroberyx darwini*
(Johnson, 1866)

Trachichthys darwini Johnson, 1866: 311, Pl. 32 (Madeira). *Gephyroberyx orbicularis* Smith, 1947: 796 (off Algoa Bay, 120 fms); **SFSA No. 292*.** *Gephyroberyx darwini:* Smith, **SFSA No. 291*.**

D VII-VIII,13-14; A III,11-12; P 13-15; scutes 10-13; LL 26-31; GR (4-6)+(13-15). Body depth 1.9-2.2, head 2.2-2.8 in SL; eye 4.0-5.0 in head.

Head and body dusky pink. Attains 60 cm. Known all round our coast; both sides of Atlantic and Indian oceans, Australia and the Philippines.

127.1 *Gephyroberyx darwini:* top: 11.5 cm (off Algoa Bay); bottom: 18 cm (off South Africa).

Genus ***Hoplostethus*** Cuvier, 1829

Ventral scutes well developed in some species; LL scales enlarged. About 16 species; represented in all 3 major oceans.

KEY TO SPECIES

1a D IV-VI,16-19; A III,10-12; ventral scutes present or absent (not well developed) ..... *H. atlanticus*
1b D IV-VII,12-16; A III,8-10 2

2a P 14-16; 8-12 well-developed scutes on belly ..... *H. mediterraneus*
2b P 16-20; 13-18 scutes on belly 3

3a Body depth 1.7-2.0 in SL; (P 17-20; eye diameter 10-13% SL) 4
3b Body depth 1.9-2.3 in SL 5

4a Abdominal scutes 15-18, inconspicuous, with numerous minute spinules on their surface; eye 3.4-3.9 in head ..... *H. melanopus*
4b Abdominal scutes 13-15, distinct, with lateral ridge and/or 1 or 2 small auxiliary spines; eye 3.2-3.4 in head ..... *H. melanopterus*

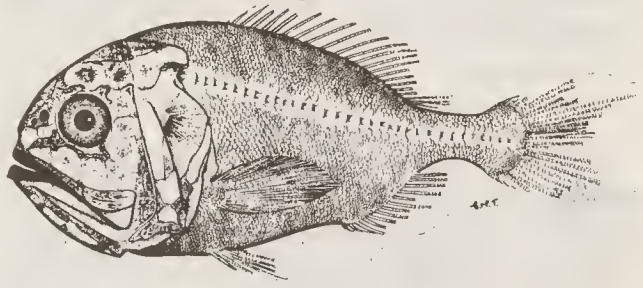
5a P 16-17; length of longest GR 19% head length; eye 10.0- 12.6% . SL ..... *H. cadenati*
5b P 17-20; longest GR 10% head length; eye 9.5% SL ..... *H. tenebricus*

127.2 *Hoplostethus atlanticus*
Collett, 1896

Hoplostethus atlanticus Collett, 1889: 306 (Azores); 1896: 17*; Smith, **SFSA No. 290;** Karrer, 1973: 223*; Kotylar, 1980: 195*. *Hoplostethus gilchristi* Smith, 1935: 182, Pl. 22, Fig. E (off Durban, 300 fms); **SFSA No. 289.**

D IV-VI,16-19; A III,10-12; P 18-20; GR (6-7)+(13-15) = 19-22; LL 28-32; scutes along belly feeble, barely discernible. D spines not much thicker than D rays. Body depth 33-47% SL; eye 8.8-11.6% SL.

Generally bright brick-red, mouth and gill cavity bluish black. Attains 69 cm. Appears to be anti-tropical in distribution; on both sides of Atlantic Ocean (from Iceland to Morocco and Walvis Bay to off Durban); also reported from south-central Indian Ocean and New Zealand. Taken off our coast in 500 - 1 090 m.



127.2 *Hoplostethus atlanticus:* 14.5 cm SL holotype of *H. gilchristi* (off Durban).

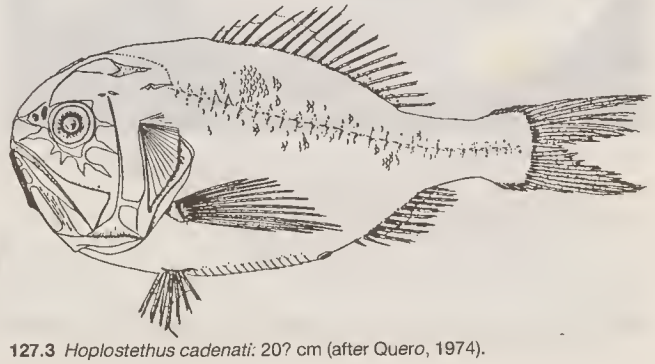
127.3 *Hoplostethus cadenati*
Quero, 1974

Black slimehead — Swart slymkop

Hoplostethus sp. Karrer, 1973: 227. *Hoplostethus cadenati* Quero, 1974: 103, Fig. (off Cape Blanc, Mauritania).

D IV-VI,12-13; A II-III,8-10; P 16-17; total GR 21-23; LL 26-28; scutes along belly distinct, 13-16. Body scales strongly adherent. D spines slender, not much thicker than soft-rays. Body depth 43-53%; eye 9.0-12.6% SL.

Body, head and fins dark grey. Attains 30 cm. West coast of Africa from 36°N to 26°S in 200 - 700 m; also taken off Transkei in 90 m.



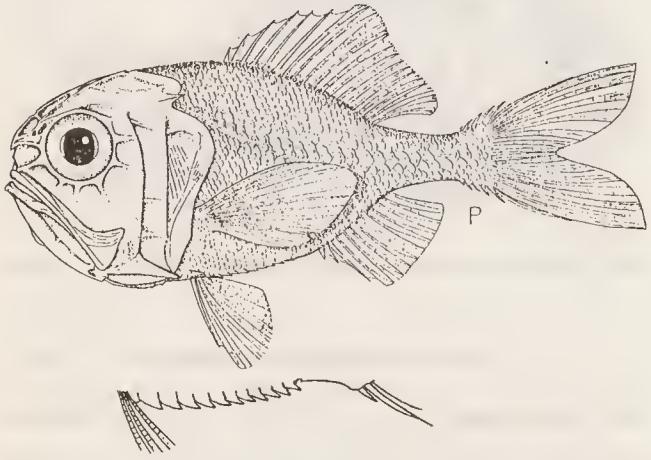
127.3 *Hoplostethus cadenati:* 20? cm (after Quero, 1974).

127.4 *Hoplostethus mediterraneus*
Cuvier, 1829
PLATE 18

Hoplostethus mediterraneus Cuvier, *in* Cuv. & Val., 1829: 344, Pl. 97 (Nice); Smith, **SFSA No. 288*;** 1964: 295; Karrer, 1973: 223; Woods & Sonoda, 1973: 314*; Kotlyar, 1980: 206*.

D VI-VII,12-14; A III,10; P 14-16; total GR 22-26; LL 25-27; belly scutes well developed, 8-12. Body scales deciduous; D spines robust, about twice as thick as soft-rays. Body depth 43-53% SL. Specimens from southern Africa seem to have a smaller eye than those in the North Atlantic Ocean (10-14% versus 14-16% SL), and they may represent a distinct subspecies, *H. mediterraneus intermedius* (Hector, 1875).

Body dusky pink dorsally, silvery below; paired fins pale; inside of mouth (posterior to vomer, palatines and tip of tongue), gill cavity and peritoneum black. Attains 30 cm. Namibia to Natal. Reported from both sides of Atlantic Ocean, Mediterranean Sea, Red Sea, Indian Ocean, and off south coast of Australia and New Zealand.



127.4 *Hoplostethus mediterraneus*: 8 cm (off South Africa) and abdominal scutes of 24 cm specimen (after Norman, 1939).

127.5 *Hoplostethus melanopterus*: 11.5 cm SL (off Natal) and abdominal scutes from 12 cm SL specimen.

127.5 *Hoplostethus melanopterus*
Fowler, 1938
PLATE 18

Hoplostethus melanopterus Fowler, 1938: 36, Fig. 9 (Philippines); Karrer, 1973: 222*.

D IV-VI,13-14; A II-III,9-10; P 17-20; total GR 19-20; LL 28; belly scutes 13-15, distinct. Body depth 50-53%, eye 12.3-12.9% SL.

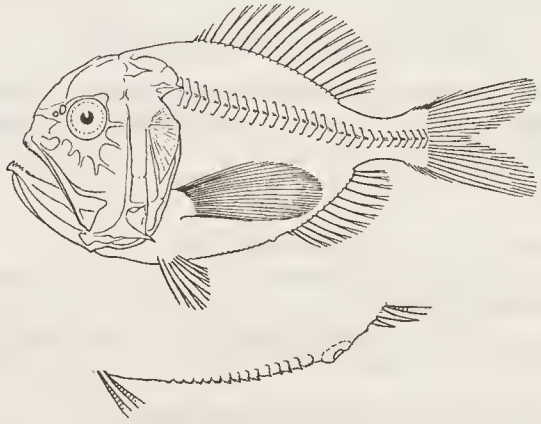
Colour in alcohol: body buff, with blackish colour of peritoneum showing through; all fins pale; spiny D membrane dusky distally; roof of mouth and inner side of operculum dark brown (RUSI 10548, 113 mm SL). Attains 14 cm. Known from off the Transkei, Somalia and the Philippines.

127.6 *Hoplostethus melanopus*
(Weber, 1913)

Leiogaster melanopus Weber, 1913: 180, Pl. 9, Fig. 7 (Moluccas, Indonesia). *Hoplostethus melanopus*: Karrer, 1973: 229*; Kotylar, 1980: 201*. *Hoplostethus natalensis* Kotlyar, 1978: 1681, Fig. (off Durban); 1980: 200*.

D IV-V,13-16; A II-III,8-10; P 18-20; total GR 21-22; LL 28; belly scutes 15-18, small, indistinct; scales deciduous. Body depth 50-57%, eye 10-12% SL.

Body and head brownish grey; fins dusky to blackish; gill and mouth cavities dark. Attains 25 cm. Indo-West Pacific from Indonesia to Natal, also off Namibia and Cape Town in 400 - 900 m.



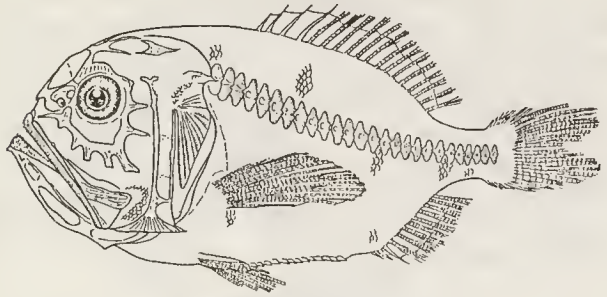
127.6 *Hoplostethus melanopus*: 21.5 cm and abdominal scutes (both after Norman, 1939).

127.7 *Hoplostethus tenebricus*
Kotlyar, 1980

Hoplostethus tenebricus Kotlyar, 1980: 203, Fig. 16 (off southern Mozambique, 26°46′S, 33°44′E, in 825 - 885 m).

D IV,14; A III,9; P 17-20(?); total GR 22; LL 25; belly scutes 17, small. Body depth 47%, eye 9.5% SL.

Body, head and fins dark grey. Attains 21 cm. A doubtful species known from only 1 specimen collected off southern Mozambique.



127.7 *Hoplostethus tenebricus:* 18 cm SL (after Kotlyar, 1980).

Family No. 128: MONOCENTRIDAE

by M.M. Smith

Pineapple fishes **Pynappelvisse**

Small, plump fishes with scales enlarged to form a solid rough armour. Dorsal fin with 5-7 strong spines; no anal fin spines; pelvic fin with 1 huge spine (which can be locked erect) and 3 or 4 tiny rays.

Pineapple fishes live in 20 - 200 m. An Indo-Pacific family of only 3 or 4 species. *Cleidopus* with apparently only 1 species (*C. gloriamaris* de Vis, 1882 of Australia) differs from *Monocentris* in having a very narrow preorbital bone and the light organ is on the side of the lower jaw (hidden when the mouth is closed).

Genus ***Monocentris*** Schneider, 1801

Two or 3 species; *M. reedi* Schultz, 1956 from off Chile differs from *M. japonicus* in having 16 lower GR instead of 12-14 and 18-19 plates along LL instead of 12-15. *M. neozelanicus* (Powell, 1938) is said to have vomerine teeth.

128.1 *Monocentris japonicus*
(Houttuyn, 1782)
PLATE 18

Pineapple fish Pynappelvis

Gasterosteus japonicus Houttuyn, 1782: 329, Pl. 2 (Sea of Japan). *Monocentris japonicus:* Smith, **SFSA No. 284*;** Smith & Smith, 1966: 119*.

D V-VI,11-12; A 9-11; P 14; V I,3; LL 12-15; GR 7+(12-14). Head scaleless, rough with large mucous cavities; D spines stout, without connecting membrane, sticking out alternately sideways when erect. Villiform teeth in jaws and palatines, vomer edentate.

Luminescent bacteria located in 2 black spots near lower jaw symphysis. A fascinating aquarium fish, especially at night. Attains 17 cm. Schools in clear water above rocky bottom; common in Japan; Indo-West Pacific and Red Sea south to Mossel Bay in 40 - 200 m.

Family No. 129: ANOMALOPIDAE

by J. E. McCosker

Flashlight fish **Flitsligvis**

A prominent luminous organ beneath each eye. Body deep or somewhat fusiform, laterally compressed. Dorsal fin continuous or divided into separate spinous and soft-rayed fins. Mouth oblique; snout blunt. Scales small, strongly ctenoid. Teeth small, in bands on jaws and palatines; none on vomer. Gill-rakers well developed.

Light from the subocular luminous organ is continuously produced by luminous bacteria and can be turned on or off by the fish with rotational or lid-like mechanisms to block the light. The light is used to see by, to communicate, to confuse predators and to attract prey. Adults live in deep water, probably below 100 m during the day, and ascend the reef to feed in shallow water during moonless nights. (See McCosker, 1977, for a review of their biology.) Rarely seen because of their nocturnal, secretive behaviour, flashlight fishes occur in all tropical oceans. Four genera with a total of 4 species. Two genera may be found in our area. Recently reviewed by Rosenblatt & Johnson (1982).

KEY TO GENERA

1a D single, continuous; luminous organ longer than eye, with a black eyelid-like flap that can be raised to cover the organ . . . . . *Photoblepharon*

1b D divided into separate spinous and soft-rayed fins; light organ shorter than eye, without a black flap to cover it . . . . . *Anomalops*
(*A. katoptron* (Bleeker), the only species of this genus, is known from Japan to the eastern Indian Ocean.)

Genus ***Photoblepharon*** Weber, 1902

Two subspecies; *P. palpebratus steinitzi,* known from the Comoro Ids. and Red Sea, may inhabit our area.

129.1 *Photoblepharon palpebratus steinitzi*
Abe & Haneda, 1973

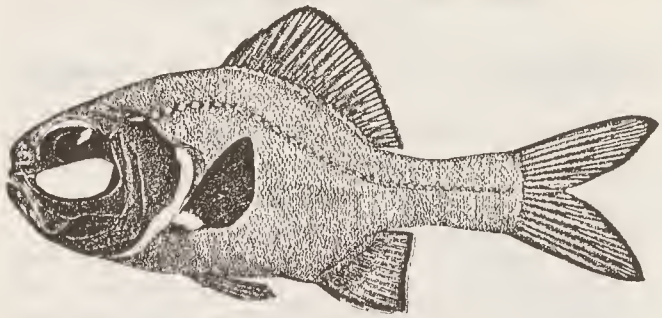
Flashlight fish Flitsligvis

Photoblepharon palpebratus steinitzi Abe & Haneda, 1973: 57, Figs. 1-4 (Ras Burka, Red Sea). *Photoblepharon palpebratus:* McCosker & Lagios, 1975: 2.

D II-III,16-18; A I-II,13-14; P 15-17; V I,5-6; GR (7-8)+(21-22). Depth 2.3-2.6; head 1.9-2.1. The Pacific subspecies, *P. palpebratus palpebratus* (Boddaert), which I have examined from Indonesia, the Philippines and the Marshall Ids., differs from *P. palpebratus steinitzi* by having a prominent white spot before the LL (weakly developed in *steinitzi*), a broader white band along the P base, and I,6 rather than I,5 V rays (rarely I,6 in

steinitzi). The analysis of further specimens may warrant full species recognition of these 2 taxa.

Body and fins dark brown to grey-black. Attains 10 cm. Although not yet recorded from southern Africa, flashlight fish may be found on coral reefs in our area.



129.1 *Photoblepharon steinitzi:* ca. 10 cm; the white area below the eye is luminous (off Grand Comoro).

Family No. 130: DIRETMIDAE

by A. Post

Diretmids **Diretmiede**

Body strongly compressed, disc-like or oval. Dorsal and anal fins continuous, without spines. Pelvic fins I,6; 1st spinous ray strong, its outer edge serrate. Scales ctenoid, covering body and cheeks. No lateral line. Eyes large, their diameter about half head length. Aggregates of epidermal glands on medial wall of gill chamber.

Adults mesopelagic below 500 m, juveniles epipelagic to mesopelagic. Occurring in all oceans, but nowhere of commercial importance. Two genera, both in our area. Recently revised by Post and Quero (1981).

KEY TO GENERA

1a Anus separated from A by more than 5 scutes; ventral midline normally scaled, not keeled anterior to V ..... *Diretmoides*

1b Anus immediately anterior to A or separated from it by only 1 or 2 scutes; ventral midline anterior to V keeled and covered by scutes ..... *Diretmus*

Genus ***Diretmoides*** Post & Quero, 1981

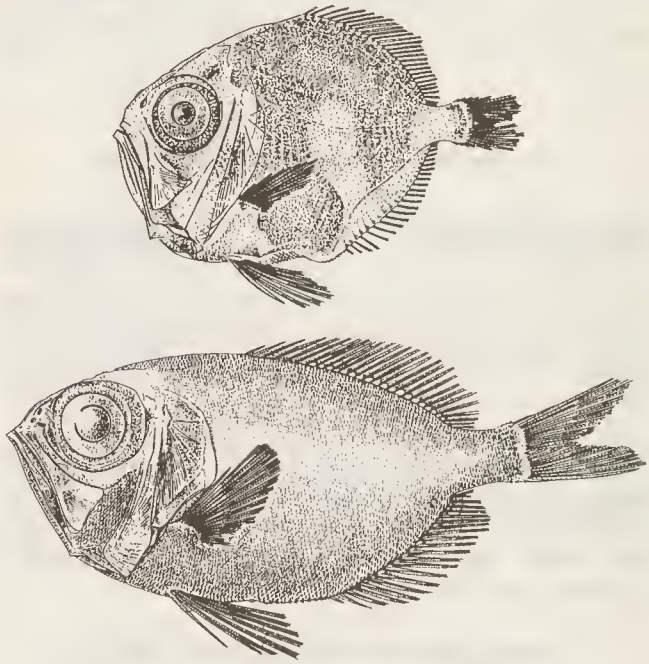
Two species. *D. pauciradiatus* (Woods, 1973) is strictly tropical and thus probably does not occur in our area; it has 24-26 D rays and 12-16 (total) GR.

130.1 *Diretmoides parini*
Post & Quero, 1981

Diretmoides parini Post & Quero, 1981: 49, Figs. 10a-h (off Spanish Sahara in 1 800 - 2 100 m). *Diretmus argenteus* (*non* Johnson): Barnard & Von Bonde, 1944: 236*; Woods & Sonoda, 1973: 291*. *Diretmus pauciradiatus* (*non* Woods): Post, 1976: 87* (in part).

D 26-29; A 20-23; P 17-20; GR (5-6)+(11-13); vertebrae 29-31; depth 1.4-2.2; head 2.5-2.9.

Metamorphosis from juveniles to adults: young juveniles with a cephalic spine directed caudally and a preopercular spine directed slightly rostrally; body disc-like in young specimens, pale, with large, dusky, horseshoe pattern on sides; body of adults oval, greyish black. Attains 40 cm. Juveniles epipelagic to mesopelagic; adults mesopelagic below 500 m; tropical to temperate in Atlantic Ocean, leaving a gap between 7°N and 17°S; probably circumglobal in southern oceans.



130.1 *Diretmoides parini:* top: 3.5 cm juvenile; bottom: 30 cm adult.

Genus ***Diretmus*** Johnson, 1863

This genus has recently been restricted to a single species (Post & Quero, 1981).

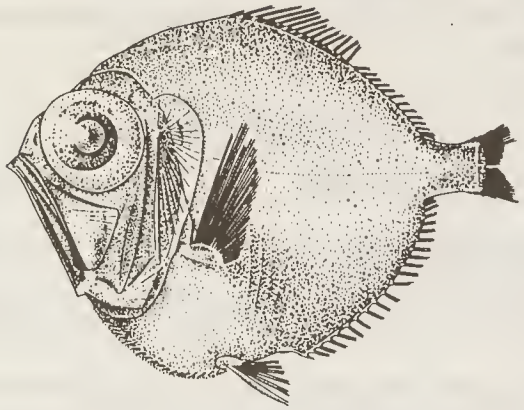
130.2 *Diretmus argenteus*
Johnson, 1863

Diretmus argenteus Johnson, 1863: 403, Pl. 36, Fig. 1 (Madeira); Smith, **SFSA No. 285*;** Hulley, 1972: 229; Karrer, 1973: 221; Post, 1976: 87*; Post & Quero, 1981: 37*.

D 25-29; A 19-24; P 17-20; GR (6-9)+(10-14); vertebrae 27-29. Depth 1.1-1.6; head 2.0-2.8.

Metamorphosis from juvenile to adult stages: cephalic and preopercular spines, both directed somewhat caudally in small juveniles; no spines on head in adolescents and adults. Body black dorsally, silvery on sides. Attains 15 cm.

Main depth range of adults: 500 - 700 m; eurytropical in all oceans.



130.2 *Diretmus argenteus:* 8+ cm.

Family No. 131: ANOPLOGASTERIDAE

by P.A. Hulley

Fangtooth **Skerptand**

Body deep, posteriorly compressed; caudal peduncle slender and tapering. Head deeper than long, with well-developed mucous cavities, covered by skin; opercular bones small. Eye small, subocular shelf absent. Mouth oblique, about as long as head; teeth fixed, fang-like and widely spaced (depressible in juveniles); largest fangs on each side of symphyses of jaws, those of lower jaw fitting into sockets in palate. Gill-rakers long and slender in juveniles, short, comprising groups of 1-3 spinules in adults. Branchiostegal rays 8-9. No fin spines, except at base of caudal fin. Scales thin, with numerous spines, on short pedicel embedded in skin.

Feeds on small fish and crustaceans. Worldwide pelagic distribution in 100 - 1 000 m; fairly common. One genus, *Anoplogaster* Günther, 1859, with 1 species.

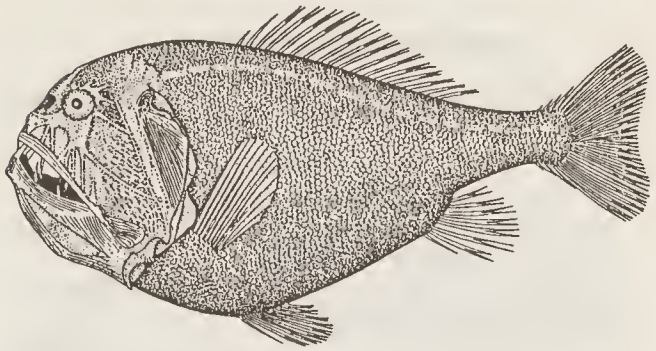
131.1 *Anoplogaster cornuta*
(Valenciennes, 1833)

Fangtooth Skerptand

Hoplostethus cornutus Valenciennes, *in* Cuv. & Val., 1833: 470 (southwest Atlantic Ocean). *Anoplogaster cornuta:* Woods & Sonoda, 1973: 387*.

D 17-20; A 8-9; P 14-16; V I,6; GR (7-11)+(7-11). Depth 1.7-1.8; head 2.7-2.8.

Uniform dark brown or black; iris blue in fresh specimens. Maximum size about 15 cm. In Agulhas Current to about 29°S; north of 35°S off West Coast (? outside Benguela Upwelling Region). Worldwide between 46°N and 46°S.



131.1 *Anoplogaster cornuta:* 8 cm SL.

Family No. 132: HOLOCENTRIDAE

by J.E. Randall & P.C. Heemstra

Squirrelfishes, soldierfishes **Soldaatvisse**

Body oblong to ovate, moderately compressed. Eyes large. Mouth moderate, the maxilla extending posterior to front edge of eye; teeth in jaws, on vomer and on palatines in villiform bands. Dorsal fin divided or continuous and deeply notched, with 10-13 spines and 11-18 soft-rays; anal fin with 4 spines and 7-16 soft-rays; pelvic fins with 1 spine and 7 soft-rays; caudal fin forked, with 17 branched rays. Scales strongly ctenoid; lateral line complete, the pored scales 25 to 56. Bones of head grooved and/or strongly ridged, the margins of those of operculum and the suborbitals with a series of spinules; some external head bones with spines. Nasal organ in a prominent subtriangular cavity (fossa) in front of eye. Vertebrae 26, 27 or 29. Usually red or partially red in colour.

Small to medium-sized fishes of tropical and subtropical seas on coral reefs or rocky bottom. Most species occur in shallow water but a few penetrate moderate depths (about 200 m). Tend to hide in caves during the day, coming out at night to feed on the larger animals of the zooplankton, benthic crustaceans and small fishes. Two distinct subfamilies: the Holocentrinae (3 genera) characterised by a long, stout spine (which may be venomous) at the corner of the preopercle, 7-10 anal soft-rays, and a moderately pointed snout; and the Myripristinae (5 genera) which lack a spine at the preopercular angle or have only a short broad-based spine (except the Atlantic genus *Corniger* Agassiz with 1 or 2 stout spines at angle), 10-16 anal soft-rays, some teeth in jaws outside the gape, and a blunter snout. There are also differences in the structure of the gasbladder and in the form of the otoliths. Shimizu and Yamakawa (1979) have reviewed the Holocentrinae of Japan, and Randall and Heemstra (1985) the Holocentrinae of the western Indian Ocean. Greenfield (1974) revised *Myripristis,* and Randall and Guézé (1981) supplemented this with a review of the coarse-scaled species of the genus.

Subfamily HOLOCENTRINAE

Squirrelfishes **Soldaatvisse**

KEY TO GENERA

1a Last D spine about equidistant from penultimate spine and 1st soft-ray; jaws about equal (rarely with lower jaw slightly protruding); body depth 2.3-3.5 in SL ..... *Sargocentron*

1b Last D spine much closer to 1st soft-ray than to penultimate spine; lower jaw projecting; body depth 2.9-3.7 in SL ..... *Neoniphon*

Genus ***Neoniphon*** Castelnau, 1875

Most authors have used the name *Flammeo* Jordan & Evermann (1898) for this genus. Randall & Heemstra (1985) have shown that it must be replaced by *Neoniphon* Castelnau (1875); the type-species, *N. armatus* Castelnau, is a synonym of *N. sammara* (Forsskål). *Neoniphon* contains 5 species, 1 of which is restricted to the Atlantic. Of the 4 Indo-Pacific species, only *N. sammara* is known from southern Africa; 3 other species are included in this account, as they may be found here.

KEY TO SPECIES OF THE WESTERN INDIAN OCEAN

1a Scales above LL to base of middle D spines 3½; LL scales 42-47; body silvery pink with yellow longitudinal stripes ..... *N. aurolineatus*

1b Scales above LL to base of middle D spines 2½; LL 36-43; no yellow stripes on body 2

2a P rays usually 13; spinous D pale (clear) with some dark red streaks distally, but no black markings ..... *N. argenteus*

2b P rays usually 14; spinous D with large black markings 3

3a A rays 7 or 8; large black spot on 1st 3 D membranes ..... *N. sammara*

3b A rays 9; broad, median, black band across entire spinous D ..... *N. opercularis*

132.1 *Neoniphon argenteus*
(Valenciennes, 1831)
PLATE 19

Silver squirrelfish **Silwer soldaat**

Holocentrum argenteum Valenciennes, *in* Cuv. & Val., 1831: 502 (New Guinea). *Holocentrus laeve:* Smith, 1955: 308. *Neoniphon argenteus:* Randall & Heemstra, 1985: 3*.

D XI/11-13; A IV,7-9; P 12-14; LL 38-43; oblique rows of cheek scales 4; GR (5-7)+(9-12). Body depth 3.0-3.7, head length 2.7-3.4 in SL.

Head and body silvery, the scales often with a blackish spot in centre (except LL scales, which have a black-edged, pale red spot); spinous D translucent, outer edge white, the 1st 2 membranes with some red colour below the white; other fins whitish, except C lobes broadly red on upper and lower margins and anterior soft D and A rays, which are also reddish. Attains 24 cm. Primarily an insular form of the Indo-West Pacific; in western Indian Ocean from northern Mozambique, Tanzania, Aldabra, Seychelles, Maldives, Laccadives and Chagos Archipelago; probably occurs in our area.

132.2 *Neoniphon aurolineatus*
(Liénard, 1839)

Yellow-striped squirrelfish **Geelstreep-soldaat**

Holocentrum auro-lineatum Liénard, 1839: 32 (Mauritius). *Neoniphon aurolineatus:* Randall & Heemstra, 1985: 3*.

D XI/12-14; A IV,8-9; P 13-15; LL 42-47; oblique rows of cheek scales 5; GR (5-7)+(11-13). Body depth 3.0-3.3, head length 2.8-3.1 in SL.

Body silvery pink with yellow stripes following scale rows; 1st 2 interspinous D membranes mostly orange-red; tips of spinous D membranes white, as well as front part of each membrane posterior to 3rd spine, rest of membranes a mixture of red and yellow; V white; rest of fins pale red. Attains 22 cm. Widely distributed but apparently rare; most specimens have been caught in 40 - 70 m. Mauritius, Réunion and Comoro Ids.; also southern Japan, Hawaii and a few localities in the western Pacific; not yet reported from southern Africa.

132.3 *Neoniphon opercularis*
(Valenciennes, 1831)
PLATE 21

Blackfin squirrelfish **Swartvin-soldaat**

Holocentrum operculare Valenciennes, *in* Cuv. & Val., 1831: 501 (New Ireland). *Holocentrus opercularis:* Smith, 1955: 5*; 1961: 566, **No. 296b.** *Neoniphon opercularis:* Randall & Heemstra, 1985: 4*.

D XI/12-14; A IV,8-9; P 14; LL 36-41; oblique rows of cheek scales 5; GR (5-8)+(11-13). Body depth 2.9-3.3, head length 2.7-3.1 in SL.

Body iridescent silvery with dark red or black mark on each scale; spinous D black, except membrane tips and base of each membrane, which are white; soft D, A and C reddish yellow; P pink, V white; operculum blackish. Attains about 35 cm. Much less common than *N. sammara,* though it occurs in the same habitat. Tropical Indo-West Pacific from Bazaruto, Mozambique (21°31'S) to Japan and French Polynesia; not in the Red Sea.

132.4 *Neoniphon sammara*
(Forsskål, 1775)
PLATE 19

Spotfin squirrelfish **Kolvin-soldaat**

Sciaena sammara Forsskål, 1775: 48 (Jeddah, Red Sea). *Holocentrus sammara:* Smith, **SFSA No. 294*;** 1964: 295. *Neoniphon sammara:* Randall & Heemstra, 1985: 4*.

D XI/11-13; A IV,8; P 13-15; LL 38-43; oblique rows of cheek scales 4 or 5; GR (6-8)+(10-13). Body depth 3.0-3.6, head length 2.9-3.2 in SL.

Body pinkish silver dorsally, silvery below, with a dark reddish black spot on each scale and a reddish stripe along LL; large reddish black blotch on 1st 3 D membranes; outer margin of C lobes and anterior soft-rays of D and A reddish; P pale pink, V white. Attains 30 cm. A common shallow-water species, usually found on patch reefs of branching corals. Feeds at night, mainly on crustaceans. Tropical Indo-Pacific from the Red Sea to Hawaii and the Pitcairn Group, Australia and Japan; south to Durban. J.L.B. Smith (1964: 295) reported a 195 mm specimen from 405 metres off Durban; this depth is far beyond the usual range of this species, and we suspect that the specimen was mislabelled.

Genus ***Sargocentron*** Fowler, 1904

Early naturalists included species of this genus in *Holocentrus,* which is now restricted to 2 Atlantic species. Recent workers have used the genus *Adioryx* for these fishes, but *Sargocentron* is an older synonym. The genus comprises about 26 species, of which 5 occur in the Atlantic, 1 in the eastern Pacific, and 5 in our area. Ten other western Indian Ocean species, at present extralimital to southern Africa, are included in this book, as they may be found in our area.

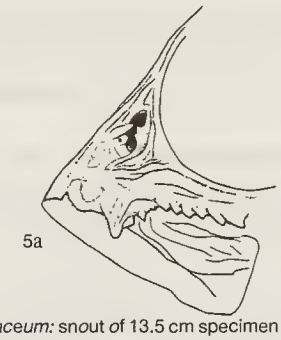
KEY TO SPECIES OF THE WESTERN INDIAN OCEAN

1a Scales above LL to base of middle D spines 3½; lower jaw slightly projecting; spinous D uniform dark red, without dark or pale markings; large, oval, dark red spot on preopercle behind eye ..... *S. spiniferum*
1b Scales above LL to base of middle D spines 2½; lower jaw not projecting; colour not as in 1a 2

2a One or 2 prominent retrorse spines on nasal bone between nasal fossa and premaxillary groove; medioposterior margin of nasal bone (hence edge of premaxillary groove) with 1 or 2 small retrorse spines; maximum SL probably less than 80 mm 3
2b No spines between nasal fossa and premaxillary groove; no spines on edge of premaxillary groove (except in *S. microstoma*); maximum SL 130 mm or more 4

3a Preopercular serrae irregular in size (especially on lower ½ of vertical limb) with some spines 3 or 4 times longer than adjacent ones; P rays 14; upper jaw reaching vertical at centre of eye, 2.6-2.8 in head length ..... *S. inaequalis*
3b Preopercular serrae regular; P rays usually (90% of specimens) 15; upper jaw not reaching past vertical at front edge of pupil, 2.9-3.2 in head length ..... *S. macrosquamis*

4a LL 33-39 5
4b LL 38-55 9

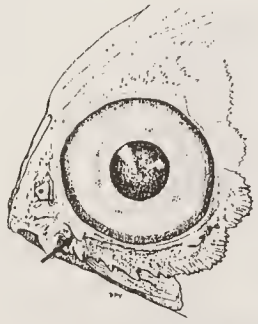


Sargocentron violaceum: snout of 13.5 cm specimen showing nasal fossa with 3 spines.

5a Margin of nasal fossa with 1 or more spinules (except some Red Sea specimens of *S. melanospilos*) 6
5b Margin of nasal fossa usually without spinules 7

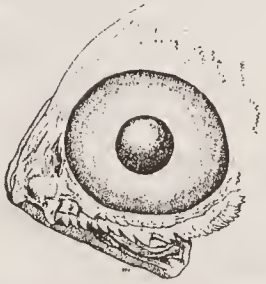
6a D rays 14 (rarely 13); body depth 2.3-2.6 in SL; spinous D membrane not incised between the spines; body dark brown to purplish red, with a silvery white vertical line on each scale ..... *S. violaceum*
6b D rays 13; body depth 2.6-3.0 in SL; spinous D membrane distinctly incised between the spines; body with alternating stripes of silvery white and orange-red ..... *S. melanospilos*

7a Upper jaw length 2.3-2.7 in head; LL scales usually 34-36; a large, laterally projecting, slightly retrorse spine (sometimes 2) at upper edge of preorbital bone (below front edge of orbit), followed by a row of much smaller spinules; spinous D membrane tips white with a submarginal zone of red 8



Sargocentron praslin: front of head of 14.5 cm specimen showing large suborbital spine below front edge of orbit.

7b Upper jaw length 2.2-2.45 in head; LL scales 35-39; a row of subequal, retrorse spines along upper edge of preorbital bone, the 1st spine slightly larger than the others; spinous D membrane tips broadly yellow ... *S. seychellense*



Sargocentron seychellense: head of 12.5 cm specimen showing row of spines along upper edge of suborbital bones.

8a Oblique rows of scales on cheek 4; upper jaw length 2.3-2.6 in head; dark pigment of V mainly on 1st ray .... *S. praslin*
8b Oblique rows of scales on cheek 5; upper jaw length 2.5-2.7 in head; dark pigment of V confined to tips of 2nd to 6th rays and distal margin of fin ..... *S. rubrum*

9a LL 38-43; preopercular spine usually more than ⅔ eye diameter 10
9b LL 41-55; preopercular spine shorter than ⅔ eye diameter (except in *S. tiere*, which has 46-52 LL scales) 11

10a Premaxillary groove not reaching past a vertical at front edge of orbit; oblique rows of scales on cheek 5; D rays usually 14; edge of nasal fossa with or without spinules; body red, without stripes; prominent silvery white spot on peduncle at D base, or C peduncle and entire rear ⅓ of body silvery white ..... *S. caudimaculatum*
10b Premaxillary groove reaches well past vertical at front edge of orbit; oblique rows of scales on cheek 4; D rays usually 13; no spinules at edge of nasal fossa; alternating stripes of red and silvery white on body; no silvery white spot on peduncle ..... *S. tiereoides*

11a Preopercular spine of adults ⅔ or more of eye diameter; longest D spine 2.6-3.5 in head; body red with faint silvery stripes, those on lower part showing blue iridescence; attains 27 cm SL ..... *S. tiere*
11b Preopercular spine of adults ½ or less of eye diameter; longest D spines 1.5-2.3 in head; body distinctly striped with red and silvery white; not exceeding 16 cm SL 12

12a Medioposterior margin of nasal bone with 1 or 2 spinules; LL 48-55; body elongate, the depth 2.9-3.5 in SL ..... *S. microstoma*

Sargocentron microstoma: dorsal view of snout of 15 cm specimen showing spinule on each side of maxillary groove.

12b Medioposterior margin of nasal bone without spinules; LL 41-49; body depth 2.7-3.3 in SL 13

13a Interorbital width greater than snout length; V 1.5-1.75 in head; body usually covered with blackish dots ..... *S. punctatissimum*
13b Interorbital width subequal to or shorter than snout length; V 1.25-1.5 in head; body not covered with blackish dots 14

14a P rays usually 14; spinous D reddish black (membrane tips white), with a more or less distinct longitudinal white band along front half of fin usually present; longitudinal body stripes distinct on preserved specimens ..... *S. diadema*
14b P rays usually 15; spinous D red (membrane tips white), with a curved white band along middle of fin formed by a series of white spots (1 per interspinous membrane) beginning at base of 1st membrane; longitudinal body stripes faint on preserved specimens and usually a dusky blotch on 1st 1 or 2 interspinous D membranes ..... *S. ittodai*

132.5 *Sargocentron caudimaculatum*
(Rüppell, 1838)
PLATE 19

Tailspot squirrelfish — Stertkol-soldaat

Holocentrum caudimaculatus Rüppell, 1838: 103 (on *Holocentrus spinifer* (*non* Forsskål): Rüppell, 1829: 86, Pl. 23, Fig. 1; Red Sea). *Holocentrus andamanensis:* Smith, 1951: 50*; 1953: 515, **No. 297b*.** *Holocentrus caudimaculatus:* Smith, 1955: 5; 1961: 566, **No. 296a.** *Sargocentron caudimaculatum:* Randall & Heemstra, 1985: 7*.

D XI/13-15; A IV,9; P 13-15; LL 38-43; body depth 2.5-2.9, head length 2.4-3.1 in SL; preopercular spine subequal to eye diameter.

Head and body red, the scales edged in silver; a silvery white spot anterodorsally on C peduncle (often disappearing after death; sometimes entire rear ½ of body is silvery white); horizontal white line along upper edge of opercle; spinous D mottled light red, the outer part of the membranes bright red. Attains about 25 cm. Red Sea and Indo-Pacific; south to Xora River mouth, Transkei; relatively common at Sodwana Bay.

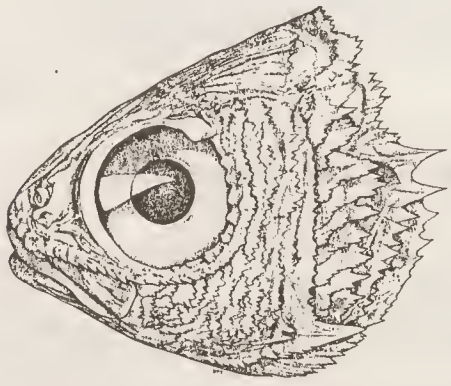
132.6 *Sargocentron diadema*
(Lacepède, 1801)
PLATE 19

Crown squirrelfish — Kroon-soldaat

Holocentrus diadema Lacepède, 1801: Pl. 32, Fig. 3; 1802: 335, 372 (no locality); Smith, SFSA **No. 296*;** 1964: 295. *Sargocentron diadema* Randall & Heemstra, 1985: 8*.

D XI/12-14; A IV,8-10; P 13-15; LL 46-50; oblique rows of cheek scales 5-6; GR (5-7)+(12-14). Body depth 2.7-3.2, head length 2.9-3.5 in SL; nasal fossa small, without spinules.

Body with alternating stripes of red and silvery white, the red stripes much broader than the white; C peduncle whitish. Attains 17 cm. An abundant coral-reef species, usually found in depths of 2 - 30 m; Smith (1964) reported a specimen from 405 m off Durban, but we suspect that the specimen was mislabelled. Wide-ranging in the Indo-Pacific; south to East London.



132.6 *Sargocentron diadema:* head of 5 cm small juvenile.

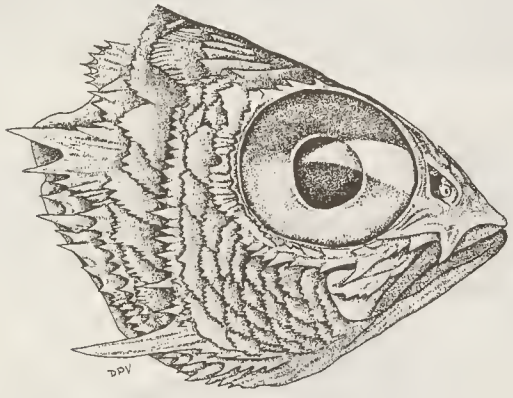
132.7 *Sargocentron inaequalis*
Randall & Heemstra, 1985
PLATE 19

Lattice squirrelfish — Latwerk-soldaat

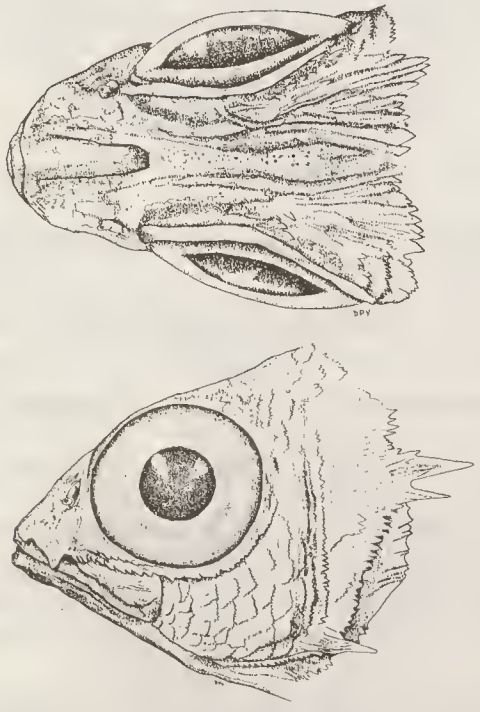
Sargocentron inaequalis Randall & Heemstra, 1985: 8, Fig. 6, Pl. 1, Fig. G (Chagos Archipelago).

D XI/13; A IV,9; P 13 or 14 (usually 14); LL 38-41; scales from LL to middle D spines 2½; oblique rows of cheek scales 4-6; GR (6-7)+(11-13). Body depth 2.5-2.7, head length 2.5-2.6 in SL.

Head, body and fins red; lateral and ventral body scales mostly white with red margins forming narrow longitudinal red lines joined by the curved lines of the posterior edges of the scales; no black or white markings on fins. Attains 7 cm. Known only from Chagos Archipelago, Comoro Ids. and the Seychelles.



132.7 *Sargocentron inaequalis:* head of 7 cm holotype.



132.8 *Sargocentron ittodai:* dorsal and lateral views of head of 9.5 cm specimen.

132.8 *Sargocentron ittodai*
(Jordan & Fowler, 1903)
PLATE 19

Samurai squirrelfish — Samurai-soldaat

Holocentrus ittodai Jordan & Fowler, 1903: 16, Fig. 4 (Okinawa, Japan). *Sargocentron ittodai:* Randall & Heemstra, 1985: 10*.

D XI/13-14; A IV,8-10; P 14-16; LL 43-47; oblique rows of cheek scales 5; GR (5-7)+(12-14). Body depth 2.8-3.1, head length 2.8-3.1 in SL.

Body with red and white stripes following the scale rows, the red stripes slightly narrower than the white ones; inner surface of P base with a black spot. Attains 17 cm (20 cm in Japan). Red Sea and Indo-West Pacific from northern Natal to Japan, Australia and the Marquesas Ids; rare in our area.

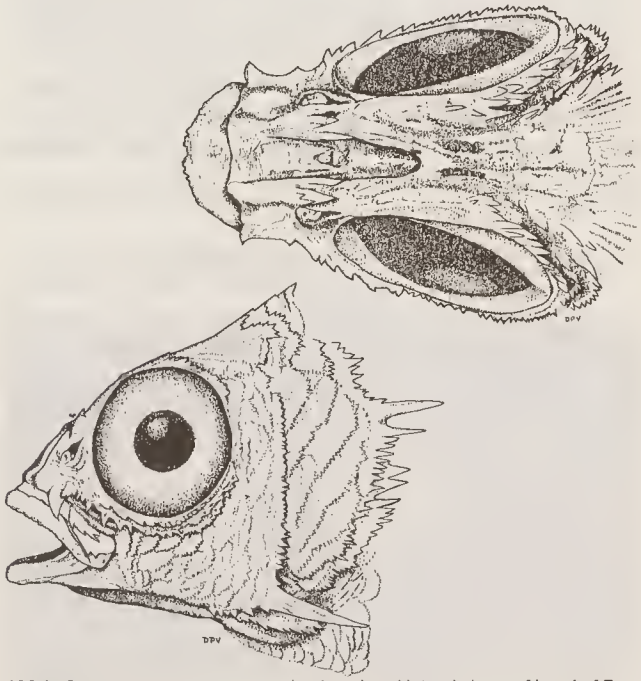
132.9 *Sargocentron macrosquamis*
Golani, 1984

Dwarf squirrelfish — Dwerg-soldaat

Sargocentron macrosquamis Golani, 1984: 40, Figs. 1 & 2 (D'Arros Id., Amirante Group, Seychelles); Randall & Heemstra, 1985: 11*.

D XI/13-14; A IV,9-10; P 14-16; LL 40-45; cheek scales not in distinct oblique rows; GR (5-7)+(10-13). Body depth 2.3-2.5, head length 2.45-2.7 in SL; 1 or 2 retrorse spines between nasal fossa and edge of premaxillary groove; 1 or 2 minute spines on edge of premaxillary groove; scales on opercle much larger than those on preopercle.

Life colour unknown. Maximum TL = 9 cm. Red Sea and several localities in western Indian Ocean; probably occurs in our area, but at present, the southernmost record is Mozambique Id.



132.9 *Sargocentron macrosquamis:* dorsal and lateral views of head of 7 cm specimen.

132.10 *Sargocentron melanospilos*
(Bleeker, 1858)
PLATE 19

Blackspot squirrelfish — Swartkol-soldaat

Holocentrum melanospilos Bleeker, 1858: 2 (Ambon). *Holocentrus cornutus* (*non* Bleeker): Smith, 1955: 308; Smith & Smith, 1963: 9*. *Sargocentron melanospilos:* Randall & Heemstra, 1985: 12*.

D XI/12-14; A IV,9-10; P 14; LL 33-36; oblique rows of cheek scales 5; GR (6-8)+(10-12). Body depth 2.6-3.0, head length 2.7-3.1 in SL; edge of nasal fossa with 1-4 spinules; preopercular spine length ½ or more of orbit diameter.

Body with red and white stripes following the scale rows; black blotch at base of soft D, A and C (black spot at base of C and A may be faint or absent); black blotch in axil of P. Attains 20 cm (25 cm in Japan). Red Sea and western Indian Ocean (Seychelles, Aldabra and Zanzibar) to Japan, Australia, New Caledonia and American Samoa; probably occurs in our area.

132.11 *Sargocentron microstoma*
(Günther, 1859)

Slender squirrelfish — Slank soldaat

Holocentrum microstoma Günther, 1859: 34 (Ambon); 1875: 98*. *Sargocentron microstoma:* Randall & Heemstra, 1985: 13*.

D XI/12-14; A IV,9-10; P 14-15; LL 48-55; oblique rows of cheek scales 5; GR (6-8)+(13-15). Body depth 3.0-3.5, head length 2.8-3.4 in SL; preopercular spine less than ½ orbit diameter.

Body with red and white stripes of variable widths; head reddish dorsally, silvery below; faint red band from eye to angle of preopercle; spinous D white, with a submarginal zone of red. Preserved fish usually with a dark blotch on 1st 2 D membranes. Attains 20 cm. Indo-West Pacific; apparently rare in the western Indian Ocean, where it is known only from Chagos Archipelago, Astove Id. and the Maldives.

132.12 *Sargocentron praslin*
(Lacepède, 1802)
PLATES 20 & 21

Dark-striped squirrelfish — Donkerstreep-soldaat

Perca praslin Lacepède, 1802: 397, 418 (Port Praslin, New Britain). *Holocentrus rubrum* (*non* Forsskål): Smith, **SFSA No. 295***. *Holocentrus ruber* (*non* Forsskål): Smith & Smith, 1963: 9*. *Sargocentron praslin:* Randall & Heemstra, 1985: 14*.

D XI/12-13; A IV,8-9; P 13-15; LL 33-36; oblique rows of cheek scales 4; GR (6-8)+(10-12). Body depth 2.5-2.8, head length 2.6-3.0 in SL. Upper edge of preorbital with a prominent, laterally projecting spine below front edge of orbit, followed by a row of much smaller, retrorse spinules.

Body white with longitudinal, dark brownish red stripes; dark brown blotch at base of soft D; spinous D membrane tips white, then a dark brownish red submarginal band, a broad zone of whitish suffused with red, and dark red at base of fin. Attains 25 cm. Indo-West Pacific; reported by Smith (**SFSA**) to reach Durban, but there are no specimens available from south of Ibo, Mozambique (15°S).

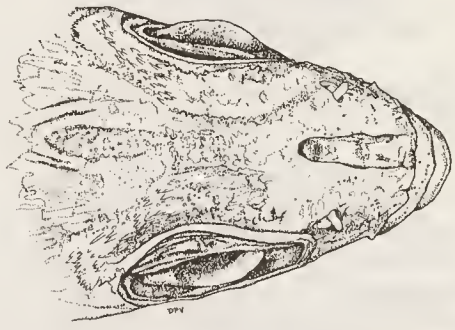
132.13 *Sargocentron punctatissimum*
(Cuvier, 1829)
PLATE 20

Speckled squirrelfish — Gespikkelde soldaat

Holocentrum lacteo-guttatum Cuvier, *in* Cuv. & Val., 1829: 214 (Indian Ocean). *Holocentrum punctatissimum* Cuvier, *in* Cuv. & Val., 1829: 215 (Strong Id., Caroline Ids.). *Holocentrus lacteoguttatus:* Smith, **SFSA No. 297***; 1955: 308; Smith & Smith, 1963: 9*. *Sargocentron punctatissimum:* Randall & Heemstra, 1985: 15*.

D XI/12-14; A IV,9; P 14-16; LL 41-47; oblique rows of cheek scales 5; GR (5-7)+(10-12). Body depth 2.7-3.1, head length 3.0-3.5 in SL; interorbital shelf present on anterodorsal edge of orbit; nasal fossa without spines; preopercular spine about ½ orbit diameter.

Body reddish silver, iridescent bluish dorsally; scales finely dotted with black; spinous D silvery white, with broad red margin. Attains 16 cm. Red Sea and Indo-Pacific (east to Hawaiian Ids. and Easter Id.); south to Algoa Bay. Occurs along rocky shores and coral reefs exposed to wave action; often seen in very shallow water.



132.13 *Sargocentron punctatissimum:* dorsal view of head of 9 cm specimen.

132.14 *Sargocentron rubrum*
(Forsskål, 1775)
PLATE 20

Russet squirrelfish — Rooibruin soldaat

Sciaena rubra Forsskål, 1775: 48 (Red Sea). *Sargocentron rubrum:* Randall & Heemstra, 1985: 16*.

D XI/12-14; A IV,8-10; P 13-15; LL 34-38; oblique rows of cheek scales 5; GR (6-8)+(9-12). Body depth 2.4-2.8, head length 2.7-2.9 in SL; a large, laterally projecting, slightly retrorse spine (sometimes 2) at upper edge of preorbital (below front edge of orbit) followed by a row of much smaller spinules; nasal fossa usually without spinules; no spines on nasal bones.

Body with subequal stripes of brownish red and silvery white; spinous D dark red with a large, quadrangular,

whitish blotch in middle of each membrane (except the 1st) forming a median band; D membrane tips white, except posteriorly. Attains 27 cm. Generally found on reef or rocky areas of protected inshore waters. Red Sea and Indo-West Pacific; not known from any islands in western Indian Ocean, nor from east coast of Africa, but it may occur here.

132.15 *Sargocentron seychellense*
(Smith & Smith, 1963)
PLATES 20 & 21

Yellow-tipped squirrelfish — Geeltip-soldaat

Holocentrus seychellensis Smith & Smith, 1963: 9, Pl. 87, Fig. E (Mahé, Seychelles); Smith, 1963: 33. *Sargocentron seychellense:* Randall & Heemstra, 1985: 18*.

D XI/12 or 13 (rarely 12); A IV,8-10; P 13-15; LL 35-39; oblique rows of cheek scales 5; GR (6-7)+(10-12). Body depth 2.4-2.7, head length 2.6-2.9 in SL; upper edge of preorbital with a row of posterolaterally projecting spines, the anteriormost largest; nasal bone and fossa without spinules.

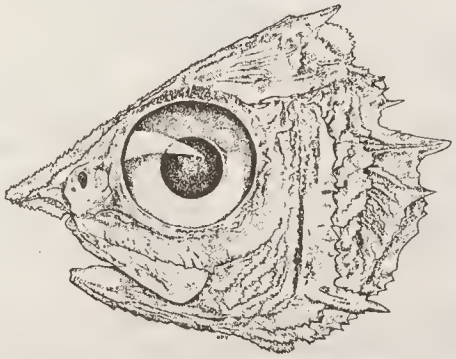
Body with subequal stripes of reddish brown and silvery white; spinous D mostly white, the membrane tips yellow, the basal part of fin red, except base of 1st 2 membranes, which are whitish; other fins pale yellowish, except upper and lower edges of C, 4th A spine and distal part of 1st A ray, which are red, and anterior edge of A and V, which are white; P base and axil dark brown. Attains 25 cm. A shallow-water species of coral reefs and rocky shores. Known only from the Seychelles, Mauritius, Madagascar, Chagos Archipelago and St. Brandon Shoals. The record of *"A. seychellensis"* from Maputaland (Smith, 1980) is erroneous.

132.16 *Sargocentron spiniferum*
(Forsskål, 1775)
PLATE 20

Sabre squirrelfish — Sabel-soldaat

Sciaena spinifera Forsskål, 1775: 49 (Jeddah, Red Sea). *Holocentrus spiniferus:* Smith, 1951: 49*; 1953: 515, **No. 297a***; Smith & Smith, 1963: 9*. *Sargocentron spiniferum:* Randall & Heemstra, 1985: 19*.

D XI/14-16; A IV,9 or 10 (usually 10); P 14-16; LL 41-45; oblique rows of cheek scales 5; GR (6-7)+(12-14). Body depth 2.4-2.6, head length 2.5-3.1 in SL; preopercular spine usually longer than orbit diameter in fish greater than 20 cm SL; nasal bone and fossa without spinules posteriorly; anterior end of nasal bone usually with 1 or 2 short spines; spinous D membrane not incised between the spines.



132.16 *Sargocentron spiniferum:* head of 3.5 cm post-larval specimen.

Head and body red, the edges of the scales silvery white; spinous D uniform crimson; other fins mainly orange-yellow; a vertically oblong crimson spot on preopercle behind eye; P axil with a crimson blotch divided by a white line. The largest of the squirrelfishes; attains about 45 cm. A coral-reef species usually found in caves, from which it emerges at night to feed on crustaceans, especially crabs. Red Sea and east coast of Africa south to Natal, east to French Polynesia and the Pitcairn Group.

132.17 *Saragocentron tiere*
(Cuvier, 1829)
PLATE 20

Red squirrelfish — Rooi soldaat

Holocentrum tiere Cuvier, *in* Cuv. & Val., 1829: 202 (Tahiti). *Sargocentron tiere:* Randall & Heemstra, 1985: 20*.

D XI/13-15; A IV,9; P 13-15; LL 46-52; oblique rows of cheek scales 5; GR (7-9)+(13-16). Body depth 2.7-3.0, head length 2.9-3.3 in SL; nasal fossa, posterior part of nasal bone and upper edge of preorbital without spines; anterior end of nasal bone with 2 short spines; preopercular spine about ⅔ eye diameter.

Head and body red, without distinct white stripes or markings; fins red; tips of spinous D membrane white, and an oblong white spot at middle of all membranes except 1st 2. Attains 33 cm. An insular coral-reef species from Mauritius, Chagos Archipelago, Aldabra and the Seychelles to the Pitcairn Group and the Hawaiian Ids.

132.18 *Sargocentron tiereoides*
(Bleeker, 1853)
PLATE 20

Pink squirrelfish — Pienk soldaat

Holocentrum tiereoides Bleeker, 1853: 334 (Ambon). *Sargocentron tiereoides:* Randall & Heemstra, 1985: 20*.

132.18 *Sargocentron tieroides:* 4 cm SL juvenile (Chagos Ids.; photo by J.E. Randall).

D XI/12-14; A IV,9-10; P 13-14; LL 39-44; oblique rows of cheek scales 4; GR (6-8)+(12-14). Body depth subequal to head length, 2.7-3.0 in SL. Front end of nasal bone with 2 short diverging spines, the posterior part without spinules; preopercular spine about ⅔ orbit diameter.

Body silvery pink with longitudinal red stripes; spinous D pink with a submarginal dark red band, the membranes tipped with white. Attains 16 cm. Rare. Indo-West Pacific: Christmas Id. (eastern Indian Ocean), Indonesia, Philippines, New Guinea to the Society Ids.; in the western Indian Ocean known only from 1 specimen from Mozambique Id., 3 from Chagos Archipelago and 1 from the Comores.

132.19 *Sargocentron violaceum*
(Bleeker, 1853)
PLATES 20 & 21

White-edged squirrelfish — Witrand-soldaat

Holocentrum violaceum Bleeker, 1853: 335 (Ambon). *Holocentrus violaceus:* Smith & Smith, 1963: 9*. *Sargocentron violaceus:* Randall & Heemstra, 1985: 21*.

D XI/12-14 (usually 14); A IV,9; P 13-14; LL 33-37; oblique rows of cheek scales 4-5; GR (6-8)+(12-13). Body deep, the depth 2.3-2.6 in SL; head length distinctly less than body depth, 2.6-3.0 in SL. Front end of nasal bone with 2 short diverging spines, the posterior part usually without spinules; edge of nasal fossa with 1-3 spinules; preopercle spine subequal to orbit diameter. Spinous D membrane not incised between the spines.

Body brownish to purplish red, each scale with a vertical silvery white line; head primarily red, membrane along upper/rear edge of opercle blackish; spinous D membrane pale red, the membrane tips white, with a submarginal scarlet line. Attains 25 cm. Tropical Indo-West Pacific; known in the Indian Ocean only from Aldabra, Seychelles, Chagos Archipelago and the Laccadive Ids.

Subfamily MYRIPRISTINAE

Soldierfishes — **Soldaatvisse**

KEY TO GENERA

1a D spines 11; D divided to the base between spines 10 and 11; lower-limb GR 19-32 ..... *Myripristis*
1b D spines 12 (*Ostichthys delta* with 11); D continuous, though deeply notched; lower-limb GR 11-18 2

2a Premaxillary groove (between nasal bones) broadly V-shaped ..... *Ostichthys*
2b Premaxillary groove narrow and elongate or rhomboidal 3

3a LL 28-30; preorbital bone with sharp spines overhanging upper jaw; a small tooth patch on posteroventral surface of premaxillary symphysis (see Fig. 132.35, p. 427) ..... *Pristilepis*
3b LL 32-42; preorbital without spines overhanging upper jaw; no tooth patch on premaxillary symphysis ..... *Plectrypops*

Genus *Myripristis* Cuvier, 1829

No enlarged spine at angle of preopercle; vertebrae 26; penultimate D spine shortest. Twenty-one species (1 Atlantic, 3 eastern Pacific, the rest Indo-Pacific, 1 of which also ranges to the eastern Pacific); 7 species in our area; 4 others are known from islands of the western Indian Ocean, including Mauritius and/or Réunion; these 4 additional species are included in this account as they may be found in our area.

KEY TO SPECIES

1a LL 26-32 2
1b LL 32-44 8

2a A single scale (rarely 2) on inner (medial) side of P base; margin of median fins broadly black (broadest on lobes of C and elevated parts of soft D and A); spinous D blackish with a submarginal unpigmented zone; size to 25 cm SL ..... *M. adusta*
2b Either no scales or numerous scales in axil of P; margins of median fins not black (although there may be a black blotch or streak distally on C lobes or on elevated parts of soft D and A); spinous D not blackish 3

3a Two pairs of symphysial tooth patches, one above the other, at tip of lower jaw just outside mouth (lower pair usually absent in specimens smaller than 9 cm SL; LL 25-29 4
3b A single pair of tooth patches (1 on each side of symphysis) at tip of lower jaw just outside gape; LL 27-32 5

4a Small scales on inner side of P base; total GR 36-43; no black markings on fins; maximum size, 16 cm SL ..... *M. hexagona*
4b No scales on inner side of P base; prominent black blotch distally on C lobes and elevated portions of soft D and A; total GR 32-38; maximum size, 24 cm SL ..... *M. melanosticta*

5a Scales on upper part of body with broad blackish rims (deep purplish or blue to dark brown in life); interorbital space and nape almost completely dark; upper-limb GR 12-16 (modally 14); LL 27-29 ..... *M. violacea*
5b Scales on upper part of body without blackish rims; upper-limb GR 11-15 (modally 12 or 13); LL 27-32 (modally 29, except *seychellensis* with 28) 6

6a Jaws equal or lower jaw slightly inferior when mouth fully closed; posterior border of vomerine tooth patch rounded (at least in adults); D rays 15 ..... *M. seychellensis*
6b Lower jaw projecting when mouth closed (except juveniles); posterior border of vomerine tooth patch usually straight; D rays 13-15 7

7a Least bony interorbital width 4.3-5.8 in head; horizontal diameter of orbit = vertical diameter; a broad orangish yellow zone on outer part of spinous D ..... *M. berndti*
7b Least bony interorbital width 3.7-4.4 in head; horizontal diameter of orbit < vertical diameter; outer part of spinous D red ..... *M. murdjan*

8a Dark brown bar from upper end of gill opening to P axil; A rays 14-16; D rays 15-17; LL scales 37-44 ..... *M. kuntee*
8b Dark brown pigment in region of gill opening, if present, confined to opercular membrane; A rays 11-15; D rays 13-16; LL 32-40 9

9a Dark brown pigment of opercular membrane ending at opercular spine or slightly below; A rays 13-15; D rays 14-16; front of lower jaw fitting into a shallow notch in upper jaw ..... *M. pralinia*
9b Dark brown pigment of opercular membrane, when present, extending well below opercular spine (usually to level of upper P base); A rays 11-13; D rays 13-15; front of lower jaw fitting into a deep notch in upper jaw 10

10a No dark brown pigment on opercular membrane; fins orange-red, the spinous D tips white; LL 35-40 ..... *M. vittata*
10b Opercular membrane dark brown; C and much of D, A and V yellow, the spinous D not tipped with white; LL 32-38 ..... *M. chryseres*

132.20 *Myripristis adusta*
Bleeker, 1853
PLATE 21

Shadowfin soldier — Skaduvin-soldaat

Myripristis adustus Bleeker, 1853: 108 (Ambon); Smith, **SFSA No. 298a;** Greenfield, 1974: 27*. *Myripristis melanostictus* (*non* Bleeker): Smith, 1955: 5*; 1961: 566, **No. 298c.**

D X/I,14-15 (modally 15); A IV,12-14; P 15-16; LL 27-29; GR (10-13)+(23-27) = 35-40. Interorbital width 3.2-4.9 in head; 1 (rarely 2) scales on inner side of P base; 1 or 2 pairs of symphysial tooth patches at front of lower jaw just outside gape.

Pale salmon pink, the edges of scales dorsally on body deep blue to black; spinous D blackish except for a broad pale lengthwise band in middle of fin; soft D, A and C broadly bordered by black (broadest on C lobes and elevated parts of soft D and A); opercular membrane dark brown to level of upper edge of P base, becoming black in region of opercular spines; P axil blackish. The largest species of *Myripristis,* reaching a length of 32 cm. Indo-Pacific, south to Natal. A reef fish of relatively shallow water.

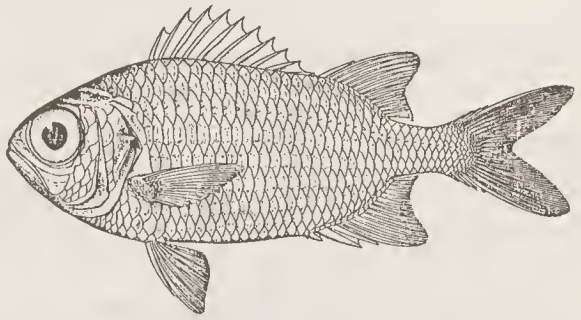
132.21 *Myripristis berndti*
Jordan & Evermann, 1903
PLATE 22

Bigscale soldier — Grootskub-soldaat

Myripristis berndti Jordan & Evermann, 1903: 170 (Honolulu); 1905: 153*; Randall & Guézé, 1981: 11*.

D X/I,13-15; A IV,11-13; P 15; LL 28-31; total GR 35-42. Interorbital width 4.3-5.8 in head; inner side of P base with small scales; lower jaw of adults prominently projecting when mouth closed; a single pair of tooth patches at symphysis of lower jaw just outside gape.

Silvery pink, sometimes pale yellowish, the edges of the scales red; opercular membrane blackish brown, the lower ½ usually silvery; naked part of P axil black; outer ½ of spinous D yellow to orange-yellow; other fins red, the leading edges white (sometimes with submarginal blackish streak). Attains 30 cm. Indo-Pacific and tropical eastern Pacific; south to Natal. Occurs in relatively shallow water (usually 3 - 15 m) on coral reefs or rocky bottom which may be exposed to surge.



132.21 *Myripristis berndti:* ca. 20 cm type (after Jordan & Evermann, 1905).

132.22 *Myripristis chryseres*
Jordan & Evermann, 1903
PLATE 22

Yellowfin soldier — Geelvin-soldaat

Myripristis chryseres Jordan & Evermann, 1903: 171 (Hilo, Hawaii); 1905: 150*: Greenfield, 1974: 14*.

D X/I,13-15; A IV,11-13; P 15; LL 32-38; total GR 33-38. Interorbital width 4.0-4.8 in head; no scales on inner side of P base; a single pair of tooth patches at symphysis of lower jaw just outside gape; vomerine tooth patch triangular with rounded corners; front of lower jaw fitting into a deep notch in upper jaw when mouth closed.

Body light red with scale edges darker red, the body sometimes suffused with yellow; black on opercular membrane extending well below opercular spine; spinous D mottled yellow and red, the membrane tips red; remaining median fins more yellow than red, with red posterior borders; P with light red rays; V with leading edge white, the first 2 soft-rays yellow, the rest of fin light red. Attains 25 cm. Known only from Hawaiian Ids., Japan, Samoa, Sri Lanka, Réunion Id. and Aliwal Shoal (Natal). A species of moderately deep water (generally more than 30 m).

132.23 *Myripristis hexagona*
(Lacepède, 1802)
PLATE 22

Doubletooth soldier — Dubbeltand-soldaat

Lutjanus hexagonus Lacepède, 1802: 213, 214 (Sumatra). *Myripristis hexagonus:* Randall & Guézé, 1981: 4*.

D X/I,13-15; A IV,12 or 13 (usually 12); LL 25-28; GR (12-15)+(24-29) = 36-43. Interorbital width 4.1-5.1 in head; numerous small scales on inner side of P base; 2 pairs of tooth patches, one above the other, at symphysis of lower jaw just outside gape (lower pair absent on juveniles but may be seen on individuals as small as 75 mm SL); vomerine teeth in a broad V-shaped patch.

Body light red to yellowish, the scale edges red; black pigment of opercular membrane extending to or nearly to level of upper P base; upper part of P axil blackish; fins red, the leading edges of soft D, A, C and V white; no black streaks in these fins submarginal to the white. Attains 20 cm. Ranges from Samoa Ids. to Inhaca Id., Mozambique.

132.24 *Myripristis kuntee*
Cuvier, 1831
PLATE 22

Epaulette soldierfish — Epoulet soldaat

Myripristis kuntee Cuvier, *in* Cuv. & Val., 1831: 487 (Mauritius). *Myripristis borbonicus* Cuvier, *in* Cuv. & Val., 1831: 489 (Réunion). *Myripristis pralinus* (*non* Cuvier): Smith, 1955: 5*; 1961: 566, **No. 298b.** *Myripristis kuntee:* Greenfield, 1974: 28*.

D X/I,15-17; A IV,14-16; P 15; LL 37-44; total GR 33-41. Interorbital width 3.0-5.0 in head; no scales on inner side of P base; a single pair of tooth patches at symphysis of lower jaw just outside gape; 3rd A spine shorter than 4th.

Body red dorsally, becoming silvery pink below LL; a broad reddish brown bar from upper end of gill opening to base of P; spinous D pale translucent red basally and broadly yellow distally; remaining fins red, this colour most dense on C, in a very large spot on outer part of elevated anterior part of soft D and A, and in a submarginal band to the white leading edge of V; leading edges of soft D, A and C narrowly white. Largest specimen, 20 cm, from Lord Howe Id.; Indo-Pacific, south to Natal.

132.25 *Myripristis melanosticta*
Bleeker, 1863
PLATE 19

Pale soldier — Bleek soldaat

Myripristis melanostictus Bleeker, 1863: 237 (Ternate); Randall & Guézé, 1981: 3*.

D X/I,13-15; A IV,11-12 (usually 12); P 14-15; LL 27-29; total GR 32-38. Interorbital width 4.5-5.6 in head; no scales on inner side of P base; 2 pairs of tooth patches, one above the other, at symphysis of lower jaw just outside gape; vomerine tooth patch triangular with rounded corners.

Front of head red; postorbital head and body silvery white, the edges of the scales red (dark reddish brown on nape and anterodorsally on body); opercular membrane black to about half the distance from opercular spine to P base; a broad red bar along edge of gill opening to P axil; spinous D whitish on basal half, red on outer half; remaining median fins red with white leading edges, the lobe tips with a large black spot; paired fins whitish. Attains 30 cm. Indian Ocean (Sri Lanka, Maldives and Sodwana Bay) to Japan and the New Hebrides. Generally occurs deeper than 25 m; caught in trawls to about 70 m. Rare.

132.26 *Myripristis murdjan*
(Forsskål, 1775)
PLATE 22

Blotcheye soldier — Vlekoog-soldaat

Sciaena murdjan Forsskål, 1775: 48 (Jeddah, Red Sea). *Myripristis axillaris* Valenciennes, *in* Cuv. & Val., 1831: 491 (Mauritius). *Myripristis murdjan:* Smith, **SFSA No. 298***; Greenfield, 1974: 19*; Randall & Guézé, 1981: 13*.

D X/I,13-15; A IV,11-13; P 14-16; LL 27-32; total GR 36-43. Interorbital width 3.7-4.4 in head; numerous small scales on inner side of P base; a single pair of tooth patches at symphysis of lower jaw just outside mouth.

Head, body and fins reddish; edge of body scales darker; leading edge of soft D, A, C and V with white stripe; soft D, A and C with or without dark pigment at tips of longest rays. Attains 27 cm. Red Sea and Indo-West Pacific south to Natal. A coral-reef species found in depths of 1 - 50 m.

132.27 *Myripristis pralinia*
Cuvier, 1829
PLATE 22

Scarlet soldier — Helderrooi soldaat

Myripristis pralinus Cuvier, *in* Cuv. & Val., 1829: 170 (Port Praslin, New Ireland); Greenfield, 1974: 22*.

D X/I,14-16; A IV,13-15; P 15; LL 34-40; total GR 35-42. Interorbital width 2.8-4.0 in head; no scales on inner side of P base; a single pair of tooth patches at symphysis of lower jaw just outside mouth.

Head, body and fins scarlet; upper part of opercular membrane black; black blotch in P axil; no black pigment in median fins. Attains 20 cm. Known from islands of the western Indian Ocean and western Pacific. Previous records from the African coast (Smith, 1955; 1961: p. 566, **No. 298b**) were based on a misidentification of *M. kuntee*.

132.28 *Myripristis seychellensis*
Cuvier, 1829
PLATE 21

Seychelles soldier — Seychelles-soldaat

Myripristis seychellensis Cuvier, *in* Cuv. & Val., 1829: 172 (Seychelles); Randall & Guézé, 1981: 10*.

D X/I,14-15; A IV,13; P 14-15; LL 28; GR (12-15)+(25-29). Interorbital width 3.6-4.5 in head; inside of P base mostly covered with small scales; a single pair of tooth patches at symphysis of lower jaw just outside mouth.

Head and body pale reddish brown; opercular membrane and P axil reddish black. Attains 23 cm. Known only from the Seychelles, Réunion and St. Brandon's Shoals.

132.29 *Myripristis violacea*
Bleeker, 1851
PLATE 22

Lattice soldier — Ruitjies-soldaat

Myripristis violaceus Bleeker, 1851: 234 (Banda Neira); Greenfield, 1974: 12*.

D X/I,14-16; A IV,12-14; P 15; LL 27-29; total GR 38-48. Interorbital width 3.0-5.0; scales usually present on inner side of P base; a single pair of tooth patches at symphysis of lower jaw just outside gape.

Body bluish silver, the scales of back edged in deep blue or dark brown to nearly black (the edges broadest and darkest on nape); scales below LL edged in brownish red; front of head brownish red and edge of gill opening dark brownish red; median fins light red, the leading edges of soft D, A and C white; P clear; V white. Reaches 20 cm. Indo-Pacific south to Natal. Usually on shallow protected reefs.

132.30 *Myripristis vittata*
Cuvier, 1831
PLATE 22

Immaculate soldier — Onbevlekte soldaat

Myripristis vittatus Cuvier, *in* Cuv. & Val., 1831: 370 (Mauritius); Greenfield, 1974: 18*.

D X/I,13-15; A IV,11-12; P 15; LL 35-40; GR (11-13)+(23-26). Interorbital width 2.3-3.3 in head; no scales on inner side of P base; 3rd A spine longer than 4th; a single pair of tooth patches at symphysis of lower jaw just outside mouth.

Head, body and fins reddish orange; no dark pigment on opercular membrane; P axil not black; no dark pigment on fins; tips of D spines and leading edge of soft-rayed fins white. Attains 18 cm. Mauritius and Seychelles to western Pacific.

Genus ***Ostichthys*** Jordan & Evermann, 1896

No greatly enlarged spine at angle of preopercle; premaxillary groove (between nasal bones) broadly V-shaped; vertebrae 26. In their revision, Randall, Shimizu and Yamakawa (1982) recognise 8 species; 3 species are known from the western Indian Ocean and might be found in our area.

KEY TO SPECIES

1a D spines 11; C peduncle depth distinctly less than its length and less than ½ length of 3rd A spine ..... *O. delta*
1b D spines 12; C peduncle depth subequal to its length and more than ½ length of 3rd A spine 2

2a P 15-17; head length 2.15-2.4 in SL; snout length 4.2-4.9 in head ..... *O. kaianus*
2b P 15; head length 2.45-2.6 in SL; snout length 3.7-4.3 in head ..... *O. archiepiscopus*

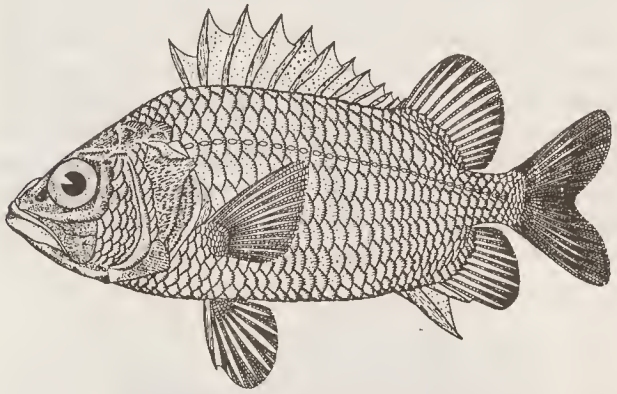
132.31 *Ostichthys archiepiscopus*
(Valenciennes, 1862)
PLATE 21

Longsnout soldier — Langsnoet-soldaat

Myripristis archiepiscopus Valenciennes, 1862: 1169 (Réunion? According to Sauvage, 1891: 28, the holotype was caught at Mauritius). *Ostichthys archiepiscopus:* Randall et al., 1982: 21*.

D XII/13-15; A IV,11-12; P 15; upper spiniform procurrent C rays 4, lower 3; LL 28-30; scales above LL to middle D spines 2½; GR (7-9)+(13-15). Body depth 2.1-2.4, head length 2.4-2.6 in SL.

Body red, with faint white lines following scale rows. Attains 32 cm. Réunion, Ryukyu Ids. and Hawaiian Ids.; probably more widely distributed. Depth range 146 - 360 m.



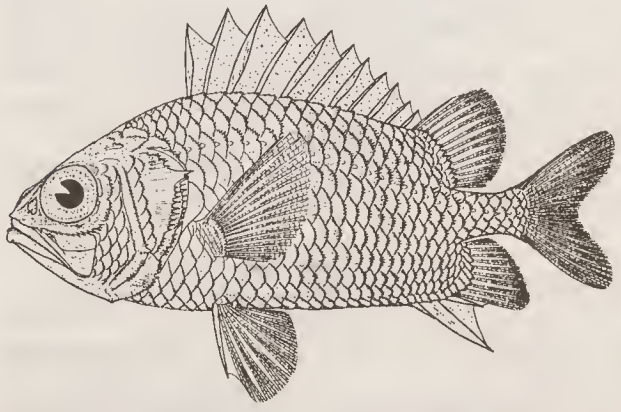
132.31 *Ostichthys archiepiscopus:* 23 cm (Japan, after Randall et al., 1982).

132.32 *Ostichthys delta*
Randall, Shimizu & Yamakawa, 1982

Redcoat — Rooibaadjie

Ostichthys delta Randall, Shimizu & Yamakawa, 1982: 18, Fig. 11 (Réunion).

D XI/13-14; A IV,10-11; P 16-17; upper spiniform procurrent C rays 5, lower 4; LL 27-28; scales above LL to base of middle D spines 2½; GR (7-8)+(13-14). Body depth 2.3-3.4, head length 2.5-2.7 in SL.



132.32 *Ostichthys delta:* 15 cm SL holotype (after Randall et al., 1982).

Head, body and fins uniform red. Largest specimen 20 cm. Known only from 3 specimens collected in 150 - 200 m at Réunion and 1 specimen from 200 m at Tutuila Id. in the central Pacific.

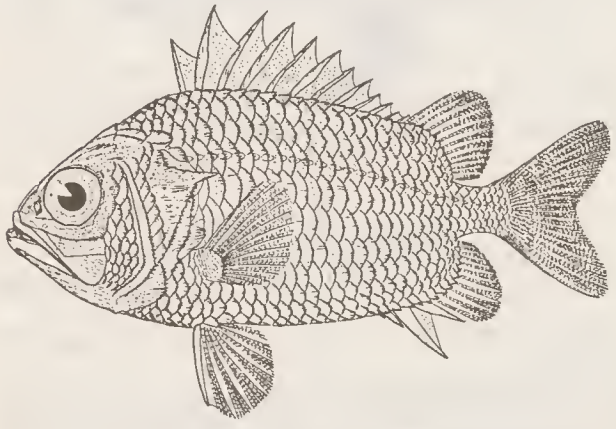
132.33 *Ostichthys kaianus*
(Günther, 1880)

Deepwater soldier — Diepwater-soldaat

Myripristis kaianus Günther, 1880: 39 (Kai Id., eastern Banda Sea). *Myripristis (Holotrachys) guezei* Postel, 1962: 158, Fig. 1 (Réunion). *Ostichthys kaianus*: Randall et al., 1982: 20*.

D XII/13; A IV,11; P 15-17; upper spiniform procurrent C rays 4, lower 3; LL 28-30; scales above LL to middle D spines 2½; GR (7-9)+(14-16). Body depth 2.0-2.2, head length 2.1-2.4 in SL.

Body red, with a series of silvery white streaks (middle of each scale with a horizontal streak) forming a longitudinal white line along each row of scales; fins reddish white. Attains 36 cm. A deep-water species caught with hook and line and trawls in depths of 310 - 640 m. Probably widely distributed but at present known only from Réunion, Indonesia and the Ryukyu Ids. (Japan).



132.33 *Ostichthys kaianus*: 18 cm SL (after Randall et al., 1982).

Genus ***Plectrypops*** Gill, 1862

No large spine at angle of preopercle; last D spine shortest, 3rd A spine longest; nasal bones projecting over upper jaw; vertebrae 27. *Holotrachys* Günther, 1874 is a synonym. Two species, 1 in western Atlantic and 1 in Indo-Pacific.

132.34 *Plectrypops lima*
(Valenciennes, 1831)
PLATE 21

Shy soldier — Skaam soldaat

Myripristis lima Valenciennes, *in* Cuv. & Val., 1831: 493 (Mauritius). *Holotrachys lima*: Smith, 1955: 308*; 1961: 566, **No. 293a.**

D XII/14-16; A IV,10-12; P 16-17; scales above LL to middle D spines 4½; LL 39-42; total GR 22-25. Body depth 2.3-2.6, head length 2.4-4.6 in SL; D spines short, the longest about 3.0 in head.

Uniform bright red. Attains 16 cm. Indo-West Pacific, including Easter Id. and Hawaiian Ids., south to Natal. A shallow-water species which hides deep in recesses in coral reefs by day.

132.34 *Plectrypops lima*: 7.5 cm (N. Mozambique).

Genus ***Pristilepis*** Randall, Shimizu & Yamakawa, 1982

Premaxillary groove (between nasal bones) elongate, narrow; nasal bones projecting over upper jaw; slightly enlarged spine at angle of preopercle; D spines 12, the last shortest; vertebrae 29. Monotypic.

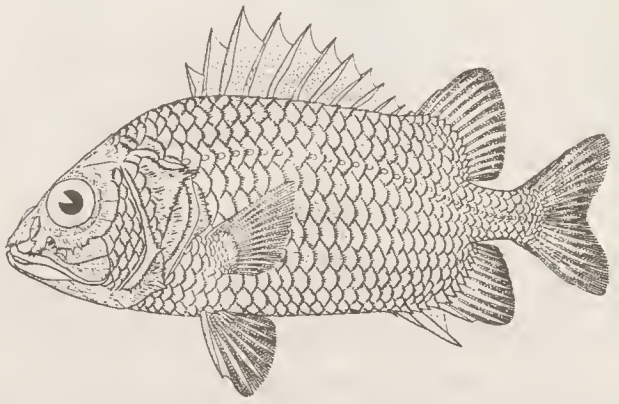
132.35 *Pristilepis oligolepis*
(Whitley, 1941)
PLATE 21

Spinyface soldier — Stekelgesig-soldaat

Holotrachys oligolepis Whitley, 1941: 28, Fig. 9 (Western Australia). *Pristilepis oligolepis*: Randall et al., 1982: 5*.

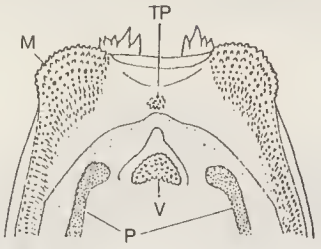
D XII/14-15; A IV,11-12; P 15-16; scales above LL to middle D spines 2½; LL 28-30; GR (6-8)+(13-14). Body depth 2.2-2.5, head length 2.4-2.5 in SL.

Reddish orange, each scale with a white spot forming longitudinal white lines. Attains 30 cm. Réunion, Western



132.35 *Pristilepis oligolepis*: 19.5 cm SL (Japan, after Randall et al., 1982).

Australia, Japan, Hawaiian Ids., Lord Howe Id. and Easter Id.; depth range 14 - 220 m.



132.35 *Pristis oligolepis:* ventral view of palate: M = maxilla; P = palatine teeth; TP = tooth patch on medial face of upper jaw symphysis; V = vomerine teeth (after Randall et al., 1982).

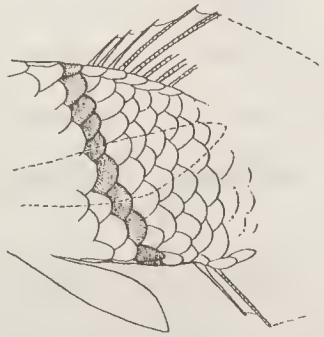
Family No. 133: MELAMPHAIDAE

by A.W. Ebeling

Bigscale fishes **Grootskub-visse**

Body oblong to fusiform. Head large, cavernous; snout blunt. Dorsal and anal fins with 1-3 weak spines. Pelvic fins located under or slightly behind pectoral fins, with 1 spine and 6-8 soft-rays. Caudal fin with 3-4 small spines preceding principal rays. Scales thin and cycloid, usually deciduous, and sometimes quite large. Sensory canal organs on head large, well developed, and covered by a thin outer skin marked with horizontal embossed lines. Lateral line rudimentary, reduced to 1 or 2 pored scales behind upper edge of operculum. Jaw teeth tiny, pointed, in single rows or bands. Vertebrae 24-31, including terminal urostyle.

Small dark brown to blackish deep-sea species occurring at mid-depths of all oceans except Arctic Ocean and Mediterranean Sea. Frequently caught in trawl hauls to great depths, but of no commercial importance. Five genera, with a total of 33 species; 14 species likely to be found in our area. Most recently revised by Ebeling & Weed (1973). LS (longitudinal scales) are counted from nape to base of caudal fin; DS (diagonal scales) are counted in an oblique series from dorsal-fin origin to anus.

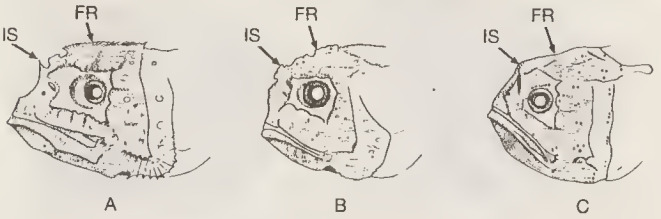


Mid-flank of a typical melamphaid, showing (shaded) scales in a diagonal series (DSR). Note: scales are drawn intact, although on most specimens many are missing and represented only by scale pockets. (From Ebeling & Weed, 1973.)

KEY TO GENERA

1a LS fewer than 15; scales almost always lost, leaving large, shaggy, ill-defined pockets ..... *Scopelogadus*
1b LS 20-40; scales often lost, but pockets well defined 2

2a Bony ridges on top of head crest-like, with serrated margins; conspicuous medial spine in front of eyes ..... *Poromitra*

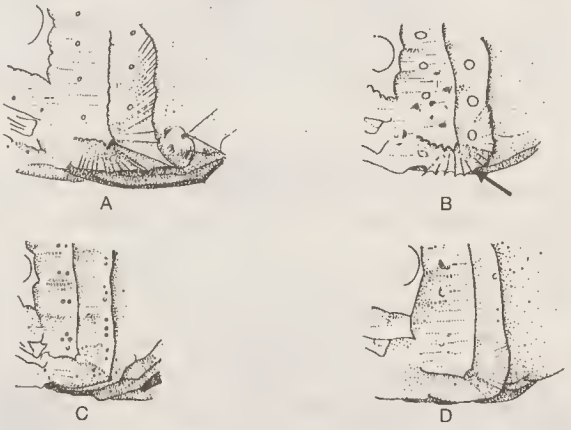


Heads of melamphaids, showing: A. crest-like ridges with serrated margins (FR) and medial spine (IS) that distinguish species of *Poromitra*, and B-C, a general lack of such crests and spines in *Scopelogadus* and *Melamphaes* respectively.

2b Bony ridges on head not crest-like, margins more or less smooth; medial spine, if present, inconspicuous 3

3a Total D spines + soft-rays = 12; branchiostegal rays 7 ..... *Sio*
3b Total D spines + rays = 13-21; branchiostegal rays 8 4

4a Total D spines + rays = 13-15 ..... *Scopeloberyx*
4b Total D spines + rays = 17-21 ..... *Melamphaes*



Lower cheeks and preopercles of melamphaids, showing: A. spine at angle of preopercle longer than base of anal fin; B. this spine (arrow) much shorter than base of A fin (South African species of *Poromitra*); C. spineless condition typical of South African *Melamphaes*; and D. finely serrated condition of *Sio nordenskjoldii*. Note: spines on horizontal edge of preopercle to angle (SHP) of *Poromitra* include this spine and all others in front of it.

Genus ***Melamphaes*** Günther, 1864

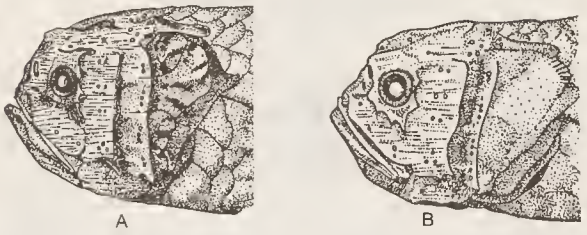
Twenty-one species; 4, possibly 5, in our area.

KEY TO SPECIES

1a Total GR on 1st arch 23-25 ..... *M. microps*
1b Total GR on 1st arch 14-19 2

2a Adults longer than 40 mm SL; eye diameter equal to or greater than suborbital width 3
2b Adults shorter than 30 mm SL; eye diameter less than suborbital width 4

3a Ridges on side of head expanded to reveal flanges of reticulate bone at their margins; scales and head epidermis durable, mostly intact ..... *M. eulepis*
3b Ridges on side of head thin, not expanded; scales and head epidermis relatively delicate, often missing ..... *M. longivelis*



M. eulepis *M. longivelis*

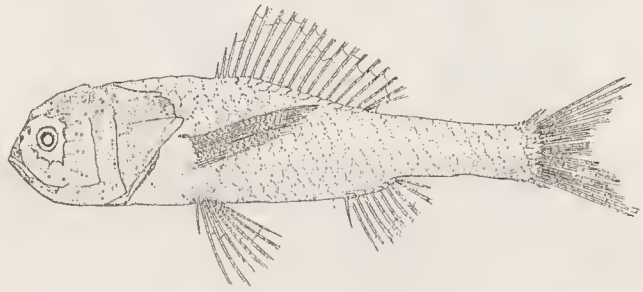
4a A I,9-10; D III,15-17 ..... *M. simus*
4b A I,8; D III,14-16 ..... *M. danae*

133.1 *Melamphaes danae*
Ebeling, 1962

Melamphaes danae Ebeling, 1962: 102, Fig. 37 (Indonesia, Celebes Sea).

D III,14-16; A I,8; LS 31-34; DS 9-11; GR (3-4)+(11-13); vertebrae 25-28, with strong antrorse spine on hemal arch of 1st caudal vertebra. Upper jaw 6.3-7.1 in SL; eye 1.1-1.3 in suborbital width; A origin under 4th or 5th from last D ray. Scales with concentric circuli delimiting grooves of equal width on all fields.

Attains 21 mm SL. Trawled below 125 m off Madagascar, throughout Indonesia and northward to 25°N, in South Pacific southeastward to 110°W, and in equatorial North Pacific.



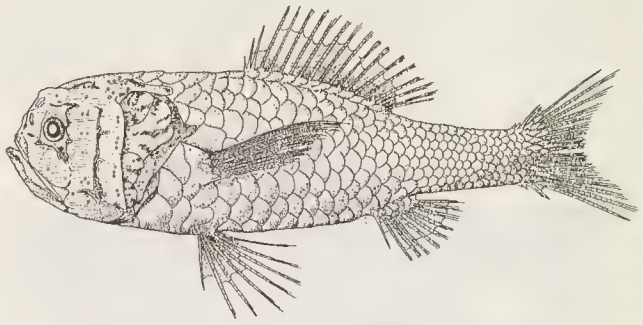
133.1 *Melamphaes danae:* 2 cm SL (after Ebeling, 1962).

133.2 *Melamphaes eulepis*
Ebeling, 1962

Melamphaes eulepis Ebeling, 1962: 70, Fig. 27 (South Atlantic, off Ghana).

D III,14-16; A I,8; LS 33-36; DS 8; GR 4 + (14-15); vertebrae 29-30, with weak antrorse spur on hemal arch of 1st caudal vertebra. Upper jaw 5.3-5.9 in SL; eye 0.8-1.0 in suborbital width; A origin under last 2 D rays. Scales with circuli on posterior field delimiting grooves 3-4 times width of narrowest grooves on anterior field. Edge of preopercle smooth, without spine.

Attains 46 mm SL. Trawled below 200 m in Atlantic south of 13°S, around Africa, in Indian Ocean, throughout Indonesia and in central equatorial Pacific.



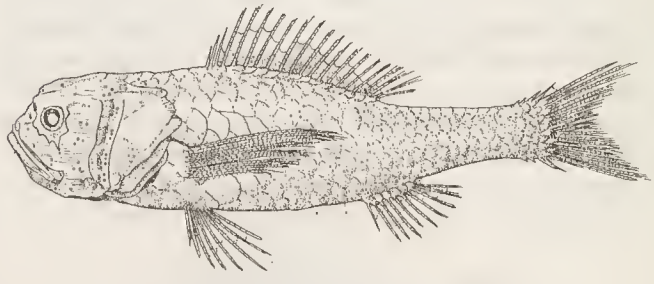
133.2 *Melamphaes eulepis:* 4.5 cm SL (after Ebeling, 1962).

133.3 *Melamphaes longivelis*
Parr, 1933

Melamphaes microps longivelis Parr, 1933: 16, Fig. 6 (West Indies). *Melamphaes longivelis:* Ebeling, 1962: 73*.

D III,15-18; A I,8-9; LS 32-35; DS 8; GR (4-5)+(13-15); vertebrae 28-30. Upper jaw 5.6-6.2 in SL; eye 0.7-0.9 in suborbital width; A origin slightly behind or directly under last D ray. Scales with circuli on posterior field delimiting grooves 3 times width of narrowest grooves on anterior field.

Attains 106 mm SL. Trawled below 500 m in North and South Atlantic, throughout Indonesia, and in tropical/subtropical Pacific. Uncommon.



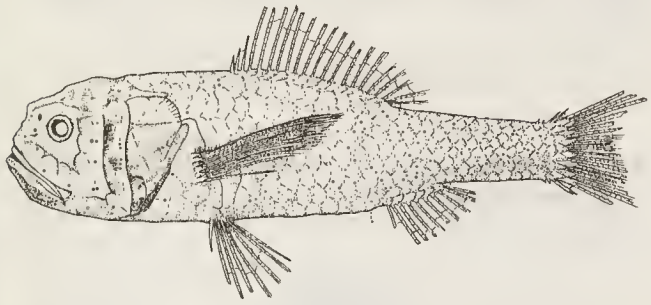
133.3 *Melamphaes longivelis:* 7.5 cm SL (after Ebeling, 1962).

133.4 *Melamphaes microps*
(Günther, 1878)

Scopelus microps Günther, 1878: 186 (between Cape of Good Hope and Kergulen Ids.). *Melamphaes microps:* Ebeling, 1962: 32*.

D III,17-18; A I,8; V I,8; LS 33-35; DS 8; GR (6-7)+(17-18); vertebrae 29-30. Upper jaw 5.1-5.6 in SL; eye 0.8-0.9 in suborbital width; A origin under last D ray. Scales with circuli on posterior field delimiting grooves 3-5 times width of narrowest grooves on anterior field.

Attains 100 mm SL. Trawled below 300 m off South Africa and New Zealand; also, Ebeling (1962) identified North Atlantic specimens as possible variants of this species. Rare.



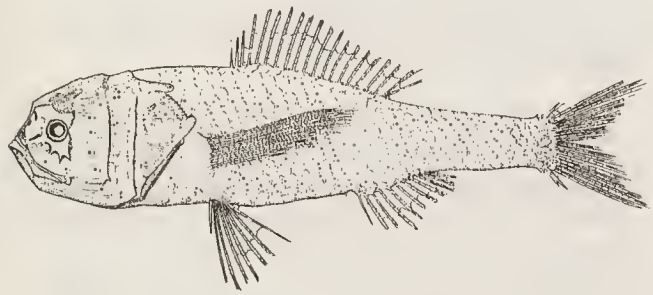
133.4 *Melamphaes microps:* 10 cm SL (after Ebeling, 1962).

133.5 *Melamphaes simus*
Ebeling, 1962

Melamphaes simus Ebeling, 1962: 94, Fig. 34 (North Atlantic, south of Canary Ids.).

D III,15-17; A I,9-10; LS 32-36; DS 10-11; GR (3-4)+(12-15); vertebrae 28-30. Upper jaw 5.5-6.5 in SL; eye 1.2-1.6 in suborbital width; A origin under 2nd to 4th from last D ray. Scales with concentric circuli delimiting grooves of equal width on all fields.

Attains 29 mm SL. Trawled below 150 m throughout tropical/subtropical regions of Atlantic, Indian and Pacific oceans.



133.5 *Melamphaes simus:* 3 cm SL (after Ebeling, 1962).

Genus ***Poromitra*** Goode & Bean, 1882

Five species; 2, possibly 3, in our area.

KEY TO SPECIES

1a Eye diameter 15-20 in head length; D III,9-10 ..... *P. oscitans*
1b Eye diameter less than 10 in head; D II-III,10-14 2

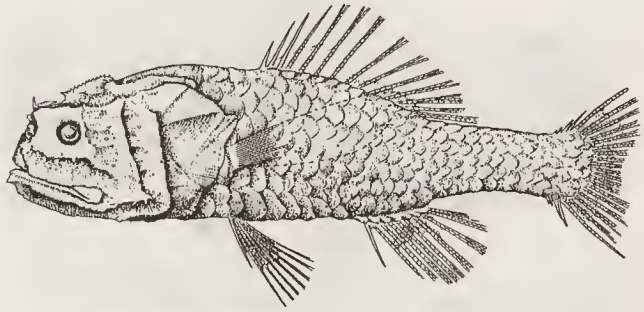
2a Eye diameter less than 5 in head; C peduncle length more than 3 times its depth ..... *P. megalops*
2b Eye diameter more than 6 in head; C peduncle length less than 3 times its depth ..... *P. crassiceps*

133.6 *Poromitra crassiceps*
(Günther, 1878)

Scopelus crassiceps Günther, 1878: 185 (Atlantic Ocean). *Melamphaes crassiceps:* Günther, 1887: 28*. *Plectromus coronatus* Gilchrist & von Bonde, 1924: 14 (off South Africa). *Melamphaes unicornis* (*non* Gilbert): Smith, **SFSA No. 281.** *Poromitra crassiceps:* Ebeling, 1962; Ebeling & Weed, 1973: 440*; Parin & Ebeling, 1980: 88.

D III,12-14; A I,8-11; GR (9-12)+(19-24); spines on horizontal edge of preopercle to angle 9-18, with longest spine at angle much shorter than length of A base; vertebrae 27-29, without spine on hemal arch of 1st caudal vertebra. Head 2.4-2.8, upper jaw 5.5-6.5 in SL.

Attains 155 mm SL. Trawled below 600 m throughout entire range of family; significant morphological variation between populations (Parin & Ebeling, 1980).



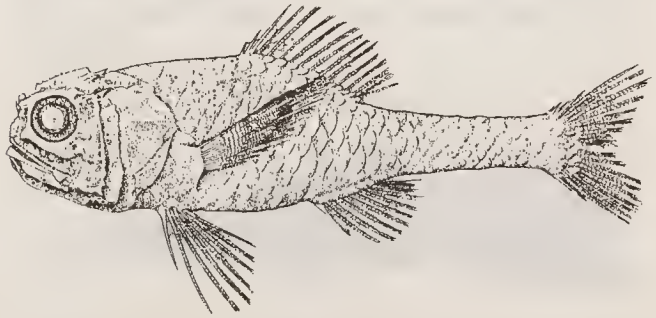
133.6 *Poromitra crassiceps:* 11.5 cm SL (after Ebeling & Weed, 1973).

133.7 *Poromitra megalops*
(Lütken, 1877)

Melamphaes megalops Lütken, 1877: 176, Pl. 5 (S. of Azores); Smith, **SFSA No. 282*.** *Poromitra megalops:* Goode & Bean, 1895: 181; Ebeling & Weed, 1973: 433*. *Plectromus macrophthalmus* Gilchrist, 1922: 205, Pl. 13 (off Cape of Good Hope).

D II-III,10-12; A I,8-10; GR (6-8)+(15-20); spines on horizontal edge of preopercle 4-8, with longest spine at angle much shorter than length of A base; vertebrae 26-30, without spine on hemal arch of 1st caudal vertebra. Head 2.7-3.3; upper jaw 5.6-7.0 in SL.

Attains 62 mm SL. Trawled below 400 m in eastern Atlantic, Indo-Pacific and eastern equatorial Pacific. Significant morphological variation between Indo-Pacific and



133.7 *Poromitra megalops:* 6 cm SL (after Ebeling & Weed, 1973).

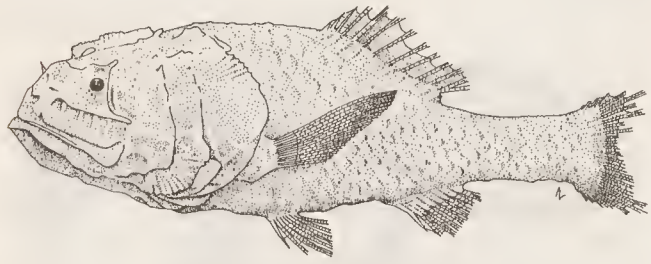
other populations; Indo-Pacific variants have counts nearer lower extremes of ranges given above.

133.8 *Poromitra oscitans*
Ebeling, 1975

Poromitra oscitans Ebeling, 1975: 308, Fig. 1 (Indonesia, Banda Sea); Parin & Ebeling, 1980: 88.

D III,9-10; A I,8; GR (6-7)+(16-18); spines on horizontal edge of preopercle 5-14, with longest spine at angle much shorter than length of A base; vertebrae 24-26, with antrorse spine on hemal arch of 1st vertebra. Head 2.1-2.4; upper jaw 4.0-4.7 SL.

Attains 68 mm SL. Trawled below 800 m in Indian Ocean, Indonesia, and tropical Pacific.



133.8 *Poromitra oscitans:* 7 cm SL holotype (after Ebeling, 1975).

Genus ***Scopeloberyx*** Zugmayer, 1911

Three or 4 species; 1, possibly 3, in our area.

KEY TO SPECIES

1a Total GR on 1st arch 20-25 ..... *S. robustus*
1b Total GR fewer than 17 2

2a LS 23-25; C peduncle length 3.3-4.0 in SL ..... *S. opisthopterus*
2b LS 37-40; C peduncle length 2.8-3.1 in SL ..... *S. microlepis*

133.9 *Scopeloberyx microlepis*
(Norman, 1937)

Melamphaes microlepis Norman, 1937: 87 (S. of Tasmania). *Scopeloberyx microlepis:* Ebeling, 1962: 19; Ebeling & Weed, 1973: 445.

D II-III,10-13; A I,7-9; GR (2-3)+(8-11); vertebrae 28-29. Head 2.9-3.6 in SL. V 5-11% SL behind P. Jaw teeth in 2-3 rows.

Attains 41 mm SL. Trawled below 500 m, generally south of 30° in South Pacific and Indian oceans.

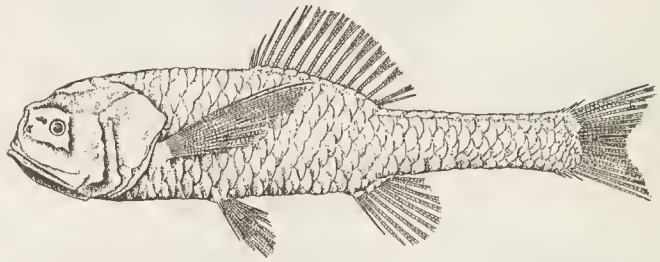
133.9 *Scopeloberyx microlepis:* 5 cm holotype.

133.10 *Scopeloberyx opisthopterus*
(Parr, 1933)

Melamphaes opisthopterus Parr, 1933: 18, Fig. 7 (western North Atlantic). *Scopeloberyx opisthopterus:* Ebeling, 1962: 19; Ebeling & Weed, 1973: 449*.

D II-III,11-12; A I,7-8; GR (2-4)+(10-13); vertebrae 24-27. Head 2.8-3.3 in SL. V 5-11% SL behind P. Jaw teeth in 3-5 rows.

Attains 37 mm SL. Trawled below 500 m throughout western tropical North Atlantic, tropical Indian Ocean, and eastern equatorial Pacific.



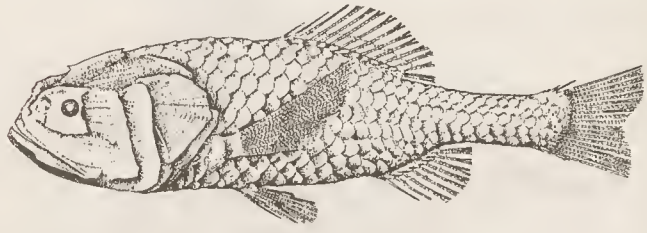
133.10 *Scopeloberyx opisthopterus:* 3.5 cm (after Ebeling & Weed, 1973).

133.11 *Scopeloberyx robustus*
(Günther, 1887)

Melamphaes robustus Günther, 1887: 29 (SW of Sierra Leone). *Scopeloberyx robustus:* Ebeling, 1962: 19; Ebeling & Weed, 1973: 446*.

D II-III,10-13; A I,7-9; GR (5-7)+(15-19); LS 24-27; vertebrae 23-27. Head 2.2-2.8, length of C peduncle 3.7-4.8 in SL. V less than 5% SL behind P. Jaw teeth in 2-4 rows.

Attains 73 mm SL. Trawled below 500 m throughout entire range of family. Significant morphological variation between Indo-Pacific and other populations; size at sexual maturity varies from 25-33 mm in some areas to more than 50 mm SL in others (Ebeling & Weed, 1973).



133.11 *Scopeloberyx robustus:* 8.5 cm SL (after Ebeling & Weed, 1973).

Genus ***Scopelogadus*** Vaillant, 1888

Four species and subspecies; 2 in our area.

KEY TO SPECIES

1a Total GR on 1st arch 22-25; body depth 3.7-4.3 in SL ..... *S. m. mizolepis*
1b Total GR 28-30; body depth 3.2-3.8 in SL ..... *S. beanii*

133.12 *Scopelogadus beanii*
(Günther, 1887)

Plectromus crassiceps (*non* Günther): Bean, 1885: 73 (western N. Atlantic). *Melamphaes beanii* Günther, 1887: 29 (substitute name for pre-occupied *P. crassiceps* Bean). *Melamphaes mizolepis* (*non* Günther): Smith, **SFSA No. 280** (on Gilchrist's record, probably misidentified). *Scopelogadus beanii:* Ebeling, 1962: 18; Ebeling & Weed, 1963: 24*.

D II,10-11; A I,7-9; GR (8-10)+(18-22); vertebrae 25-27. Head 2.6-3.0, length of C peduncle 2.6-3.0 in SL.

Attains 122 mm SL. Trawled below 600 m in Atlantic, southern Indian and western South Pacific oceans.

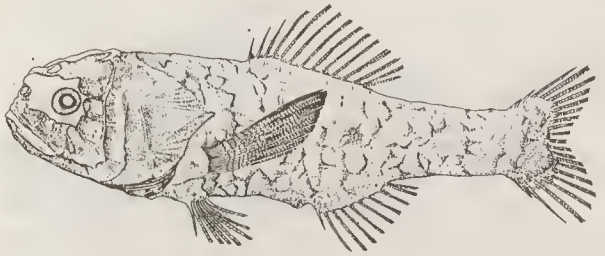
133.12 *Scopelogadus beanii:* 8 cm SL (after Ebeling & Weed, 1963).

133.13 *Scopelogadus mizolepis mizolepis*
(Günther, 1878)

Scopelus mizolepis Günther, 1878: 185 (S. of New Guinea). *Melamphaes mizolepis:* Smith, **SFSA No. 280***. *Scopelogadus mizolepis mizolepis:* Ebeling & Weed, 1963*.

D II,10-12; A I,8-9; GR (6-8)+(15-18); vertebrae 24-26. Head 2.4-2.9, length of C peduncle 2.7-3.3 in SL.

Attains 94 mm SL. Trawled below 300 m in tropical Atlantic and Indian oceans to 20-30°S, and in western and central tropical Pacific, where it intergrades with *S. mizolepis bispinosus,* its eastern Pacific counterpart (Ebeling & Weed, 1963).



133.13 *Scopelogadus mizolepis mizolepis:* 8.5 cm SL (after Ebeling & Weed, 1963).

Genus ***Sio*** Moss, 1962

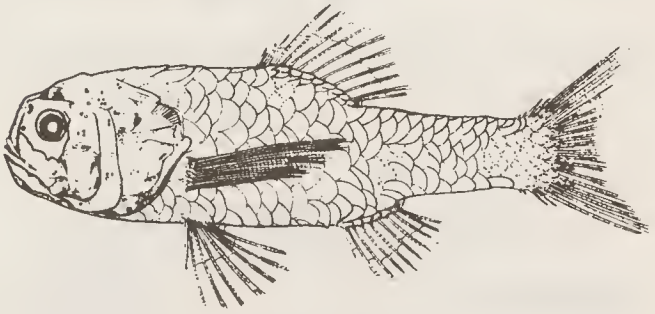
Monotypic.

133.14 *Sio nordenskjoldii*
(Lönnberg, 1905)

Melamphaes nordenskjöldii Lönnberg, 1905: 58 (NW of Falkland Ids.). *Sio nordenskjoldii:* Moss, 1962: 5*; Grindley & Penrith, 1965: 284.

D III,9; A I,8-9; GR (6-9)+(18-20); LS 25-30. Upper jaw not extending past eye, 6.7-7.7; C peduncle 3.1-4.0 in SL. Lower edge of preopercle finely serrate.

Attains 115 mm SL. Trawled below 200 m in South Atlantic and Indian oceans south of 30°; several records off South Africa; 1 record from North Pacific.



133.14 *Sio nordenskjoldii:* 7 cm SL (after Moss, 1962).

Family No. 133a: STEPHANOBERYCIDAE

by P.C. Heemstra

Pricklefishes **Stekelvisse**

Body oblong; dorsal and anal fins opposite and of similar size; pelvic fins small, inserted well behind pectorals, with 5 soft-rays and no spine; head bones with strongly serrated ridges (except in *Malacosarcus*, which is known only from the Pacific); lateral line papillate; no teeth on vomer or palatines; vertebrae 30-33; orbitosphenoid bone absent.

Three monotypic genera of small bathypelagic or abyssal benthic fishes (Ebeling & Weed, 1973). *Stephanoberyx monae* Gill, 1883 is known only from the western North Atlantic, Caribbean Sea and Gulf of Mexico; it has the pelvic fins inserted nearer to vertical at base of pectorals than to anal fin origin and 1-3 weakly developed dorsal fin spines.

Genus ***Acanthochaenus*** Gill, 1884

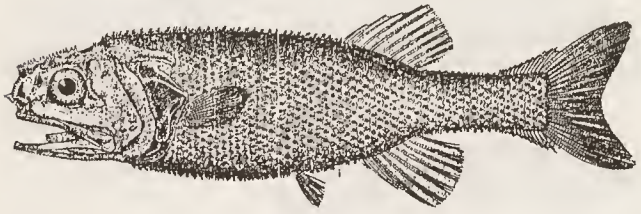
No D spines; V nearer A origin than vertical at base of P; scales with 1-3 large spines at their centres.

133a.1 *Acanthochaenus lutkenii*
Gill, 1884

Acanthochaenus lutkenii Gill, 1884: 433 (37°12'N, 69°39'W; off Virginia, (U.S.A.); Ebeling & Weed, 1973: 420*.

D 11; A I,9-10; P 12-13; V 5; GR 8+(17-20). Body depth 3.6-3.7, head length about 3 in SL; C peduncle depth 9-11, length 24-25% SL.

Attains 15 cm. Known off the mid-Atlantic United States (depth 2 176 and 5 308 m), off the Azores, and off Durban (R/V Galathea Stn. 190; 29°42′S, 33°19′E; depth 2 700 m).



133a.1 *Acanthochaenus lutkenii:* 15 cm lectotype (after Goode & Bean, 1885).

Family No. 134: POLYMIXIIDAE

by P.C. Heemstra

Beardfishes **Baardvisse**

Body oblong, moderately compressed. Two long barbels from middle of lower jaw (hyoid arch). Dorsal fin with 4-6 graduated spines and 26-38 soft-rays; anal fin with 3 or 4 spines and 13-18 soft-rays; ventral fins with 7 rays (1st unbranched) and no spine; caudal fin branched rays 16. Branchiostegal rays 4 (plus 3 curved round base of barbels); vertebrae 28 or 29. Villiform teeth on jaws, vomer, palatines, endopterygoids and tongue; 2 supramaxillae. Scales ctenoid, extending onto cheeks, opercles and lower jaw. Gasbladder, orbitosphenoid bone and subocular shelf present; peritoneum black.

One genus, *Polymixia* Lowe, 1836, with 6 species; 2 species in our area, but another 2 may be found here and are included in the Key.

KEY TO SPECIES

1a D V,35-37 (last ray double) ..... *P. nobilis*
1b D IV-V,28-35 (last ray double) 2

2a Distinct black blotch on distal part of anterior D rays; 8 or 9 scales from D origin to LL ..... *P. japonicus* Günther, 1877 (Reported from India)
2b D rays dusky, but no distinct black blotch; 5-8 scales from D origin to LL 3

3a D IV-V,28-31; total GR (not counting rudiments) 12-14; scales from D origin to LL 5-6; A IV,14-16 ..... *P. berndti*
3b D V,33; total GR 16-17; scales from D origin to LL 7-8; A IV,13 ..... *P. fusca* Kotthaus, 1970 (NW Indian Ocean)

134.1 *Polymixia berndti*

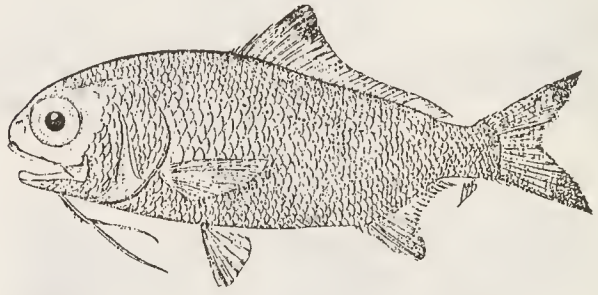
Gilbert, 1905

Pacific beardfish Pasifiese baardvis

Polymixia berndti Gilbert, 1905: 616, Pl. 78 (Hawaii); Smith, 1966: 85*. *Polymixia nobilis* (*non* Lowe): Smith, **SFSA No. 283*** (Figure only).

D IV-V,28-31; A IV,14-16; P 15-17; GR (4-5)+(8-9); LL 30-33 + 2 or 3 on C. Depth 2.7-3.0, head 2.8-3.1 in SL. Eye 3.4-3.6 in head.

Head and body dusky greenish dorsally, silvery below; C dusky. Attains 16 cm. Known from off Natal, Kenya, Philippines, Japan and Hawaii; depth: 300 - 500 m.



134.1 *Polymixia berndti:* 15 cm (off Durban).

134.2 *Polymixia nobilis*

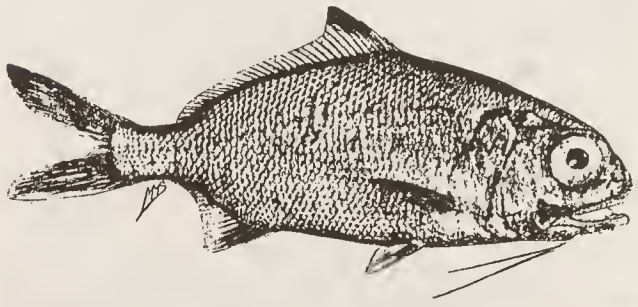
Lowe, 1836

Atlantic beardfish Atlantiese baardvis

Polymixia nobilis Lowe, 1836: 198, Pl. 4 (Madeira); Smith, 1968: 8*; Woods & Sonoda, 1973: 270*.

D V,35-37; A IV,15-16; P 15-16; GR (3-4)+(7-9); LL 31-34 + 2 or 3 on C; 7 or 8 scales from D origin to LL. Depth 2.5-2.8, head 2.7-2.9 in SL.

Head and body dark brownish grey, silvery below; black blotch on distal part of anterior D rays. Attains 40 cm. An Atlantic species known in our area from 1 specimen taken off Bazaruto, southern Mozambique in 500 - 600 m.



134.2 *Polymixia nobilis:* 23 cm (S. Mozambique).

Order CETOMIMIFORMES

by J.R. Paxton & D.J. Bray

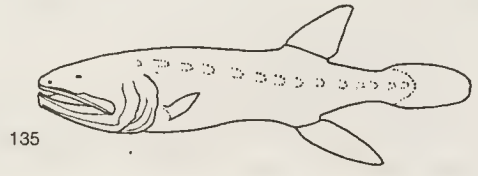
Whalefishes **Walvisvisse**

Enormous mouth; moderate to tiny eye; whale-shaped body; dorsal and anal fins far posterior and opposite one another; lateral line a large pored tube or a series of vertical papillae; no fin spines; pelvic fins, scales and cavernous (luminous?) tissue present or absent; colour orange, red, brown or black.

Relationships of the whalefishes are problematical. Nelson (1984) has succinctly summarised previous placements of the families. The editors of the present volume have chosen to recognise a separate order, whereas the authors would place at least the families Barbourisiidae and Rondeletiidae with the stephanoberycoid families.

KEY TO FAMILIES

1a Pelvic fins absent; abdominal ribs absent; belly highly distensible ..... CETOMIMIDAE (No. 135)



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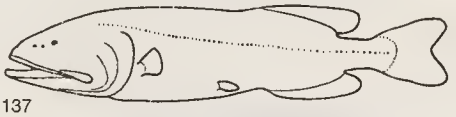
1b Pelvic fins present; abdominal ribs present; belly moderately or not distensible 2

2a Scales present; lateral line a tube pierced by small pores; live colour orange-red, preserved colour white ..... BARBOURISIIDAE (No. 137)



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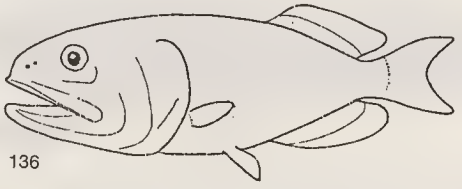
2b Scales absent; lateral line a series of vertical rows of papillae; live colour orange-brown, preserved colour brown ..... RONDELETIIDAE (No. 136)



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Family No. 135: CETOMIMIDAE

by J.R. Paxton & D.J. Bray

Whalefishes **Walvis-visse**

Small dark brown or black pelagic fishes. Skin naked (although large scales usually embedded in lateral-line canal). Lateralis system cavernous at least on head, usually on body as broad tube pierced by large pores. Head large; mouth huge and terminal, jaws extending far behind tiny eye. No abdominal ribs, fin spines or pelvic fins. Dorsal and anal fin opposite and posterior, with 13-35 rays; pectoral fins with 15-22 rays. Vertebrae 39-58. Belly highly distensible.

Four described and at least 3 undescribed genera, 1 in our area.

Genus *Cetomimus* Goode & Bean, 1896

Nine described species and at least 5 undescribed species; 2 species known from our area. Generic synopsis by Maul (1969).

KEY TO SPECIES

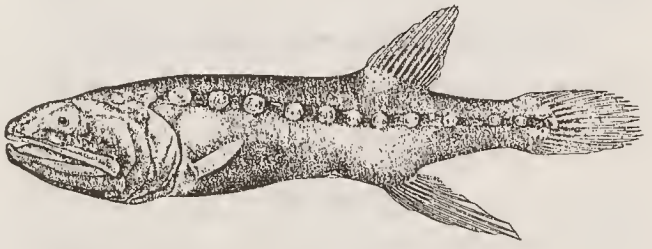
1a Gills 3, with small slit behind 3rd arch; 21 LL pores and organs behind gill opening ..... *C. picklei*

1b Gills 4, with well-developed slit behind 4th arch; 14 LL pores and organs behind gill opening ..... *C. indagator*

135.1 *Cetomimus indagator*
Rofen, 1959

Cetomimus (Psapharocetus) indagator Rofen, 1959: 255, Pl.1, Fig. 1 (off Port St. Johns, Transkei); Maul, 1969: 8; Smith, 1961: 566, **No. 209a.**

D 14; A 13; vertebrae 42. GR absent, replaced by small knobs covered



135.1 *Cetomimus indagator:* 15 cm holotype (after Rofen, 1959).

with minute teeth, 3+9-10 on 1st arch. No lappets over A; small amount of cavernous tissue at A origin, none elsewhere.

Colour dark brown. Only known specimen, 118 mm SL, trawled in 3 620 m.

135.2 *Cetomimus picklei*
(Gilchrist, 1922)

Pelecinomimus picklei Gilchrist, 1922: 56, Pl. 9, Fig. 1 (off Cape Town in 1 014 fms); Smith, 1935: 180; Maul, 1964: 8. *Cetomimus picklei*: Smith, **SFSA No. 209*.**

D 16; A 16; vertebrae 56. No GR; several rows of minute teeth along 1st gill arch. No lappets over A; cavernous tissue from 1st to 6th A ray; none elsewhere.

Colour dark brown. The data given above are from a re-examination of the 56 mm SL holotype and only known specimen.

135.2 *Cetomimus picklei*: 7 cm holotype (photo by John Fields).

Family No. 136: RONDELETIIDAE

by J.R. Paxton & D.J. Bray

Redmouth whalefishes **Rooibek-walvis-visse**

Small, orange-brown, midwater fishes. No scales; lateralis system of vertical rows of papillae on body. Mouth moderate and terminal, extending to under eye. Abdominal ribs present. No fin spines; pelvic fins abdominal, with 5-6 rays. Vertebrae 24-27. Belly not highly distensible.

One genus with 2 species. Family synopsis by Paxton (1974).

Genus ***Rondeletia*** Goode & Bean, 1896

Two species; 1 in our area.

136.1 *Rondeletia loricata*
Abe & Hotta, 1963

Rondeletia loricata Abe & Hotta, 1963: 43, Pl. 11, Figs. 1-7, Pl. 12, Figs. 8-9 (off Kesen-numa, Miyagi Prefecture, Japan); Paxton, 1974: 177*; Shcherbachev et al., 1978: 188. *Rondeletia bicolor* (*non* Goode & Bean): Grindley & Penrith, 1965: 283.

D 13-16; A 13-16; P 9-11; GR (4-6)+(14-15); vertical rows of LL papillae 14-19. No bony hook over orbit; supratemporal and cleithrum with large posterior bony extensions. Snout to A 77-82% SL.

Attains 11 cm. Three specimens taken off our south coast in 500 - 1 130 m. Uncommon; Atlantic, Indian and Pacific oceans.

136.1 *Rondeletia loricata*: 8.5 cm SL (off California; after Larson).

Family No. 137: BARBOURISIIDAE

by J.R. Paxton & D.J. Bray

Red whalefish **Rooi walvis-vis**

Moderate-sized, reddish-orange pelagic fishes. Scales minute, embedded, with small central spine, covering head and body. Lateralis system a broad tube with small pores. Mouth large and terminal, jaws extending far behind small eye. No fin spines; pelvic fins abdominal, with 6 rays. Belly moderately distensible. Vertebrae 40-43; abdominal ribs present.

A single genus with 1 species.

137.1 *Barbourisia rufa*
Parr, 1945
PLATE 18

Barbourisia rufa Parr, 1945: 128, Pl. 1 (Gulf of Mexico); Rofen, 1959: 259*; Talbot, 1960: 257; Smith, 1961: 566, **No. 208a*;** Trunov, 1968: 135*; Penrith, 1969: 67; Parin & Golovan, 1976: 265; Shcherbachev et al., 1978: 188.

D 19-22; A 15-18; P 13-14; GR (5-6)+(14-16); LL pores 28-33.

Attains 33 cm. Occasionally trawled off west coast in 550 - 1 500 m. Rare; Atlantic Ocean between 56°N and 35°S, Indian Ocean between 5°S and 12°S and Pacific Ocean between 45°N and 22°S.

137.1 *Barbourisia rufa*: 21 cm (Madagascar; after Rofen, 1959).

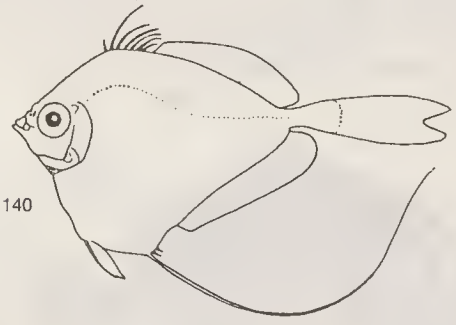
Order ZEIFORMES

Body oblong or disc-like, more or less compressed. Dorsal fin spines 5-10; anal fin spines 0-4; pelvic fins thoracic, with or without a spine and 5-10 soft-rays; caudal fin with 13 or 15 principal (segmented) rays and 11 or 13 branched rays; dorsal, anal and pectoral rays unbranched. Gills 3½ (no slit behind last hemibranch); branchiostegal rays 7 or 8; gill openings unrestricted. Orbitosphenoid bone, subocular shelf and supramaxilla absent.

Rosen (1984) has proposed a radical hypothesis of relationship between zeiform fishes and the plectognaths, which he then unites in the Order Tetraodontiformes. Until Rosen's evidence has been critically evaluated by other workers, we will maintain the status quo in the classification of the Zeiformes. Five families are provisionally recognised (Heemstra, 1980). *Parazen pacificus* Kamohara, 1935, of the monotypic Family Parazenidae, may occur in our area, as it has been found off Tanzania. It has 2 lateral lines and pelvic fins with 7 soft-rays and no spine.

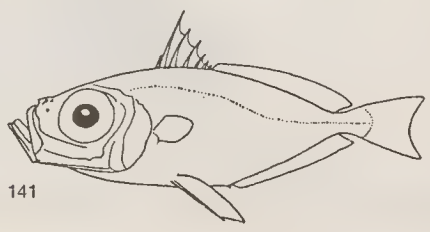
KEY TO FAMILIES

1a Mouth very small, upper jaw length contained twice in eye diameter; scales vertically elongate; branched caudal fin rays 13 ..... GRAMMICOLEPIDIDAE (No. 140)


140

1b Mouth large or moderate, upper jaw length less than twice in eye diameter; scales small or absent but not vertically elongate; branched caudal rays 11 2

2a Body depth subequal to head length, 2.3-2.7 in SL; anal fin spine weak or absent ..... ZENIONTIDAE (No. 141)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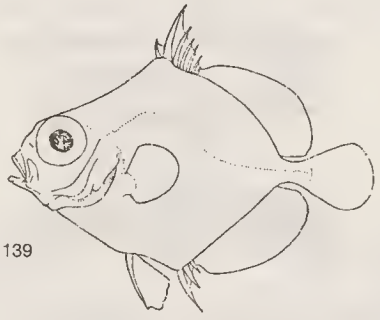
2b Body depth distinctly greater than head length, 0.9-2.1 in SL; anal fin with 1-4 distinct spines 3

3a Preorbital depth (least distance from eye to maxilla) distinctly less than ½ eye diameter; dorsal fin spines 4-8; pelvic fins with 1 spine and 5-7 soft-rays ..... OREOSOMATIDAE (No. 139)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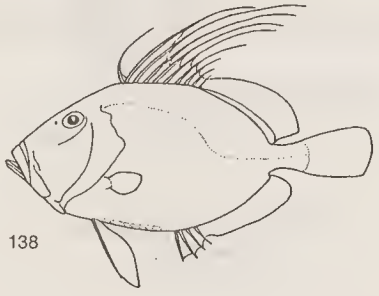
3b Preorbital depth 0.5-2.3 times eye diameter; dorsal fin spines 7-11; pelvic fins with 5-10 soft-rays and with or without a spine ..... ZEIDAE (No. 138)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Family No. 138: ZEIDAE

by P.C. Heemstra

Dories **Dories**

Body oval, compressed; depth greater than head length, 1.0-2.1 in SL. Scales small, rudimentary or absent. Head compressed; mouth large, oblique; upper jaw very protrusible; no spines or serrae on opercular bones. Principal caudal fin rays 13, branched rays 11. Dorsal, anal and pectoral fin rays unbranched. Vertebrae 29-34; 7 branchiostegals.

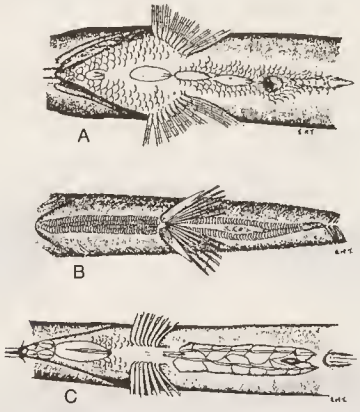
Near bottom fishes, common in trawls from 100 to 300 m. Five genera with a total of 9 species; the 5 South African species recently revised by Heemstra (1980).

KEY TO GENERA

1a V with 9 or 10 soft-rays and no spine; A I-II,29-30; thoracic region broad and flattened ventrally . . . . . *Cyttopsis*
1b Total V elements (spine + rays) 6-8; A II-IV,20-39 2

2a A II,37-39; body covered with small ctenoid scales; no bony plates or spines along base of D & A . . . . . *Cyttus*
2b A III-IV,20-26; scales cycloid, rudimentary (embedded) or absent; large bony bucklers or spines along base of D & A 3

3a A III,24-26; bony bucklers (5 or 6) along base of both spiny and soft-rayed D . . . . . *Zenopsis*
3b A IV,20-23; bony bucklers or spines only along soft D base . . . . . *Zeus*



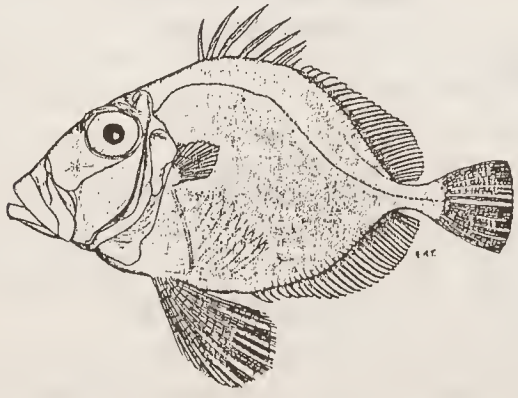
Chests and bellies of A. *Cyttopsis roseus:* 18.5 cm SL specimen; B. *Cyttus traversi:* 35.5 cm SL specimen; C. *Zeus capensis:* 27.5 cm SL specimen.

Genus ***Cyttopsis*** Gill, 1862

One species.

138.1 *Cyttopsis roseus*
(Lowe, 1843)
PLATE 17

Zeus roseus Lowe, 1843: 85 (Madeira). *Paracyttopsis scutatus* Gilchrist & von Bonde, 1924: 18, Pl. 5 (Natal). *Zen scutatus:* Smith, **SFSA No. 274.** *Cyttopsis roseus:* Heemstra, 1980: 5*.



138.1 *Cyttopsis roseus:* 18.5 cm SL (off Durban).

D VII-VIII/28-30; A I-II,29-30 (1st spine short, broad and immovable; 2nd spine very small); P 13-14; V 9-10; GR rudimentary, 1+8. Depth 1.7-2.0, head 2.4-2.8 in SL; eye 2.3-2.9 in head. Scales small, cycloid; 2 keeled scutes between V and anus; row of low bony ridges on each side along base of soft D and A. Jaws with bands of villiform granular teeth; similar teeth on vomer.

Rosy pink and silvery in life; V reddish, the membranes black. Attains 22 cm. Off Natal in 400 - 600 m; in eastern Atlantic from France to southern Angola, from the Caribbean and Gulf of Mexico and off southwest coast of India, Maldives and Japan.

Genus ***Cyttus*** Günther, 1860

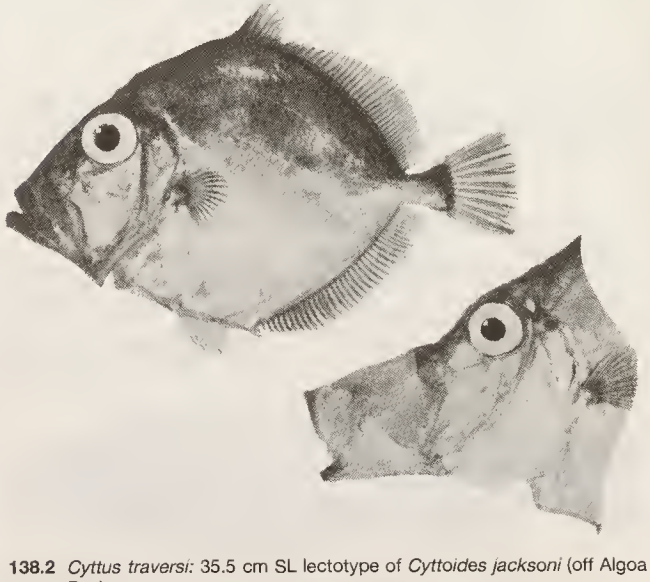
Three species; 1 in our area.

138.2 *Cyttus traversi*
Hutton, 1872

Cyttus traversi Hutton, 1872: 19 (Saltwater Creek, Canterbury, New Zealand); Heemstra, 1980: 7*; Trunov, 1982: 51. *Cyttus ventralis* Barnard & Davies, 1947: 790, Fig. (near Cape Town). *Cyttoides jacksoni* Smith, 1947: 795 (Algoa Bay). *Cyttoidops mccullochi:* Smith, **SFSA No. 268***; Karrer, 1973: 232*.

D IX-X/35-37; A II,36-38; P 17-18; V I,6; lower GR 12,iv. Depth 0.9-1.6, head 2.0-2.6 in SL; eye 2.6-4.0 in head. Scales small, ctenoid, covering body, also on cheeks; D and A with a sheath at their base of 2 rows of scales; zip-like double row of small scutes from sternal angle to anus. Narrow band of villiform teeth on jaws and vomer.

Juveniles (to 10 cm) silvery with brown blotches; adults silvery grey; 1st D black distally. Attains 50 cm. Walvis Ridge and off Cape Town to Algoa Bay in 360 - 460 m; south coast of Australia and New Zealand.



138.2 *Cyttus traversi:* 35.5 cm SL lectotype of *Cyttoides jacksoni* (off Algoa Bay).

Genus ***Zenopsis*** Gill, 1862

Two species; *Z. nebulosus* (Temminck & Schlegel) from Japan and Australia has D VIII-IX,27-29; 12-14 dorsal bucklers and 8 or 9 along base of A.

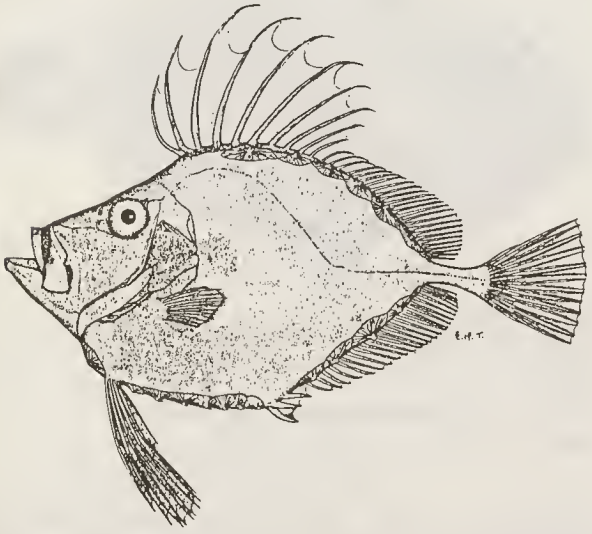
138.3 *Zenopsis conchifer*
(Lowe, 1850)

Buckler dory — Beukelaar-dorie

Zeus conchifer Lowe, 1850: 247 (Madeira). *Zenopsis ocellatus:* Schnakenbeck, 1931: 29*. *Zenopsis conchifer:* Smith, **SFSA No. 269;** Heemstra, 1980: 11*.

D IX-X,24-26; A III,24-26; P 12; V I,5; ii+2,vi. Depth 1.7-1.9, head 2.5-2.7 in SL; eye 4.1-4.6 in head. Scales absent; 7 large bucklers along D bases, 5 or 6 along base of A; 2 rows of 7 or 8 keeled scutes, each ending in a small spine, between V and A; 2 bucklers in front of V. One or 2 rows of small teeth on jaws and a few on vomer.

Body silvery, with a dusky midlateral spot just posterior to, and slightly above, end of P. Attains 80 cm. Walvis Bay to Natal and north to Kenya in 90 - 360 m; eastern Atlantic, and off North and South America.



138.3 *Zenopsis conchifer:* 14 cm SL (off Natal).

Genus ***Zeus*** Linnaeus, 1758

Two species; both in our area.

KEY TO SPECIES

1a Blue-black ocellus below LL at tip of P; 5-8 large bucklers, each with 1 or 2 spines, along base of soft D & A ..... *Zeus faber*

1b Black spot (sometimes indistinct) surrounded by several smaller silver spots, on or above LL and below anterior soft D rays; 9-13 spines along base of soft D & A ..... *Zeus capensis*

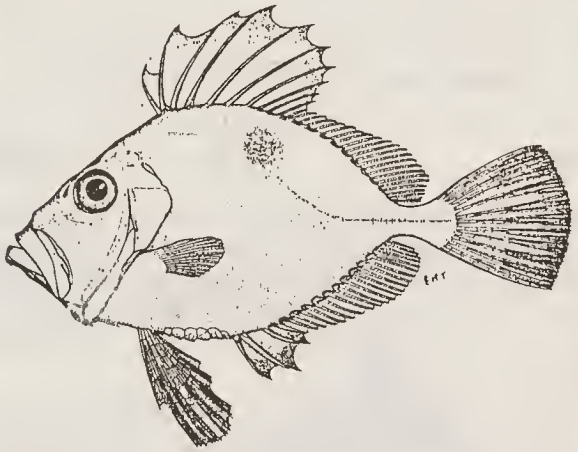
138.4 *Zeus capensis*
Valenciennes, 1835

Cape dory — Kaapse dorie

Zeus capensis Valenciennes, *in* Cuv. & Val., 1835: 23 (Cape of Good Hope); Barnard, 1925: 373*; Heemstra, 1980: 9*. *Zeus faber* (*non* Linnaeus): Smith, **SFSA No. 270*;** Smith & Smith, 1966: 118*.

D IX-X/22-24; A IV/20-22; P 13-14; V I,6; GR rudimentary (4-5)+ (13-18). Depth 1.5-2.1, head 2.2-2.8 in SL; eye 2.8-4.1 and 2nd D spine 2.0-2.9 in head. Scales rudimentary, not imbricate; 10-12 broad-based spines along each side of soft D base; 9-13 spines along base of A (not counting those on bases of A spines); 2 rows of 7-10 spiny scutes from A origin to V bases.

Head and body silvery grey; indistinct dusky spot on or above LL and below front of soft D. Attains 90 cm. St. Helena Bay to Natal in 35 - 200 m; endemic to this region.



138.4 *Zeus capensis:* 17.5 cm SL (off Algoa Bay).

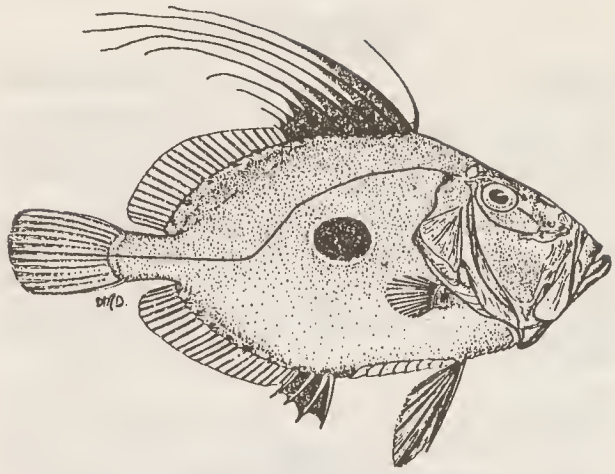
138.5 *Zeus faber*
Linnaeus, 1758
PLATE 17

John Dory — Jandorie

Zeus faber Linnaeus, 1758: 267 ("*Habitat in Pelago*"); Heemstra, 1980: 8*. *Zeus japonicus:* Smith, **SFSA No. 271*;** Smith & Smith, 1966: 118*.

D IX-XI/22-24; A IV/20-23; P 13-14; V I,6-7; GR rudimentary (4-5)+ (7-11). Depth 1.6-2.1, head 2.3-2.8 in SL; eye 3.4-6.7 in head; 2nd D spine 1.2-1.4 in head. Scales rudimentary, not imbricate; 5-8 large bucklers along base of soft D and A; 2 rows of 7-10 spiny scutes from V to A. Narrow band of minute canines on jaws and vomer.

Attains 60 cm. An excellent food-fish. Common along our whole coast, and north to Kenya in 60 - 360 m; Mediterranean and eastern Atlantic from Norway to South Africa, Australia, New Zealand and Japan.



138.5 *Zeus faber:* 30 cm (off Algoa Bay).

Family No. 139: OREOSOMATIDAE

by Ch. Karrer

Oreos **Oreos**

Body deep and compressed. Head broad, dorsally flat, superficial bones very rough; eye large to huge. Upper jaw protrusible; 1-2 rows of tiny teeth on jaws, sometimes on vomer. Fin spines longitudinally grooved, soft-rays of dorsal, anal and pectoral fins not branched. Scales ctenoid or cycloid.

Adults benthopelagic on continental slope; a pelagic prejuvenile stage, called *Oreosoma,* is quite different in shape with expanded belly, groups of enlarged transformed scales and a spotted or marbled pattern. In temperate waters of all oceans, especially of the southern hemisphere and Antarctic; common in some areas. Four genera with a total of 8 species. Revision in preparation (Karrer & Eschmeyer).

KEY TO GENERA
(only for adult specimens)

1a First visible D spine longer than 2nd; V I,5 . . . . . *Pseudocyttus*
1b First D spine much shorter than 2nd; V I,6-7 2

2a Predorsal profile convex, straight or slightly concave, never rising abruptly before D . . . . . *Allocyttus*
2b Predorsal profile concave, rising distinctly before D 3

3a Scales on sides of body cycloid, deciduous; postorbital distance less than ½ eye diameter . . . . . *Oreosoma*
3b All scales strongly ctenoid; postorbital distance more than ½ eye diameter . . . . . *Neocyttus*

Genus ***Allocyttus*** McCulloch, 1914

Three species; 1, possibly 2 in our area.

KEY TO SPECIES

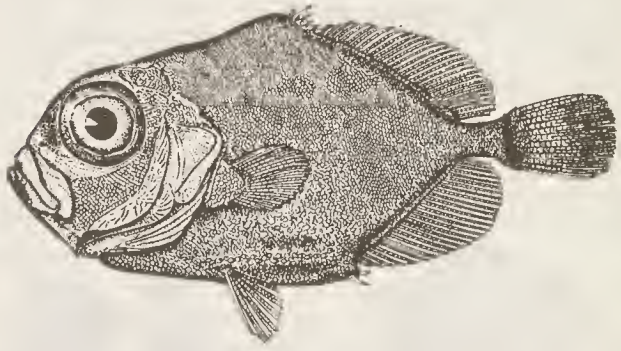
1a Scales strongly ctenoid; 2 rows of enlarged scales horizontally on belly . . . . . *A. verrucosus*
1b All scales strongly adherent, but smooth to touch; no enlarged scales on belly . . . . . *A. guineensis*

139.1 *Allocyttus guineensis*
Trunov & Kukuev, 1982

Allocyttys guineensis Trunov & Kukuev, 1982: 45, Fig. (off Angola); Karrer & Eschmeyer (in press).

D IV-VI,30-32; A II,26-29; P 17-18; LL 84-92 (+1-5); GR (3-6)+(17-22). Depth 1.5-1.8; head 2.3-2.5. Body rhomboidal. Scales cycloid, mostly with an elevated centre. Radiating bony ridges on unscaled operculum very fine. All fin spines very weak. Belly of prejuveniles not much enlarged, with a lateral row of 4 small scaled hillocks and ending in a tiny cone; 2 similar ones in a swollen area before and below D_1.

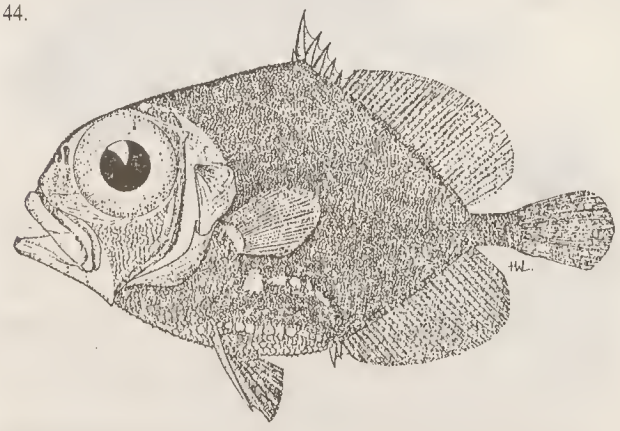
Prejuveniles and larger specimens (largest known 232 mm SL) uniformly dark brown. Largest known specimens still with juvenile characters. One specimen caught at 33°S, 2°E; also in southern Gulf of Guinea and eastern Central Atlantic. Known from depths of 360 to 1 900 m; perhaps a pelagic species.



139.1 *Allocyttus guineensis:* 22.5 cm SL holotype (after Trunov, 1982).

139.2 *Allocyttus verrucosus*
(Gilchrist, 1906)

Cyttosoma verrucosum Gilchrist, 1906: 151, Pl. 40 (off Cape Point); *Allocyttus verrucosus:* Smith, **SFSA No. 277*;** 1961: 568; Karrer, 1973: 232; Mel'nikov, 1980: 99; 1981: 178; Pakhorukov, 1981: 27; Trunov, 1982: 44.



139.2 *Allocyttus verrucosus:* ca. 20 cm (off South Africa).

D V-VII,29-33; A II-III,27-31; P 17-20; V I,6; LL 83-91; GR (5-6)+(19-22). Depth 1.4-1.7; head 2.2-2.7, both measurements from specimens longer than 12 cm. Shape rhomboidal. Scales ctenoid. Operculum covered with radiating bony ridges, unscaled. Prejuveniles with 2 rows of enlarged scales low on belly; less distinct with age, but their remnants may still be seen on large fishes.

Adults blackish violet; prejuveniles silvery, back greenish with large grey blotches, disappearing at about 12 cm. Attains at least 38 cm. Feed mainly on shrimps, cephalopods and fish. Common between 400 and 1 500 m, from Walvis Bay to Mozambique Channel; also known from Walvis Ridge, Gulf of Guinea, off Mauretania, western Atlantic and Australia.

Genus ***Neocyttus*** Gilchrist, 1906

Three species, 1 in our area and another likely to be found here.

KEY TO SPECIES

1a Snout fully scaled; no prominent spines at front of preorbitals . . . . . *N. rhomboidalis*

1b No scales across front of snout; 2 strong spines or lumps on anterior part of preorbitals . . . . . *N. acanthorhynchus* Regan, 1908 (1 specimen known from Saya de Malha Bank, western Indian Ocean)

139.3 *Neocyttus rhomboidalis* Gilchrist, 1906

Neocyttus rhomboidalis Gilchrist, 1906: 153, Pl. 42 (off Cape Point); Smith, **SFSA No. 278***; Karrer, 1973: 233; Pakhorukhov, 1981: 28.

D VII,33-35; A III-IV,30-33; P 19-21; V I,6; LL about 95-110; GR (4-5)+(16-18). Depth 1.3-1.5; head 2.3-2.6. Body elevated, greatest depth between origins of D and A; concavity of predorsal profile variable. Caudal peduncle relatively short and deep. Operculum dorsally with radiating ridges, ventrally scaled. Fin spines long and stout; soft-rays of D and A with lateral spinules at their bases. Scales ctenoid. The smallest known specimen (95 mm) already has the adult shape.

Body grey, fins dark. Attains 34 cm. At depths of 460 - 900 m from Walvis Bay to Cape; also off Argentina and Australia.

139.3 *Neocyttus rhomboidalis:* 12 cm (off South Africa).

Genus ***Oreosoma*** Cuvier, 1829

Oreosoma, described from a 35 mm prejuvenile (Cuvier, 1829), has priority over *Cyttosoma* Gilchrist, 1904. Monotypic.

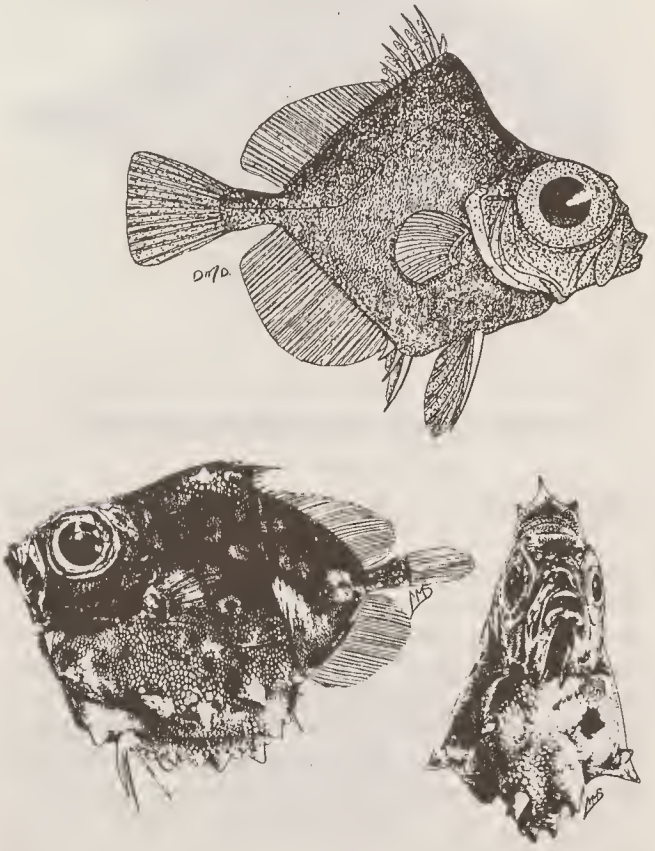
139.4 *Oreosoma atlanticum* Cuvier, 1829

Oxeye dory — Osoog-dorie

Oreosoma atlanticum Cuvier, *in* Cuv. & Val., 1829: 515, Pl. 99 (as *O. coniferum*) (Atlantic Ocean); Smith, 1961: 565*; Trunov, 1982: 50. *Cyttosoma boops* Gilchrist, 1904: 6, Pl. 23 (near Cape Point); Smith, **SFSA No. 275***.

D VI-VIII,29-31; A II-III,28-31; P 19-21; V I,6-7; LL 85- 100; GR (4-5)+(22-26). Depth 1.4-1.7, head 2.4-2.7 for specimens of 11-15 cm SL. Body deep, similar to *Neocyttus*, but predorsal profile extremely concave. Caudal peduncle long and slender. Eye more than ½ head length; operculum with a strong horizontal bony ridge. Fin spines slender, strong. Scales on sides of body cycloid, very deciduous; enlarged scales inconspicuous, when present on back and belly. Prejuveniles with belly much expanded laterally with a row of 5 large cones; other cones beside ventral midline and on predorsal area.

Life colour of adults unknown; prejuveniles blackish violet, cones and irregular blotches on back greenish silvery. Attains 21 cm. In 220 - 1 550 m around South Africa between 30° and 35°S, and off Australia.



139.4 *Oreosoma atlanticum:* top: 15 cm; bottom: 11 cm front and side views (off Cape Town).

Genus ***Pseudocyttus*** Gilchrist, 1906

Prejuveniles described as *Xenocyttus* Abe, 1957. Monotypic.

139.5 *Pseudocyttus maculatus*
Gilchrist, 1906

Pseudocyttus maculatus Gilchrist, 1906: 153, Pl. 41 (off Cape Point); Karrer, 1973: 233*; Pakhorukov, 1981: 28; Trunov, 1982: 49. *Cyttosoma maculatus:* Smith, **SFSA No. 276;** Penrith, 1969: 69. *Xenocyttus nemotoi* Abe, 1957: 228, Pls. 1, 2 (Antarctic); Abe & Suzuki, 1981: 123*.

D V-VI,34-36, A II-III,31-34; P 19-21; V I,5; LL about 98-110; GR (6-7)+(17-21). Depth 1.5-1.8; head 2.6-3.2, both measurements from specimens longer than 13 cm. Body rhomboidal. Operculum fully scaled. Fin spines weak. Scales on sides of body cycloid, deciduous. Specimens less than 12 cm are unknown; prejuveniles with 3 small hillocks in a line on belly.

The largest specimen, a ripe female of 50 cm, was (freshly caught) chocolate brown, fins darker; prejuveniles silvery, completely covered with numerous dark spots of various sizes, becoming larger with age but still visible on preserved specimens of 25 cm. In 460 - 1 160 m from Walvis Bay to the Cape; also Walvis Ridge, western Atlantic, New Zealand, and Southern Ocean.

139.5 *Pseudocyttus maculatus:* 31 cm (New Zealand).

Family No. 140: GRAMMICOLEPIDIDAE

by Ch. Karrer & P.C. Heemstra

Tinselfishes **Klatergoudvisse**

Body deep and compressed; scales much elongated vertically, covering body and most of head; a row of small spines along each side of dorsal and anal fin bases. Mouth very small; maxilla ridged, bound to ascending process of premaxilla, loosely connected to palatines. Jaws with 1 or 2 rows of minute slender teeth, none on vomer or palatines. Caudal fin branched rays 13; pelvic fin rays I,6; gills $3\frac{1}{2}$, no slit behind last hemibranch; branchiostegal rays 7, the membranes joined to isthmus. In young specimens, the 1st anal spine is greatly prolonged, reaching to or well beyond caudal fin, and the 2nd dorsal spine is usually longer than the head; these prolonged fin rays become greatly shortened in adults.

Tinselfishes occur worldwide (but not in polar seas) at depths of 100 - 800 m; 2 genera, each with 1 species. Revision in preparation by Karrer & DeWitt.

KEY TO SPECIES

1a Total D spines + soft (segmented) rays = 32-35; no spiny scutes on body at any stage . . . . . *Xenolepidichthys dalgleishi*

1b Total D spines + soft-rays = 39-41; young (less than 24 cm SL) with 10 or 11 widely separated spiny scutes on sides of body and caudal peduncle . . . . . *Grammicolepis brachiusculus*

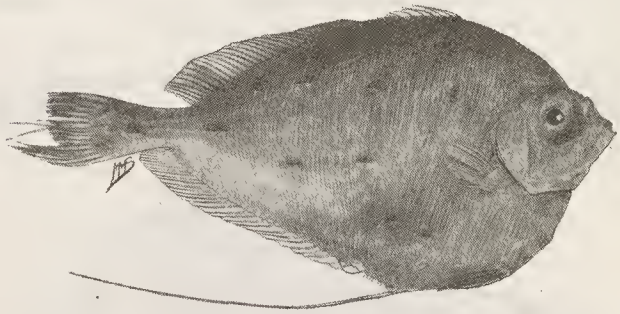
140.1 *Grammicolepis brachiusculus*
Poey, 1873
PLATE 24

Thorny tinselfish **Doring-klatergoudvis**

Grammicolepis brachiusculus Poey, 1873: 403, Pl. 12 (Cuba); Quero, 1979: 573*; Trunov, 1982: 42. *Xenolepidichthys americanus:* Barnard, 1948: 363*; Smith, **SFSA No. 279a.** *Daramattus armatus* Smith, 1960: 231, Pls. 3 & 4; 1961: 566, **No. 279a*** (name change); 1968: 7*; Trunov, 1982: 42. *Daramattus barnardi* Smith, 1968: 8 (on *Xenolepidichthys americanus* of Barnard, 1948; off Table Bay).

D VI-VII,32-34; A II+33-35; P 14-15; GR rudimentary, (1-2)+12; 34-36 spines along base of D and A; vertebrae 43-46. Prejuveniles with body depth 1.4-1.6 (2.0-2.3 in adult), head length 3.2-3.8 (4.2-4.4 in adult) in SL; body with conspicuous, horizontally flattened spiny scutes. Metamorphosis from prejuvenile stage occurs at about 25-30 cm SL, at which time the body becomes more elongate, the spiny scutes are lost and the prolonged fin rays greatly shortened.

Body silvery; young with irregular black blotches on body, black spots on C, and 5 black bars on A. Attains 64 cm. Saldanha Bay to Durban in 400 - 800 m; Japan, Hawaii and both sides of Atlantic Ocean.



140.1 *Grammicolepis brachiusculus:* 24 cm holotype of *Daramattus barnardi* (off Table Bay).

140.2 *Xenolepidichthys dalgleishi*
Gilchrist, 1922

Tinselfish **Klatergoudvis**

Xenolepidichthys dalgleishi Gilchrist, 1922: 73, Pl. 12, Fig. 1 (Natal); Smith, 1935: 184*; Barnard, 1948: 361*; Smith, **SFSA No. 279*.**

D V,27-30; A II+27-29; P 14-15; GR rudimentary; 29 spines along base of D, 26-27 along A base; vertebrae 36-37. Depth 0.8-1.2, head 2.9-3.7 in SL; eye 2.0-2.5 in head (for specimens 5-12 cm SL).

Body silvery, with round black spots; anterior V rays and end of C black. Attains 15 cm. Walvis Bay to Natal; Atlantic and Indo-West Pacific oceans.

140.2 *Xenolepidichthys dalgleishi*: 5 cm (off Port Alfred).

Family No. 141: ZENIONTIDAE

by P.C. Heemstra

Zeniontids **Zeniontiede**

Body elongate oval, depth subequal to head length, about 2.5 in SL. Upper jaw extremely protrusible, its length subequal to eye diameter; minute teeth on jaws. Vertebrae 25-27; branchiostegal rays 7 or 8; pelvic fins I,6, broadly separated.

Fairly deep-water fishes (300 - 600 m). Two or 3 genera with a total of 7 species; 1 genus and 2 species in our area. Head length is measured with upper jaw retracted.

Genus ***Zenion*** Jordan & Evermann, 1896

Four species have been described, but *Z. japonicum* Kamohara, 1934 and *Z. longipinnis* Kotthaus, 1970 are apparently synonyms of *Z. hololepis*.

KEY TO SPECIES

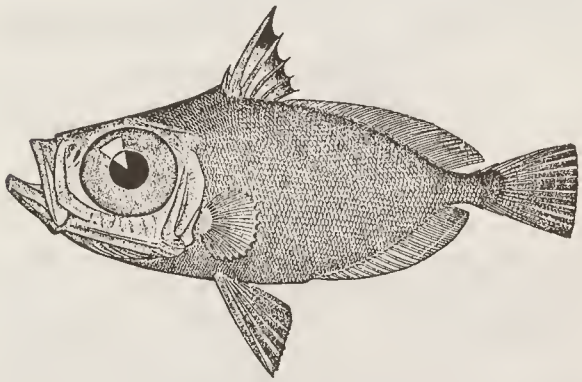
1a A I+28-32 ..... *Z. leptolepis*
1b A I+23-28 ..... *Z. hololepis*

141.1 *Zenion hololepis*
(Goode & Bean, 1896)

Cyttus hololepis Goode & Bean, 1896: 225, Fig. 233 (Caribbean). *Zenion hololepis*: Smith, **SFSA No. 272*.**

D VI-VII,25-28; A I+23-28; P 16; lower GR 14-16. Depth 2.5, head 2.7 in SL; eye 1.9-2.1 in head. Second D spine longest, equals eye diameter, serrate on front margin; a row of small scutes along base of soft D & A.

Body reddish. Attains 10 cm. Caribbean and eastern Atlantic; reported from 440 m off Delagoa Bay by Gilchrist & von Bonde (1924: 17). Data taken from Goode & Bean, 1896; Poll, 1954, and 2 specimens from off Tanzania.



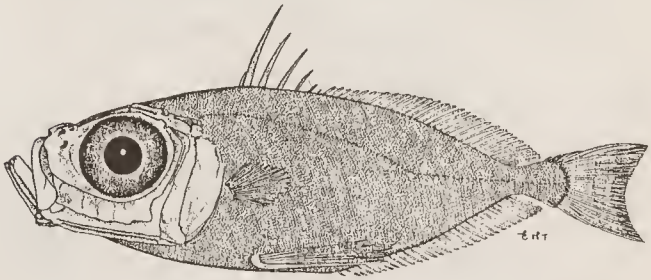
141.1 *Zenion hololepis*: ca. 8 cm (after Goode & Bean, 1896).

141.2 *Zenion leptolepis*
(Gilchrist & von Bonde, 1924)

Cyttus leptolepis Gilchrist & von Bonde, 1924: 17 (Natal & off Delagoa Bay). *Zenion leptolepis*: Smith, **SFSA No. 273.**

D VI-VII,28-31; A I+28-32; P 15-17; GR i+13-15 plus 1 or 2 rudiments. Depth 2.5-2.8, head 2.8 in SL; eye 2.0-2.3 in head.

Attains 16 cm. Natal, Delagoa Bay and Kenya in 330 - 700 m.



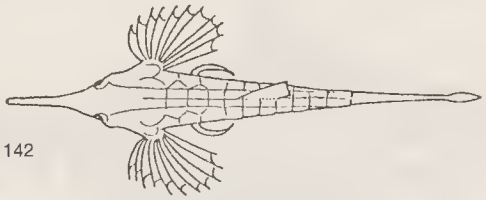
141.2 *Zenion leptolepis*: 7 cm SL (Kenya).

Order SYNGNATHIFORMES

The Order Syngnathiformes comprises 7 families of highly specialised species derived from some primitive acanthopterygian. Some authors include the Gasterosteriformes in this order (Pietsch, 1978; Lauder & Liem, 1983), but the evidence for this relationship is not convincing. Anterior vertebral centra elongated; branchiostegal rays 1-5.

KEY TO FAMILIES

1a Head and body depressed, the scales fused into a bony armour; large bony rostrum projecting over the small protrusile mouth; pectoral fins enlarged, wing-like, horizontal ..... PEGASIDAE (No. 142)



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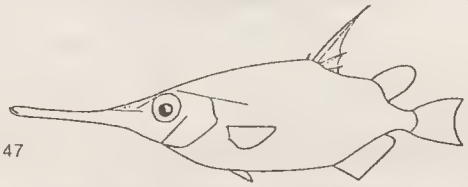
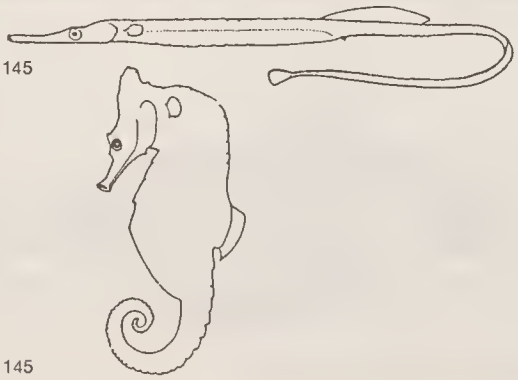
1b Head and body elongated or S-shaped with a curled prehensile tail, or the body is deep and compressed with minute prickly scales; mouth at the end of a long tubular snout 2

2a Body compressed, deep; scales like shark denticles, with sharp ridges and spines; bony plates above pectoral fins and/or along ventral midline of body; first dorsal fin with 5-8 spines, the second spine much enlarged ..... MACRORAMPHOSIDAE (No. 147)



147

2b Body elongated; scales not as above; dorsal fin spines (if present) 8-12 isolated, short, subequal, weak spines 3



145

145

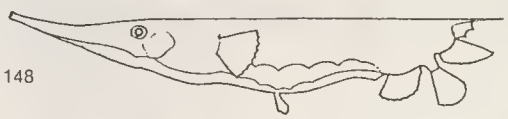
3a Pelvic fins absent; body encased in a series of bony rings; gill opening restricted to a small pore on dorsolateral part of head; gill filaments tufted, lobate ..... SYNGNATHIDAE (No. 145)

3b Pelvic fins present; body armoured or not; gill openings not restricted 4

4a Head and body greatly compressed and covered with bony plates or a stiff transparent integument; maximum length 16 cm 5

4b Body naked or covered with ordinary small scales; maximum length up to 150 cm 6

5a Body covered with a smooth, stiff, transparent armour with a sharp ventral edge; pelvic fins small, with 4 short rays; caudal and dorsal fins deflected to ventral edge of body ..... CENTRISCIDAE (No. 148)

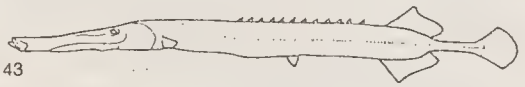


148

5b Body mostly covered with ridged bony plates, those along sides of tail with short spines as well as ridges; pelvic fins enlarged, with 7 rays; caudal and dorsal fins in the usual positions ..... SOLENOSTOMIDAE (No. 146)

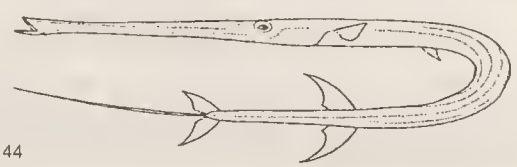
146

6a Body compressed, with small scales; soft dorsal fin preceded by a row of 8-12 isolated, feeble spines; chin with a fleshy barbel; caudal fin rounded ..... AULOSTOMIDAE (No. 143)



143

6b Body depressed, naked (juveniles with rows of small, hooked spinules; a row of elongated bony plates may be present on dorsal and ventral midlines in front of dorsal and anal fins; no chin barbel; caudal fin forked, the middle 2 rays fused and greatly elongated ..... FISTULARIIDAE (No. 144)



144

Family No. 142: PEGASIDAE

by M.M. Smith

Seamoths **Seemotte**

Armoured body with bony rings, tail similar but flexible; pelvic fins abdominal, of 1 slender spine and 1-2 rays; pectoral fins enlarged, horizontal, but not used in aerial gliding; enlarged nasal bone forms rostrum projecting well forward above the small toothless mouth.

Cryptic colouring and a strange shape enable seamoths to live undetected in weed. Nothing is known of their biology, thus their breeding habits are still a mystery. Four genera with 5 species all restricted to the Indo-Pacific; 2 recorded from our area.

KEY TO GENERA

1a 8 tail rings; 2 deep grooves behind head; rostrum rounded in front ..... *Eurypegasus*
1b 12 tail rings; no grooves behind head; rostrum sword-like ..... *Pegasus*

Genus ***Eurypegasus*** Bleeker, 1863

Chubby, short-tailed; 2 species: *E. papilio* (Gilbert, 1905) from deep water off Hawaii and 1 in our area.

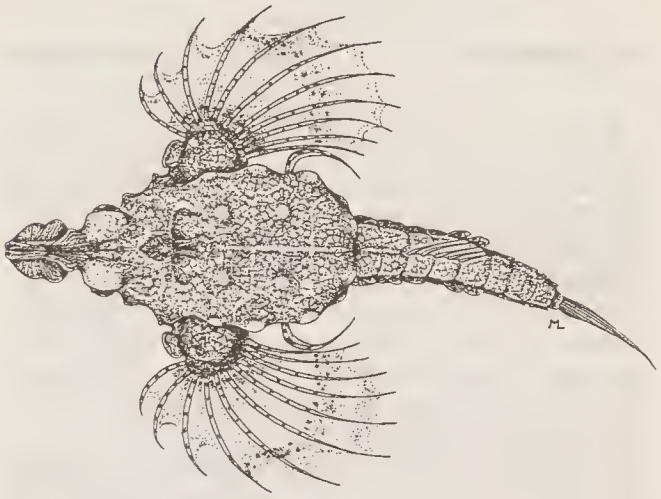
142.1 *Eurypegasus draconis*
(Linnaeus, 1766)
· PLATE 24

Seamoth Seemot

Pegasus draconis Linnaeus, 1766: 418 (India); Smith, **SFSA No. 371*.**

D 5; A 5; P 10-12; V I,2; 3 body rings, 8 tail rings, 7 behind vent, some spines on side of tail.

Attains 10 cm. Indo-West Pacific along the shore to Algoa Bay; rare in our area.



142.1 *Eurypegasus draconis:* 9 cm (Inhaca Id.).

Genus ***Pegasus*** Linnaeus, 1758

Tail longer than rest of body; monotypic.

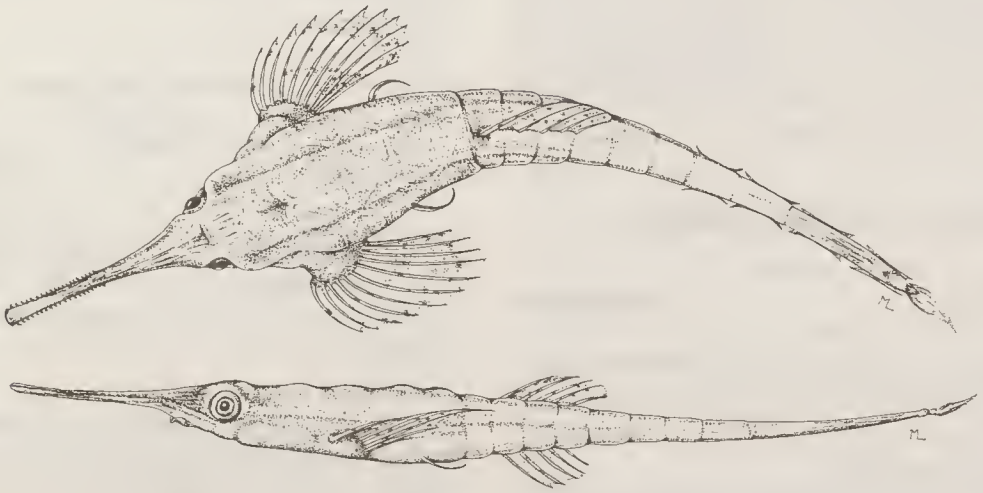
142.2 *Pegasus volitans*
Linnaeus, 1758

Longtail seamoth Langstert-seemot

Pegasus volitans Linnaeus, 1758: 338 (China). *Pegasus natans:* Smith, **SFSA No. 372*.**

D 5; A 5; P 11; V I,2; body of 3 rings; 12 tail rings, with a fine spine at each end of each plate on rear part of tail; rostrum sword-like with short retrorse spines.

Brownish, sometimes banded or spotted, fins with darker spots. Attains 175 mm. Tropical Indo-West Pacific; quiet waters of estuaries and bays south to Durban; rare.



142.2 *Pegasus volitans:* 7.5 cm dorsal and lateral views (Inhaca Id.).

Family No. 143: AULOSTOMIDAE

by P.C. Heemstra

Trumpetfishes **Trompetvisse**

Body very elongate, somewhat compressed, covered with small ctenoid scales. Head very compressed; snout produced into an elongate tube. First dorsal fin represented by 8-13 isolated, short spines; pelvic fins reach anus, with 6 branched rays and no spine; caudal fin rounded, with 5+5 branched rays. Branchiostegal membranes separate, free from isthmus, with 4 or 5 rays. No teeth in upper jaw; minute teeth at front of lower jaw; elongate band of teeth on vomer. Barbel at symphysis of lower jaw. Gills 4, a slit behind last; gill-rakers absent. Vertebrae 59-64, the first 4 fused and greatly elongated.

A common reef predator, the trumpetfish feeds on small fishes and prawns; it often conceals itself by floating in a vertical head-down position among the branches of gorgonians. Another favourite trick it uses is to swim alongside a large fish moving over the reef until it is near enough to rush and capture its prey. One genus, *Aulostomus* Lacepède, 1803, with 2 or 3 species; 1 species in our area.

143.1 *Aulostomus chinensis*

(Linnaeus, 1766)

PLATE 23

Trumpetfish Trompetvis

Fistularia chinensis Linnaeus, 1766: 515 (in part; type-locality *"India orientalis"*, as restricted by Shaw, 1804). *Aulostomus valentini:* Smith, **SFSA No. 360*.** *Aulostomus chinensis:* Wheeler, 1955: 616.

D VIII-XIII+III,23-27; A III,23-26; P 16. Depth 7-9, head 2.8-3.1 in SL. Body with 3 bony plates along dorsal midline just behind head.

Colour variable; body generally brownish, often with pale vertical bars; dark stripe along base of soft D & A; black spot at base of each V; round black spot usually present at middle of upper C rays and another sometimes visible at middle of lower rays; some specimens completely yellow. Attains 50 cm. Widespread in Indo-West Pacific region, extends south to East London.

Family No. 144: FISTULARIIDAE

by P.C. Heemstra

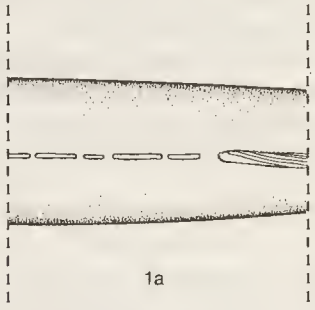
Flutemouths **Fluitbekke**

Body extremely elongate, slightly depressed; snout prolonged, tubular; no dorsal or anal fin spines; caudal fin forked, the middle rays greatly prolonged; pelvic fins with 6 rays; anus close behind pelvics.

The elongate tubular snout is a very efficient device for sucking in small fishes, which are the most common food item for these stealthy predators. One genus, *Fistularia* Linnaeus, 1758 (from the Latin *fistularis,* of a pipe), with 4 species; recently reviewed by Fritzsche (1976). Two species in our area.

KEY TO SPECIES

1a Elongate bony plates along dorsal midline in front of and behind D; posterior LL ossifications ending in a retrorse spine ..... *F. petimba*



1a

1b No bony plates along dorsal midline of body; no spines on LL ossifications ..... *F. commersonii*

144.1 *Fistularia commersonii*

Rüppell, 1838

PLATE 23

Smooth flutemouth Gladde fluitbek

Fistularia commersonii Rüppell, 1838: 142 (Mohila, Red Sea). *Fistularia petimba* (*non* Lacepède): Smith, **SFSA No. 361*.**

D 15-17; A 14-16; P 14-16. Upper and lateral ridges of snout serrate on proximal ⅔; upper ridges diverge ⅔ distance from eye to mouth and then converge again. Post-temporal ridges smooth. Vertebrae 4+(46-47)+34.

Body uniform green or brownish dorsally, with a pair of blue or green lines and/or rows of blue spots; median fins pink distally. Attains 150 cm. A widespread Indo-Pacific species; south to Mossel Bay.

144.2 *Fistularia petimba*

Lacepède, 1803

PLATE 23

Serrate flutemouth Geriffelde fluitbek

Fistularia petimba Lacepède, 1803: 89 (New Britain, Réunion & equatorial Pacific). *Fistularia villosa* Klunzinger, 1871: 516 (Red Sea); Smith, **SFSA No. 362;** 1965: 16.

D 14-17; A 14-15; P 15-17. Upper, lateral and lower ridges on snout serrate; post-temporal ridge with large antrorse serrae. Vertebrae 4+46+26.

Body reddish to orange-brown dorsally, silvery ventrally. Attains 150 cm. Atlantic, Indian and western Pacific oceans; east coast of Africa south to Mossel Bay; also reported from Walvis Bay.

Family No. 145: SYNGNATHIDAE

by C.E. Dawson

Seahorses and pipefishes — **Seeperdjies en pypvisse**

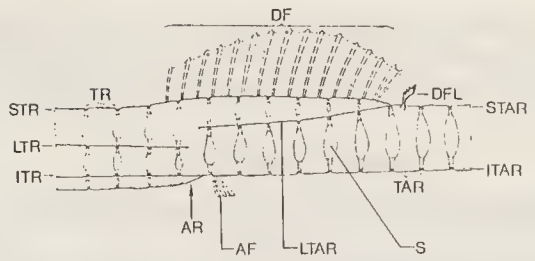
Typically slender and elongate fishes, with or without a prehensile tail, with body armoured by dermal plates arranged to form a series of rings and with or without a fleshy external integument. Mouth small, terminal, usually on a protruding tubiform snout; no true teeth; gill opening a pore in membrane above opercle; four complete gill arches, gills lobate; spinous dorsal and pelvic fins absent, other fins variously present or absent. Sexually dimorphic; males carry the eggs exposed or partly to completely concealed within a well-defined pouch under trunk or tail. Larvae and early postlarvae are often like adults, but there are significant differences between early young and adults in some genera (see Dawson & Allen, 1978; Dawson et al., 1979).

Syngnathids range from boreal regions to southern cold waters. Species abundance is perhaps highest in temperate/subtropical areas, and greatest diversity (ca. 70% of recognised species) is in the subtropical/tropical Indo-Pacific. The family, including some 52 genera and more than 200 species, is predominantly marine but freshwater and estuarine forms are not uncommon. A few species are oceanic but most are taken near shore in less than 50 m depth. Some species mature at lengths of 20-25 mm, while others may exceed 60 cm. These fishes have little economic value but they are sometimes sold as curios, and some (particularly seahorses) are popular aquarium exhibits.

Within our area, there is 1 genus and about 6 species of seahorses, and 14 genera (including 6 subgenera) with at least 25 species of pipefishes. *Syngnathus phlegon* (Risso, 1826) is a Mediterranean species that was erroneously recorded from South Africa (see Smith, **SFSA No. 349**). As there are no confirmed records of *Syngnathus pelagicus* Linnaeus from the southeastern Atlantic or Indo-Pacific, its reported occurrence in southern Africa (see Smith, **SFSA No. 353,** based on Günther, 1870) is apparently erroneous. Similarly, there are no confirmed records of an Indo-Pacific species *Syngnathus fasciatus* Gray, 1830 = *Corythoichthys haematopterus* (Bleeker, 1851) south of 20°S (see Smith, **SFSA No. 354**), but Smith, 1963: 536, Pl. 81 gives a good illustration of specimens from Pinda and Zanzibar.

Identification of specimens usually requires a microscope and depends mainly on the following characters and methods:

1. Configuration of principal body ridges (STR, STAR, ITR, ITAR, LTR, LTAR). Ridges are obscure or indistinct in some genera and configuration may be difficult to determine in juveniles; slight drying usually enhances the ridge pattern.



Lateral aspect of posterior part of trunk and anterior part of tail of a generalised syngnathid illustrating principal body ridges and other features useful for identification purposes. AF – anal fin; AR – anal ring; DF – dorsal fin; DFL – dermal flap; ITR – inferior trunk ridge; ITAR – inferior tail ridge; LTR – lateral trunk ridge; LTAR – lateral tail ridge; S – scutellum; STR – superior trunk ridge; STAR – superior tail ridge; TR – trunk ring; TAR – tail ring.

2. Presence or absence of dorsal, pectoral, anal and caudal fins. The anal fin, often minute and difficult to see, is sometimes concealed within the anterior part of the brood pouch in mature males. All fin rays are counted separately. Among genera treated here, the caudal fin is absent in *Hippocampus* and *Syngnathoides* and in subadults/adults of *Acentronura;* caudal fin rays are typically 9 in *Microphis* and *Trachyrhamphus,* and 10 in the remaining genera. Counts differing from these probably indicate regeneration of the tail and high probability of an atypical number of tail rings.

3. Counts of body rings and subdorsal rings are usually required for identification. Trunk-ring counts begin with ring bearing the pectoral fin base and end with ring bearing the anus (indicated by arrow in diagrams). Tail-ring counts begin with the 1st ring behind the anus (usually bearing anal fin) and end with the penultimate ring, excluding the terminal element bearing the caudal fin. In specimens lacking pectoral fins (e.g. subgenus *Nannocampus*), the 1st complete ring behind the gill opening is counted as the 2nd trunk ring. Body-ring counts are reported as number of trunk rings + number of tail rings. The number of subdorsal rings is estimated to the nearest ¼ of ring length and indicated by the formula: number of trunk rings covered by dorsal fin base + number of tail rings covered by dorsal fin base = total subdorsal rings.

4. Presence, degree of development or absence of some head ridges and/or dermal flaps are important for some determinations. Dermal flaps (fleshy appendages) are absent in some genera (e.g. *Hippichthys, Syngnathus*) but typically present in others (e.g. *Micrognathus*). However, in the latter case, they may be sparse or lost in poorly preserved material.

5. Snout length is measured from anterior tip of snout (mouth closed) to inner anterior margin of bony orbit; snout depth is the least vertical dimension of snout, behind gape.

Keys to genera and species include only those taxa known from our area. They have been constructed to minimise the

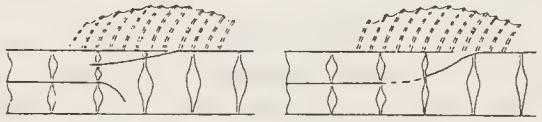
use of sexually dimorphic characters (e.g. brood-pouch type or location) and should, in the case of pipefishes, permit ready identification of adults and most juveniles.

KEY TO GENERA

1a Superior trunk and tail ridges discontinuous near rear of D base 2
1b Superior trunk and tail ridges continuous 10

2a Inferior trunk and tail ridges continuous 3
2b Inferior trunk and tail ridges discontinuous near anal ring 5

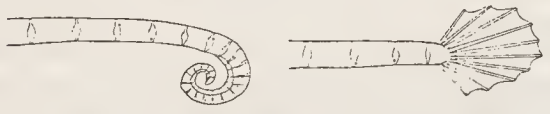
3a Lateral trunk ridge deflected ventrad near anal ring, infrequently confluent with inferior ridge ..... *Hippichthys*



3b Lateral trunk ridge not deflected ventrad 4

4a D 28-42; median dorsal snout ridge essentially smooth ..... *Syngnathus*
4b D 16-20; snout ridge with 3-5 bony dorsal projections ..... *Cosmocampus*

5a C absent; tail usually coiled distally, clearly prehensile ..... *Hippocampus*

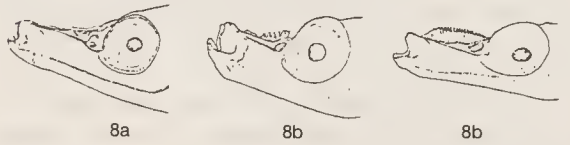


5b C present; tail not coiled distally, not clearly prehensile 6

6a C rays 10 7
6b C rays 8-9 9

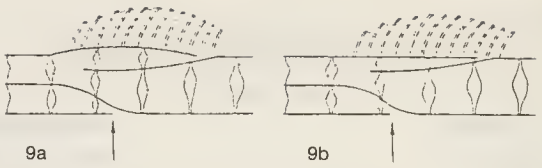
7a P rays 9-18; male brood area under tail 8
7b P rays 17-23; male brood area under trunk ..... *Doryrhamphus*

8a Median dorsal snout ridge low, concave in lateral aspect, entire; margins of body ridges essentially entire; dermal flaps absent from eye ..... *Micrognathus*



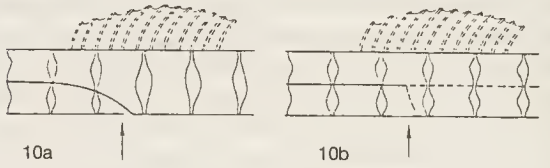
8b Median dorsal snout ridge linear to somewhat elevated, not concave in lateral aspect, the margin spiny to denticulate; margins of principal body ridges often denticulate to spiny; dermal flaps usually present on eye ..... *Halicampus*

9a Superior trunk ridge arched dorsad below D base; total subdorsal rings 4.5-6; tail rings 53-63; male brood area under tail; C rudimentary in subadults and adults ..... *Trachyrhamphus*



9b Superior trunk ridge not arched dorsad below D base; total subdorsal rings 7-16.5; tail rings 20-26; male brood area under trunk; C not rudimentary ..... *Microphis*

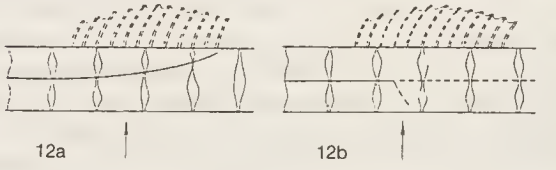
10a Inferior trunk and tail ridges discontinuous near anal ring 11



10b Inferior trunk and tail ridges continuous 12

11a C present; P rays 17-23; male brood area under trunk; tail not coiled distally, not clearly prehensile ..... *Choeroichthys*
11b C absent in subadults/adults; P rays 12-17; male brood area under tail; tail coiled distally, clearly prehensile ..... *Acentronura*

12a P rays 20-23; C absent; tail usually coiled distally, clearly prehensile; lateral trunk ridge angled dorsad to end near superior tail ridge ..... *Syngnathoides*



12b P rays 0-17; C present; tail not coiled, not clearly prehensile; lateral trunk ridge not angled dorsad 13

13a Anal fin absent ..... *Nannocampus*
13b Anal fin present 14

14a Principal ridges of posterior tail rings flared laterad, the posterior angles forming hook-like points; lateral trunk ridge ends on 1st-5th tail ring (on 3rd-4th in 95% of specimens examined) ..... *Phoxocampus*

14b Principal ridges of tail rings not flared laterad, the posterior angles not forming hook-like points; lateral trunk ridge ends on 0-1 tail rings (on last trunk ring in 79% of specimens examined) ..... *Festucalex*

Genus ***Acentronura*** Kaup, 1853

Five or 6 nominal species in 3 subgenera; 1 species (subgenus *Acentronura*) in our area. The subgenus *Idiotropiscis*

Whitley, 1947, is endemic to Australia and the subgenus *Amphelikturus* Parr, 1930, is represented in the tropical/subtropical Atlantic Ocean.

145.1 *Acentronura tentaculata*
Günther, 1870

Pipehorse — Pypperdjie

Acentronura tentaculata Günther, 1870: 516 (Gulf of Suez). *Acentronura gracillima* (*non* Temminck & Schlegel): Smith, 1951: 53; 1953: 516, **No. 348a***. *Acentronura mossambica* Smith, 1963: 522, Pl. 76, Figs. F & G (Inhaca, Mozambique). *Acentronura* (*Acentronura*) *tentaculata*: Dawson, 1985: 17*.

Rings (12)+(39-44); D 16-17; P 14-16; A 4; subdorsal rings (2.5-1.5)+(1.5-2.5) = 3.25-4.4; dermal flaps present on head and body. Small, sluggish, seahorse-like pipefishes lacking C in subadults and adults; C present in pouch in young and early juveniles.

Mainly brown, some dermal flaps blackish. Reaches at least 63 mm. Inhaca and Inhambane, Mozambique; northern Red Sea to Torres Straits and Queensland, Australia.

145.1 *Acentronura tentaculata*: left: 5 cm female paratype; right: 5 cm male holotype of *A. mossambica* (both Inhaca Id.).

Genus ***Choeroichthys*** Kaup, 1856

Six species; 2 in our area. *C. brachysoma* (Bleeker) is known from northern Mozambique and may be expected in our area. From this species, *C. smithi* is readily distinguished by its higher number of trunk rings (18-19 versus 14-17), its deep snout (snout depth in snout length averages 2.3 versus 4.5) and by the bicoloured rather than plain D. The keeled scutella of *C. sculptus* are lacking in *C. brachysoma*.

KEY TO SPECIES

1a D 27-34; scutella with longitudinal keels ..... *C. sculptus*
1b D 17-21; scutella without longitudinal keels ..... *C. smithi*

145.2 *Choeroichthys sculptus*
(Günther, 1870)

Sculptured pipefish — Gegraveerde pypvis

Doryichthys sculptus Günther, 1870: 185 (Fiji Ids.). *Choeroichthys sculptus*: Duncker, 1915: 59; Weber & de Beaufort, 1922: 60; Smith, 1963: 530*; Dawson, 1976: 53*.

Rings (18-21)+(21-25); D 27-34; P 18-23; A 4; C 10; subdorsal rings (7.25-4.0)+(0.5-2.5) 6.25-8.25. Snout depth averages 2.7 in snout length; male brood area under trunk, with pouch plates and membranous folds.

D not bicoloured; sides with 3-4 rows of spots or ocelli. Attains 8 cm. Inhaca, Mozambique, to Kenya; Madagascar to Society Ids. (See illustration on p. 449.)

145.3 *Choeroichthys smithi*
Dawson, 1976

Shortfin pipefish — Kortvin-pypvis

? *Choeroichthys* n. sp. Smith, 1951: 53 (Delagoa Bay). *Choeroichthys valencienni* (*non* Kaup): Gabie, 1960: 73*. *Choeroichthys suillus* (*non* Whitley): Smith, 1963: 529*. *Choeroichthys smithi* Dawson, 1976: 51, Figs. 5-6 (Inhaca, Mozambique).

Rings (18-19)+(18-21); D 17-21; P 18-21; A 4; C 10; subdorsal rings (4.5-3.25)+(0-1.25) = 3.75-5.25. Snout depth less than 3 in snout length; male brood area under trunk, with pouch plates and membranous folds.

D bicoloured, dark in front and pale posteriad. Attains 5 cm. Delagoa Bay and Pinda, Mozambique; but records from Mozambique Ids. and Zanzibar (Smith, 1963) are uncertain. (See illustration on p. 449.)

Genus ***Cosmocampus*** Dawson, 1979

About 15 species; 1 in our area.

145.4 *Cosmocampus banneri*
(Herald & Randall, 1972)

Roughridge pipefish — Ruwerif pypvis

Syngnathus banneri Herald & Randall, 1972: 135, Fig. 4 (Ryukyu Ids., Marshall Ids.).

Rings 15+(27-30); D 16-20; P 11-14; A 3-4; C 10; subdorsal rings (1.75-0.25)+(2.75-4.0) = 3.75-4.75. Median dorsal snout ridge with 3-4 distinct, semi-isolated, subtriangular projections; lateral snout ridge present; other head ridges usually prominent, somewhat elevated; body notched or deeply indented between rings; ring of minute dermal flaps on eye, sometimes flaps present elsewhere on head; male brood area under tail, with pouch plates and membranous folds.

Body usually pale, with diffuse dark bars crossing belly and lower half of trunk. Reaches at least 6 cm. Two specimens from Sodwana Bay; northern Red Sea to Ryukyu and Marshall Ids. to 30 m. (See illustration on p. 449.)

Genus ***Doryrhamphus*** Kaup, 1856

Ten species and 3 subspecies in 2 subgenera; 4 species in our area, 1 endemic to southern Africa.

KEY TO SPECIES

1a Snout with 1-5 dorsolateral rows of spines or spinules on each side of median dorsal ridge; pouch folds present in mature males; usually with striped colour pattern; (subgenus *Doryrhamphus*) 2

1b Snout without rows of spinules; pouch folds absent; mostly with banded colour pattern; (subgenus *Dunckerocampus*) 3

2a Subdorsal trunk rings 5.0-3.0; upper half of side of trunk plain or with broad dark stripe; subadult/adult males with 1 ventrolateral bony projection on snout ..... *D. excisus*

2a 2b

2b Subdorsal trunk rings 2.5-2.0; upper half of side of trunk with narrow dark stripe; subadult/adult males with 2 ventrolateral bony projections on side of snout ..... *D. bicarinatus*

3a Head and body with ca. 20-40 dark bands; 6-13 bands on trunk ..... *D. dactyliophorus*

3b Head and body with ca. 58-113 dark bands; 19-36 bands on trunk ..... *D. multiannulatus*

145.5 *Doryrhamphus bicarinatus*

Dawson, 1981

Narrowstripe pipefish — Smalstreep-pypvis

Doryrhamphus bicarinatus Dawson, 1981: 13, Figs. 8, 10 (Sodwana Bay, South Africa). *Doryrhamphus* (*Doryrhamphus*) *bicarinatus:* Dawson, 1985: 60*.

Rings 16+(16-17); D 21-23; A 4; subdorsal rings (2.5-2.0)+(2.75-3.0) = 4.75-5.75.

Attains 8 cm. Sodwana Bay and Inhaca Id., Mozambique. (See illustration on p. 449.)

145.6 *Doryrhamphus excisus excisus*

Kaup, 1856

PLATE 23

Bluestripe pipefish — Bloustreepte-pypvis

Doryrhamphus excisus Kaup, 1856: 54, Pl. 3, Fig. 5 (locality not stated, probably Indian Ocean). *Doryrhamphus melanopleura:* Smith, 1953: 517, **No. 358a***; 1963: 530*. *Doryrhamphus excisus excisus*: Dawson, 1981: 4*. *Doryrhamphus* (*Doryrhamphus*) *excisus excisus*: Dawson, 1985: 61*.

Rings (17-19)+(13-17); D 21-29; A 4; subdorsal rings (5.0-3.0)+(1.75-4.5) = 5.75-8.25. *D. excisus abbreviatus* Dawson, 1981, with (15-16)+(11-12) rings is the Red Sea subspecies, whereas *D. excisus paulus* Fritzsche, 1980, with (16-17)+(14-16) rings, is endemic to the Revillagigedo Ids., Mexico.

Attains 8 cm. Xora River Mouth to Mozambique; also throughout Indo-Pacific region to west coast of tropical America. (See illustration on p. 449.)

145.7 *Doryrhamphus dactyliophorus*

(Bleeker, 1853)

PLATE 23

Banded pipefish — Band-pypvis

Syngnathus dactyliophorus Bleeker, 1853: 506 (Batavia). *Dunckerocampus dactyliophorus dactyliophorus*: Smith, 1963: 526*. *Dunckerocampus dactyliophorus*: Herald & Randall, 1972: 130. *Doryrhamphus* (*Dunckerocampus*) *dactyliophorus*: Dawson, 1985: 67*.

Rings (15-16)+(18-22); D 20-26; P 18-22; A 4; subdorsal rings (1.75-0.0)+(2.0-4.75) = 3.0-4.75.

Typically with 1 dark band crossing opercle. Attains at least 19 cm. One adult male taken at Aliwal Shoal, Natal; northern Red Sea to Austral Ids. (See illustration on p. 449.)

145.8 *Doryrhamphus multiannulatus*

(Regan, 1903)

PLATE 23

Many-banded pipefish — Veelband-pypvis

Doryichthys multiannulatus Regan, 1903: 413, Pl. 13, Fig. 3 (Mauritius). *Dunckerocampus bentuviae* Fowler & Steinitz, 1956: 273, Fig. 22 (Eilat, Red Sea); Herald & Randall, 1972: 122. *Dunckerocampus dactyliophorus multiannulatus*: Smith, 1963: 526*. *Dunckerocampus multiannulatus*: Herald & Randall, 1972: 123. *Doryrhamphus* (*Dunckerocampus*) *multiannulatus*: Dawson, 1985: 67*.

Rings 16+(19-20); D 20-23; P 18-22; A 4; subdorsal rings (1.0-0.25)+(2.0-3.75) = 3.0-4.25.

Typically with 4-5 dark bands crossing opercle. Attains 18 cm. One subadult taken at Sodwana Bay; Red Sea, Comoro Ids., Mauritius and Chagos Archipelago. (See illustration on p. 449.)

Genus ***Festucalex*** Whitley, 1931

Six species; 1 in our area.

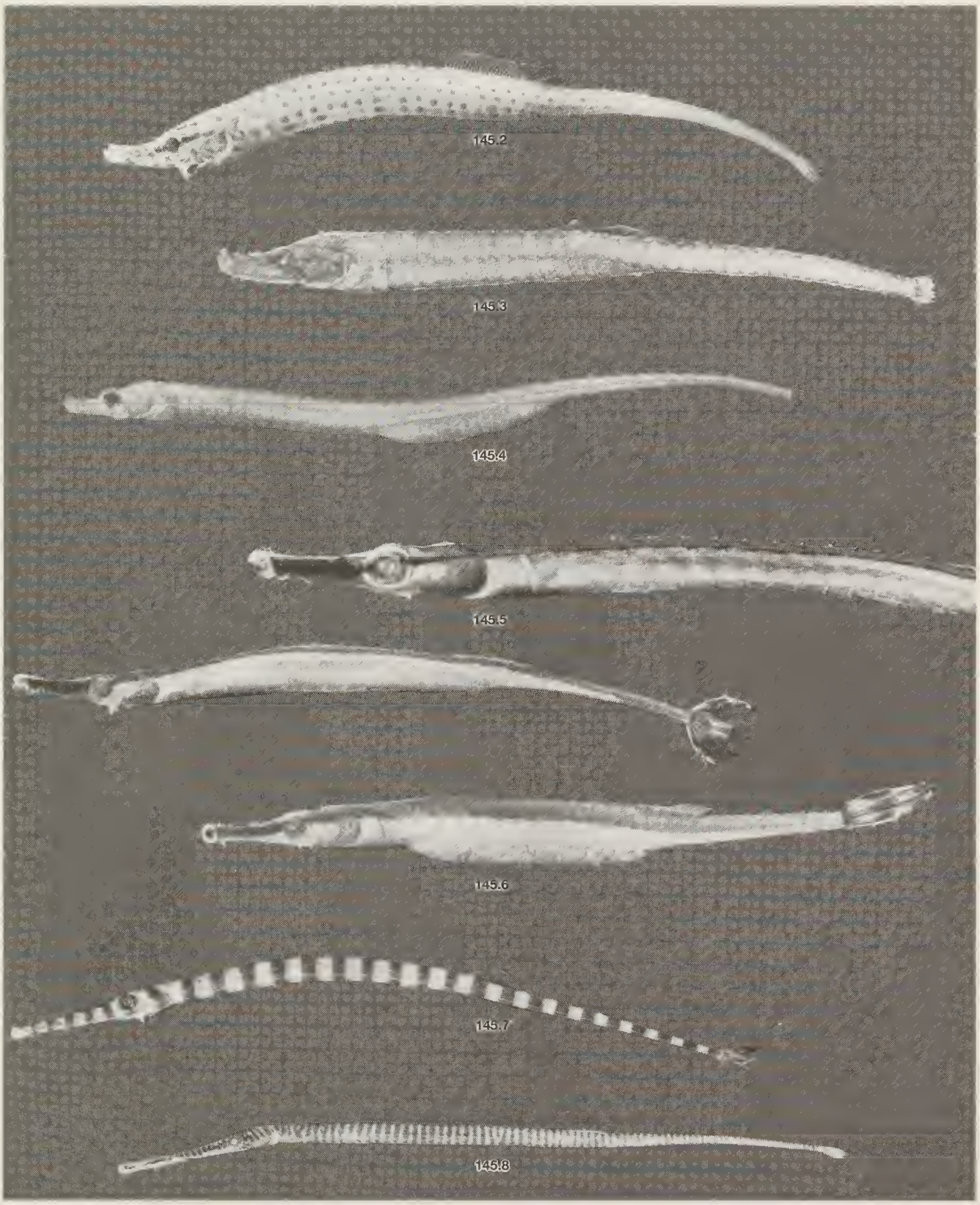
145. 9 *Festucalex erythraeus*

(Gilbert, 1905)

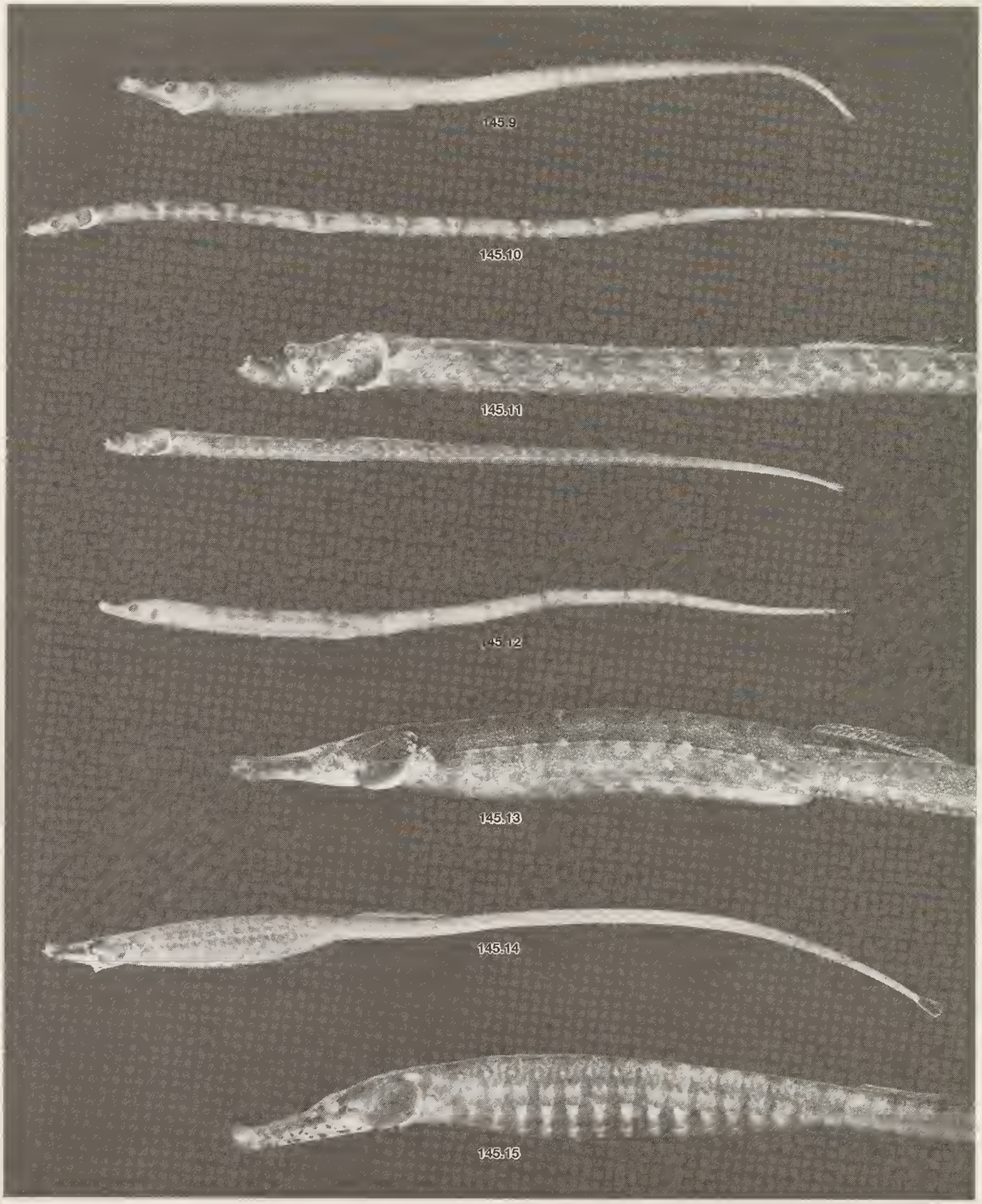
Red pipefish — Rooi pypvis

Ichthyocampus erythraeus Gilbert, 1905: 613, Fig. 238 (Hawaiian Ids.). *Ichthyocampus townsendi*: Smith, 1963: 539. *Festucalex erythraeus*: Dawson, 1977: 629*.

Rings (15-17)+(32-37); D 18-21; P 11-12; A 4; C 10; subdorsal rings (1.0-0.5)+(3.5-5.0) = 4.25-5.75. Principal ridges of last 1-2 tail rings entire, not projecting laterad; brood area under tail, protective membranous folds present, pouch plates little enlarged.



145.2 *Choeroichthys sculptus:* 6 cm SL female. **145.3** *Choeroichthys smithi:* 4.5 cm SL holotype (Inhaca Id.). **145.4** *Cosmocampus banneri:* 5 cm SL brooding male. **145.5** *Doryrhamphus bicarinatus:* top: 4.5 cm SL subadult male holotype; bottom: 5.5 cm SL adult female paratype. **145.6** *Doryrhamphus excisus excisus:* 4.5 cm SL brooding male. **145.7** *Doryrhamphus dactyliophorus:* 7 cm SL juvenile. **145.8** *Doryrhamphus multiannulatus:* 16 cm SL male.



145.9 *Festucalex erythraeus:* 7 cm SL female. **145.10** *Halicampus dunckeri:* 9 cm presumptive female. **145.11** *Halicampus mataafae:* 7 cm SL female or juvenile male. **145.12** *Halicampus zavorensis:* 9.5 cm SL holotype (S. Mozambique). **145.13** *Hippichthys cyanospilos:* 12.5 cm SL female. **145.14** *Hippichthys heptagonus:* 10.5 cm SL female. **145.15** *Hippichthys spicifer:* 11 cm SL female.

Some specimens described as reddish in life. Attains 8 cm. Infrequently taken in shore collections, reportedly once dredged in 80.5 m. One specimen from Inhambane, Mozambique; also known from Mekran coast, Maldive Ids. and Sulu Archipelago to Hawaii. (See illustration on p. 450.)

Genus ***Halicampus*** Kaup, 1856

About 13 species; 3 in our area.

KEY TO SPECIES

1a Trunk rings 14; median dorsal snout ridge continuous 2
1b Trunk rings 15; median dorsal snout ridge discontinuous, with 2-3 semi-isolated spine-like elevations ..... *H. mataafae*

2a Median dorsal snout ridge essentially linear; D rays 22-23 ..... *H. zavorensis*
2b Median dorsal snout ridge arcuate; D rays 16-20 ..... *H. dunckeri*

145.10 *Halicampus dunckeri*
(Chabanaud, 1929)

Dusky pipefish — Donker pypvis

Micrognathus Dunckeri Chabanaud, 1929: 170, Figs. 2 & 3 (Amboina).

Rings 14+(33-39); D 16-20; P 11-13; A 3; subdorsal rings (1.25-0.0)+(2.75-5.0) = 3.75-5.25.

Brownish to near black, tip of snout usually pale, often with irregular pale bars on dorsum of body. A slender species which attains at least 15 cm. One specimen taken in Sodwana Bay; Red Sea to Japan and Fiji Ids. (See illustration on p. 450.)

145.11 *Halicampus mataafae*
(Jordan & Seale, 1906)

Brown pipefish — Bruin pypvis

Corythroichthys mataafae Jordan & Seale, 1906: 213, Fig. 19 (Samoa). *Micrognathus mataafae:* Smith, 1963: 534*.

Rings 15+(33-36); D 21-26; P 12-13; A 3; subdorsal rings (1.25-0.5)+(4.0-5.0) = 4.75-5.75.

Mainly brownish, sometimes with irregular diffuse pale bars on dorsum. Attains at least 13 cm. One specimen taken in Sodwana Bay at a depth of 10 - 12 m; northern Mozambique to Red Sea, east to Samoa. (See illustration on p. 450.)

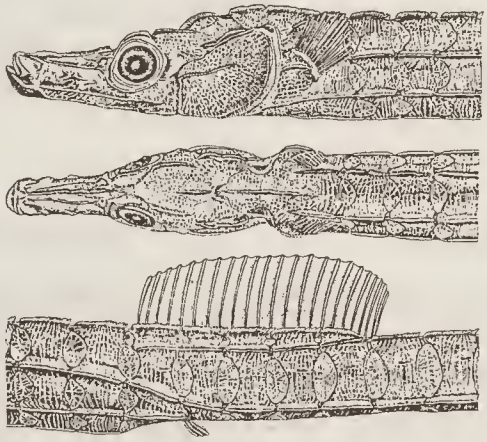
145.12 *Halicampus zavorensis*
Dawson, 1984

Zavora pipefish — Zavora-pypvis

Halicampus zavorensis Dawson, 1984: 2, Figs. 1, 2 (Zavora, Mozambique).

Rings 14+(36-37); D 22-23; P 13; A 3-4; subdorsal rings (1.0-0.75)+(4.0-4.25) = 5.0-5.25.

Side and dorsum of body with ca. 15 diffuse dark brown bars (0.5-1.0 ring wide) separated by 2-3 ring pale or mottled interspaces; venter of trunk with a light brown bar on each ring. Attains at least 10 cm. One specimen from Zavora, Mozambique; 2 others from Sūr, Gulf of Oman. (See illustration on p. 450.)



145.12 *Halicampus zavorensis:* 9.5 cm SL holotype (S. Mozambique).

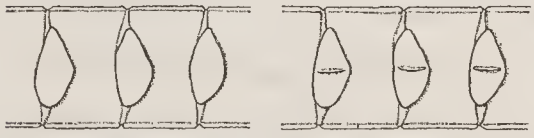
Genus ***Hippichthys*** Bleeker, 1849

Five species in 2 subgenera, *Hippichthys* and *Parasyngnathus*. Three species in our area, all in subgenus *Hippichthys*.

KEY TO SPECIES

1a Trunk rings 12-14; total rings 45-48; D origin always on trunk ..... *H. cyanospilos*
1b Trunk rings 14-16; total rings 51-57; D origin usually on tail 2

2a Scutella without a longitudinal keel; D origin usually (in 94% examined) on 1st tail ring; HL averages 10 in SL ..... *H. heptagonus*



2a 2b

2b Scutella usually with a longitudinal keel; D origin usually (in 98%) on or behind 2nd tail ring; HL averages 8 in SL ..... *H. spicifer*

145.13 *Hippichthys cyanospilos*
(Bleeker, 1854)
PLATE 23

Bluespeckled pipefish — Blouspikkelde-pypvis

Syngnathus cyanospilos Bleeker, 1854: 114 (Indonesia); Smith, **SFSA No. 351*;** 1963: 538*. *Syngnathus mossambicus* Peters, 1855: 465 (Mozambique); 1855: 277. *Hippichthys cyanospilus*: Dawson, 1978: 150*.

Rings (12-14)+(32-35); D 20-28; P 13-16; total subdorsal rings 4.25-6.0; D origin on last or penultimate trunk ring.

Venter and side of trunk without dark bars; D typically with 3-4 prominent brown spots on each ray. Reaches 16 cm. Inhaca and Inhambane, Mozambique; northern Red Sea to Fiji. (See illustration on p. 450.)

145.14 *Hippichthys heptagonus*
Bleeker, 1849

Belly pipefish — Boepens-pypvis

Hippichthys heptagonus Bleeker, 1849: 15 (Indonesia); Dawson, 1978: 136*. *Syngnathus djarong*: Smith, 1951: 53; 1953: 516, **No. 352a**; 1963: 537*.

Rings (14-15)+(36-42); D 23-30; P 13-16; total subdorsal rings 5.0-6.25.

Brownish, often without distinctive markings; venter of trunk commonly dusky, shading to near black on median ridge; some with brownish bars; D rays without distinct row of brown spots. Reaches 15 cm. Durban, St. Lucia and 'nHtunga lakes, Natal; Kenya to Solomon Ids. (See illustration on p. 450.)

145.15 *Hippichthys spicifer*
(Rüppell, 1838)
PLATE 23

Bellybarred pipefish — Balkpens-pypvis

Syngnathus spicifer Rüppell, 1838: 143, Pl. 33, Fig. 4 (Red Sea); Smith, **SFSA No. 352***; 1963: 537*. *Hippichthys spicifer*: Dawson, 1978: 142*. *Hippichthys* (*Hippichthys*) *spicifer*: Dawson, 1985: 98*.

Rings (14-16)+(36-41); D 25-30; P 15-18; total subdorsal rings 5.0-6.0; subadults and adults always with some keeled scutella.

Variably brownish, mottled or with prominent dark bars crossing lower half of side and venter of trunk; bars absent or obscured by dark ground colour in some adults; D rays without rows of distinct brown spots. Reaches 175 mm. Durban and Xora River mouth; northern Red Sea to Samoa. (See illustration on p. 450.)

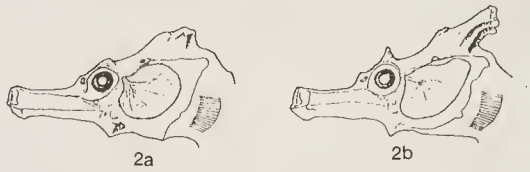
Genus ***Hippocampus*** Rafinesque, 1810

Although often represented in collections and aquaria and sometimes sold as curios, the seahorses are poorly known systematically. Characters employed for their identification (e.g. ring counts, numbers of fin rays) exhibit little variation between species, and both morphometric features and preserved coloration are rather variable within a species. Seahorses occur in offshore waters but most are found in inshore habitats among algae or sea grasses. Some species are reported to reach 30 cm TL, but others are mature at 25 mm TL. In most cases, identification is difficult and the correct name for many species is presently uncertain. More than 100 species have been described, but valid species probably number fewer than 30; 6 recorded from our area. The key and species accounts for seahorses are modified from Smith (1949, 1963, 1965).

KEY TO SPECIES

1a Body rings with long spines ..... *H. histrix*
1b Body rings without long spines 2

2a Coronet low or obsolete 3


2a 2b

2b Coronet prominent 5

3a Snout length ca. 2 in HL; D rays 19-21 ..... *H. trimaculatus*
3b Snout length more than 2 in HL, about equals postorbital length; D rays 16-18 4

4a Coronet usually obsolete in adults; 2 prominent tubercles below D base ..... *H. capensis*
4b Coronet low, distally bifid; 3 prominent tubercles below D base ..... *H. kuda*

5a D 19-21; P 17-18; coronet with 5-6 distal points in young, broadly rounded in adults ..... *H. camelopardalis*
5b D 16-17; P 15-16; coronet distally concave and usually pentagonal ..... *H. whitei*

145.16 *Hippocampus camelopardalis*
Bianconi, 1853

Giraffe seahorse — Kameel-seeperdjie

Hippocampus camelopardalis Bianconi, 1853: 68 (Mozambique); Bianconi, 1855: 223, Pl. 1, Fig. 3; Smith, **SFSA No. 348***; 1963: 519*.

145.16 *Hippocampus camelopardalis*: left: 5 cm female; right: 7.5 cm male (both Inhaca Id.).

Rings 11+(35-38); D 19-21; P 17-18; A 4-5, subdorsal rings 3+1, snout length 2.2-2.5 in HL. Head and body somewhat spinose in young, often with well-developed dermal flaps.

Reaches 10 cm. Inhambane to Durban; Zanzibar and Mauritius.

145.17 *Hippocampus capensis*
Boulenger, 1900
PLATE 24

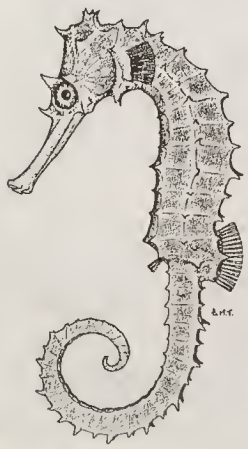
Knysna seahorse — Knysna-seeperdjie

Hippocampus capensis Boulenger, 1900: 11, Pl. 3, Fig. 2 (Knysna Estuary); Smith, **SFSA No. 345***; 1963: 518*; Smith & Smith, 1966: 103*.

Rings (10-11)+(32-34); D 16-18; P 15-17; A 3; subdorsal rings (3-2)+1, snout length about 3 in HL. Spinules on rings and small coronet present in juveniles, usually obsolete in adults.

Reaches 7 cm. Known from Knysna estuary (34°S), Keurbooms estuary, Mossel Bay and Plettenberg Bay.

453.17 *Hippocampus capensis*: left: 4.5 cm male; right: 4.5 cm female (both Knysna).



145.18 *Hippocampus histrix*: 5 cm from crown of head to curve of tail (W. of East London).

145.18 *Hippocampus histrix*
Kaup, 1853

Thorny seahorse — Stekel-seeperdjie

Hippocampus histrix Kaup, 1853: 229 (Japan); Kaup, 1856: 17*; Fowler, 1935: 361; Smith, 1963: 518*. *Hippocampus hystrix*: Smith, **SFSA No. 344.**

Rings 11+(33-34); D 17-19; P 17-18; A 4; subdorsal rings 2+(1-2), snout longer than remainder of head. *H. jayakari* Boulenger, 1900, characterised mainly by a somewhat shorter snout (ca. 2 in HL), may prove to be a junior synonym of *H. histrix*.

Attains 15 cm. Uncommon in our area, but recorded from vicinity of Durban; Red Sea to Japan.

145.19 *Hippocampus kuda*
Bleeker, 1852

Yellow seahorse — Geel seeperdjie

Hippocampus kuda Bleeker, 1852: 82 (Singapore); Smith, **SFSA No. 347***; 1963: 518*. *Hippocampus natalensis* von Bonde, 1923: 9, Pl. 1, Fig. 1 (Natal).

Rings 11+(34-37); D 15-18; P 15-17; A 4; subdorsal rings 2+(1-2); snout length variable, about equal to postorbital length. Coronet low, usually bifid distally.

Reportedly reaches 30 cm TL. Mossel Bay to Mozambique; Red Sea, Kenya, Madagascar and eastward to Japan and central Pacific islands.

145.19 *Hippocampus kuda*: left: 6 cm female (N. Mozambique); right: 8.5 cm male (Inhaca Id.) measured from top of head to bend in tail.

145.20 *Hippocampus trimaculatus*
Leach, 1814

Longnose seahorse — Langneus-seeperdjie

Hippocampus trimaculatus Leach, 1814: 104 (Indian and Chinese Seas); Smith, 1961: 566, **No. 344a**; 1963: 518* (not seen); 1965: 566.

Rings 11+(38-42); D 19-21; P 17; A 4; subdorsal rings 2+2, coronet low and retrorse, supraorbital spines large.

In our area, reported only from Morgan Bay (near Kei River mouth); Zanzibar and Indo-West Pacific area.

145.20 *Hippocampus trimaculatus:* 11.5 cm measured from top of head to bend in tail (after Lee, 1983).

145.21 *Hippocampus whitei*
Bleeker, 1855

Crowned seahorse — Kroon-seeperdjie

Hippocampus whitei Bleeker, 1855: 17, 30 ("New Holland" = New South Wales, Australia). *Hippocampus novae-hollandiae:* Barnard, 1927: 294; Smith, **SFSA No. 346;** 1963: 518*.

Rings 11+(32-36); D 16-17; P 15-16; A 4; subdorsal rings 3+1, snout length about equals postorbital length; small spines on rings.

145.21 *Hippocampus whitei:* 60 cm female (Inhaca Id.).

Reaches at least 8 cm. Recorded from Natal and southern Mozambique to depths of 46 m; also southeastern Australia.

Genus ***Micrognathus*** Duncker, 1912

Five species; 1 in our area.

145.22 *Micrognathus andersonii*
(Bleeker, 1858)

Shortnose pipefish — Kortneus-pypvis

Syngnathus Andersonii Bleeker, 1858: 465 (Kokos Id. (Indonesia)). *Micrognathus brevirostris* (*non* Rüppell): Duncker, 1915: 75 (in part); Smith, 1952: 1024; 1953: 517, **No. 357a***; 1963: 533* (in part, South African records only). *Micrognathus andersonii*: Dawson, 1982: 672*.

Rings (15-17)+(28-32); D 17-24; P 11-13; A 3; subdorsal rings (1.75-0.25)+(2.5-5.0) = 3.75-5.75. Principal ridges of posterior tail rings usually neither angled laterad nor ending in protruding hook-like points. This species has been confused with *M. brevirostris* (Rüppell), which, though similar to *M. andersonii*, has 14-16 trunk rings and further differs in coloration and other features.

Pale to dark brown, often with 2-3 dark blotches on sides of trunk. Attains 8 cm. Tidepool and reef habitats from Knysna and vicinity to Xora River; also northern Mozambique to Kenya, Madagascar, and from northern Red Sea to southern Japan and Samoa. (See illustration on p. 455).

Genus ***Microphis*** Kaup, 1853

Eighteen species in 5 subgenera; revised by Dawson (1984). Represented in our area by 2 species in 2 subgenera.

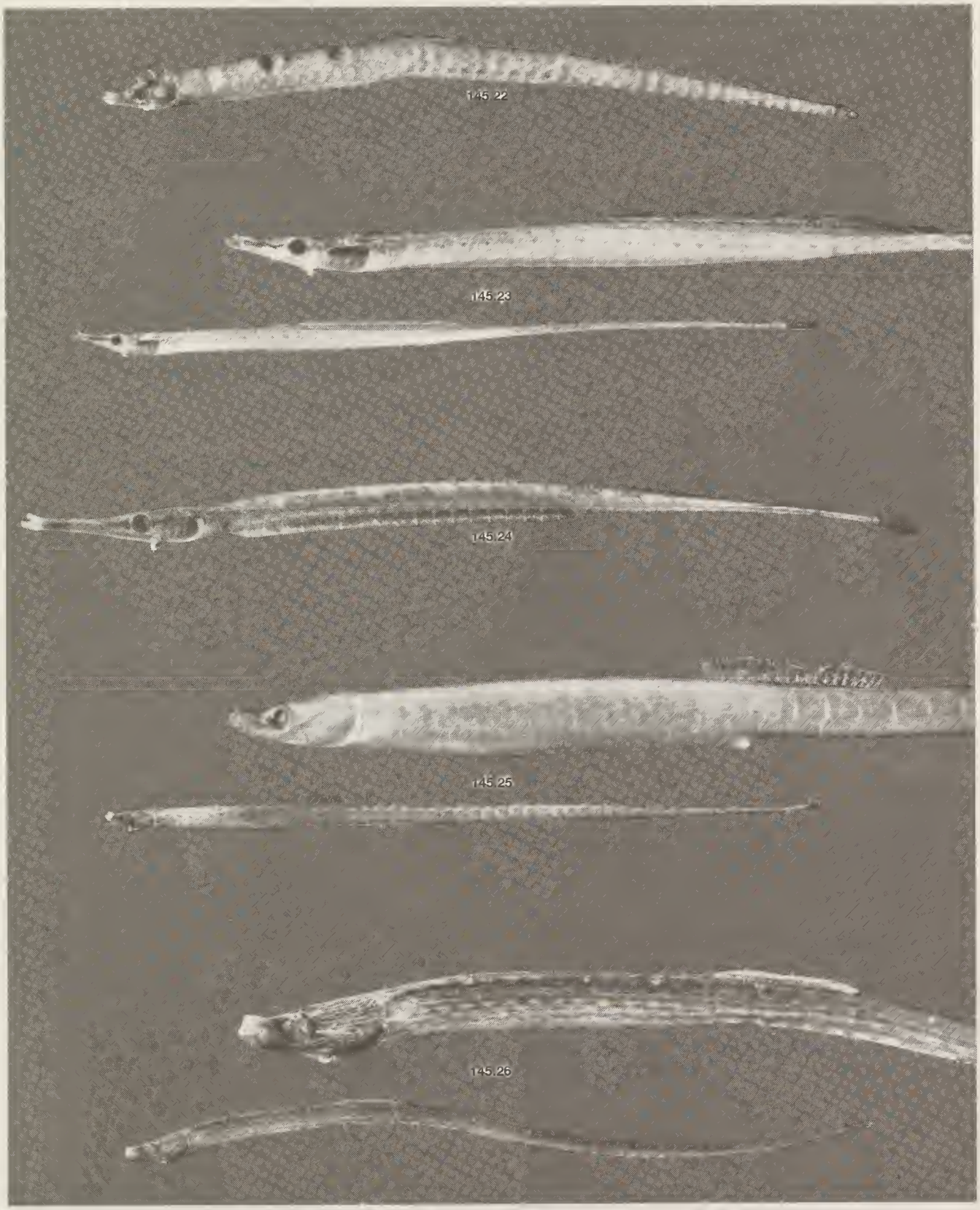
KEY TO SPECIES

1a Total subdorsal rings 14-16; D rays 60-69; (subgenus *Belonichthys*) ..... *M. fluviatilis*
1b Total subdorsal rings 7-11; D 37-54; (subgenus *Oostethus*) ..... *M. brachyurus*

145.23 *Microphis fluviatilis*
(Peters, 1852)

Freshwater pipefish — Varswater-pypvis

Syngnathus fluviatilis Peters, 1852: 685 (Tette, Zambezi River, Mozambique). *Syngnathus Zambezensis* Peters, 1855: 465. *Belonichthys* (*Syngnathus*) *zambezensis*: Peters, 1868: 108*. *Belonichthys fluviatilis*: Barnard, 1925: 286; Smith, **SFSA No. 359***; 1963: 528*. *Microphis* (*Belonichthys*) *fluviatilis*: Dawson, 1984: 137*.



145.22 *Micrognathus andersonii:* 6.5 cm SL male. **145.23** *Microphis fluviatilis:* 15 cm SL female. **145.24** *Microphis brachyurus:* 11 cm SL brooding male. **145.25** *Nannocampus elegans:* top: 9 cm SL female paratype; bottom: 10 cm SL male paratype. **145.26** *Nannocampus pictus:* 8 cm male.

Rings (18-20)+(21-23); D 60-69; P 15-20; A 4; C 9; subdorsal rings (12.0-10.0)+(3.0-4.5) = 14.0-15.75. Brood area under trunk, with non-convergent lateral plates, without protective membranous folds.

Attains 21 cm. Coffee Bay and Mtata River, Transkei; Zambezi River, Mozambique to Sabaki River, Kenya and Madagascar. (See illustration on p. 455.)

145.24 *Microphis brachyurus*
(Bleeker, 1853)
PLATE 23

Short-tail pipefish — Kortstert-pypvis

Syngnathus brachyurus Bleeker, 1853: 16 (Indonesia). *Dorichthys millepunctatus* Kaup, 1856: 60 (Madagascar, Réunion). *Microphis brachyurus*: Smith, 1934: 89*; **SFSA No. 358***. *Oostethus brachyurus*: Smith, 1963: 533*; Dawson, 1979: 465*. *Microphis* (*Oostethus*) *brachyurus*: Dawson, 1984: 152.

Rings (17-22)+(20-26); D 37-54; P 17-23; A 4; C 9; subdorsal rings (4.0-0.25)+(4.0-8.75) = 7.0-10.75. Brood area under trunk, with non-convergent lateral plates, without protective membranous folds. The western Indian Ocean subspecies, *M. b. millepunctatus* (Kaup, 1856), is in part characterised by the following counts: rings (19-22)+(20-22), D 39-45, subdorsal rings (2.5-0.75)+(6.25-7.75).

Subadults and adults usually found in rivers, streams and estuaries, planktonic juveniles sometimes oceanic; reaches at least 215 mm. Rare in our area, Durban and Sodwana estuary to Kenya, Madagascar, Réunion and Mauritius. (See illustration on p. 455.)

Genus ***Nannocampus*** Günther, 1870

Four species in 2 subgenera. In our area, 2 species in 2 subgenera.

KEY TO SPECIES

1a P absent; subdorsal trunk rings 2.0-1.25; (subgenus *Nannocampus*) ..... *N. elegans*
1b P present; subdorsal trunk rings 1.0-0.0; (subgenus *Mannarichthys*) ..... *N. pictus*

145.25 *Nannocampus elegans*
Smith, 1961

Elegant pipefish — Elegante pypvis

Nannocampus (sp. nov.) Smith, 1951: 53. *Nannocampus elegans* Smith, 1953: 516, **No. 355a*** (Xora River mouth); 1963: 524*; Dawson, 1979: 492*.

Rings (12-14)+(40-42); D 21-24; C 10; subdorsal rings (2.0-1.25)+(3.5-4.5) = 5.25-6.25. Lateral trunk ridge deflected a little ventrad; median dorsal snout ridge low, not elevated to or above dorsal rim of orbit; P and A absent in subadults and adults; P present in late embryos, probably present in larvae.

Usually in tide pool and reef habitats; attains 12 cm. Great Fish Point to Inhaca, Mozambique. (See illustration on p. 455.)

145.26 *Nannocampus pictus*
(Duncker, 1915)

Reef pipefish — Rif-pypvis

Ichthyocampus pictus Duncker, 1915: 95 (Ceylon, Gulf of Mannar); Smith, 1963: 527*. *Mannarichthys pictus*: Dawson, 1977: 608*. *Nannocampus* (*Mannarichthys*) *pictus*: Dawson, 1985: 149*.

Rings (13-14)+(34-41); D 18-22; P 5-7; C 10; subdorsal rings (1.0-0.0)+ (3.5-5.5) = 4.25-5.75. Lateral trunk ridge deflected towards inferior ridge near anal ring; male brood area under tail.

Tan to brown, some specimens with narrow dark streaks or lines on head and body. Attains 10 cm. Frequents reef or coral habitats to depths of ca. 9 m. One specimen from Sodwana Bay; northern Mozambique and Kenya to Queensland, Australia. (See illustration on p. 455.)

Genus ***Phoxocampus*** Dawson, 1977

Three species; 1 in our area.

145.27 *Phoxocampus belcheri*
(Kaup, 1856)

Rock pipefish — Klip-pypvis

Ichthyocampus Belcheri Kaup, 1856: 30 ("China"); Smith, 1963: 527*. *Phoxocampus belcheri*: Dawson, 1977: 615*.

Rings (16-17)+(29-32); D 20-24; P 11-13; A 3-4; C 10; subdorsal rings (2.0-0.25)+(3.5-5.5) = 4.75-6.5. Lateral trunk ridge ends, without deflection, on 1st-5th (usually 3rd-4th) tail ring; male brood area under tail, with plates and membranous folds. Attains 8 cm.

Usually in rock or coral habitats to depths of 25 m. One specimen from Bizana coast (31.5°S), Transkei; also central Mozambique to Kenya and northern Red Sea to Fiji Ids. (See illustration on p. 458.)

Genus ***Syngnathoides*** Bleeker, 1851

One species.

145.28 *Syngnathoides biaculeatus*
(Bloch, 1785)

Alligator pipefish — Kaaiman-pypvis

Syngnathus biaculeatus Bloch, 1785: 10, Pl. 121, Figs. 1, 2, 2a (East Indies). *Syngnathoides biaculeatus*: Smith, **SFSA No. 357***; 1963: 523*.

Rings (15-18)+(ca. 40-54); D 38-48; P 20-24; A 4; subdorsal rings (2.0-0.25)+(7.5-10.5) = 8.75-11.75. Trunk compressed dorsoventrally, broadest near middle of trunk length; inferior trunk ridges inconspicuous, largely located on venter; tail prehensile; with or without conspicuous dermal flaps; brood area under trunk, the eggs carried exposed in membranous compartments.

Attains 29 cm. Frequents coastal shallows, often associated with "grass" or algal bottoms; juveniles occasionally found near surface. Knysna northwards; northern Red Sea to Japan, Guam and Samoa. (See illustration on p. 458.)

145.28 *Synognathoides biaculeatus:* 15 cm (Inhaca Id.).

Genus ***Syngnathus*** Linnaeus, 1758

About 35 species; 2 in our area.

KEY TO SPECIES

1a Snout long, its length about 1.7 in HL; P rays 10-14 ..... *S. acus*
1b Snout short, its length about 3 in HL; P rays 6-8 ..... *S. watermeyeri*

145.29 *Syngnathus acus*
Linnaeus, 1758
PLATE 23

Longsnout pipefish — Langsnoet-pypvis

Syngnathus acus Linnaeus, 1758: 337 (Europa); Barnard, 1925: 288; Smith, **SFSA No. 350***; 1963: 539*; Smith & Smith, 1966: 103*. *Syngnathus Temminckii* Kaup, 1856: 36 (Cape of Good Hope); Smith, **SFSA No. 355.** *Syngnathus Delalandi* Kaup, 1856: 45 (Cape of Good Hope).

Rings (18-21)+(36-43); D 33-42; P 10-14; A 3; subdorsal rings (2.0-0.0)+(7.25-9.75) = 8.0-10.75. P base more or less centred on level of lateral trunk ridge; lateral trunk and tail ridges variably continuous or discontinuous near anal ring.

Light greenish to dark brown, markings variable. Attains 30 cm in local waters, reported to reach 46 cm off European shores. Often associated with vegetation such as *Zostera*, this is the most common pipefish in South African estuaries and also occurs offshore to depths of at least 110 m. Known from the vicinity of Möwe Bay (ca. 19°20′S on the west coast) to northern Natal. Despite literature records to the contrary, there is no conclusive evidence of the Indo-Pacific occurrence of *S. acus* outside of South African waters. (See illustration on p. 458.)

145.30 *Syngnathus watermeyeri*
Smith, 1963

River pipefish — Rivier-pypvis

Syngnathus watermeyeri Smith, 1963: 538, Pl. 82, Figs. G and H (Bushmans River, eastern Cape Province).

Rings (16-18)+(37-40); D 28-32; P 6-8; A 3; subdorsal rings (1.0-(0.25))+(6.0-7.25) = 6.75-7.75. P base mainly below level of lateral trunk ridge.

Greenish brown with close-set dark lines on head and pale lines on body. Attains 13 cm. Known only from areas of tidal influence within the Kariega, Kasouga and Bushmans rivers (ca. 33°50′S). (See illustration on p. 458.)

Genus ***Trachyrhamphus*** Kaup, 1853

Three species; 1 in our area.

145.31 *Trachyrhamphus bicoarctatus*
(Bleeker, 1857)

Double-ended pipefish — Dubbelent-pypvis

Syngnathus bicoarctatus Bleeker, 1857: 99 (Amboina). *Yozia bicoarctata:* Smith, **SFSA No. 356***; 1963: 532*; Dawson et al., 1979: 244*. *Trachyrhamphus bicoarctatus*: Dawson, 1984: 181*.

Rings (21-24)+(53-63); D 24-32; P 15-19; A 4; C 8-9; subdorsal rings (4.0-2.0)+(1.75-3.5) = 4.75-6.5. Snout long, slender and somewhat arched, without spines or denticulations; C degenerate in subadults and adults, usually with 9 fin rays; planktonic young with elongate dermal processes.

Mainly brownish, often with small dark or pale spots on trunk. Attains at least 39 cm. In depths of 40 m from Durban northwards to Kenya; also northern Red Sea and Arabian Gulf to Mariana Ids. (See illustration on p. 458.)

145.31 *Trachyrhamphus bicoarctatus:* 32 cm (Inhaca Id.).

145.27 *Phoxocampus belcheri:* 6 cm SL brooding male. **145.28** *Syngnathoides biaculeatus:* 17.5 cm presumptive female. **145.29** *Syngnathus acus:* 13 cm SL female or juvenile male. **145.30** *Syngnathus watermeyeri:* 10 cm brooding male paratype (Bushmans River, W. of Port Alfred). **145.31** *Trachyrhamphus bicoarctatus:* 19 cm SL.

Family No. 146: SOLENOSTOMIDAE

by R. A. Fritzsche

Ghost pipefishes **Spookpypvisse**

Body short and compressed; encased in bony plates. Dorsal fins separate; anterior dorsal fin comprising 5 feeble spines. Soft dorsal and anal fins similar and opposite. Snout long and compressed with small terminal mouth. Pelvic fins of female expanded and modified into brood pouch for incubation of eggs.

A small group of Indo-Pacific fishes. One genus.

Genus ***Solenostomus*** Lacepède, 1803

Solenichthys Bleeker, 1865 is a synonym. Perhaps 2 species; 1 in our area. *S. paradoxus* (Pallas, 1770) reported from Zanzibar may be found in our area.

KEY TO SPECIES

1a C peduncle about 3 times longer than deep ..... *S. paradoxus*
1b C peduncle about as long as deep ..... *S. cyanopterus*

146.1 *Solenostomus cyanopterus*
Bleeker, 1854
PLATE 24

Ghost pipefish Spookpypvis

Solenostomus cyanopterus Bleeker, 1854: 507 (Ceram); Smith, **SFSA No. 370*;** Fishelson, 1966: 95*. *Solenostoma cyanopterus:* Barnard, 1947: 75*.

D V+18-20; A 18-20; P 25-28; V 7. Head 2.2-2.6; snout height 5-9 in head. Caudal peduncle depth usually greater than its length.

Colour variable, brown to pink or yellow and marked with small black or white spots; 2 elongate black spots between 1st 3 D spines. "Always found in pairs, swimming head down close to each other. Searching for food they approach the selected place turning their eyes in all directions, simultaneously or separately" (Fishelson, 1966). Attains 17 cm. Uncommon shore fish in weedy areas throughout Indo-Pacific region including India, Japan and Australia, and south to East London.

Family No. 147: MACRORAMPHOSIDAE

by P.C. Heemstra

Snipefishes **Snipvisse**

Body very compressed. Snout produced into a long tube at the end of which is the small toothless mouth. Bony plates on flanks above pectoral fins and/or along ventral midline of body. Pelvic fins small. Dorsal fins separate, first with 5-8 spines, the 2nd spine much enlarged. Scales like shark denticles, with sharp ridges and spines. Gasbladder present.

Three genera with about 12 species; 5 species in our area. Body length is from rear edge of gill cavity to base of caudal fin.

KEY TO GENERA

1a Spinous and soft D separated by a distinct gap; body depth (vertical at origin of V) contained 2 or more times in distance from eye to C base ..... *Macroramphosus*
1b Spinous and soft D contiguous; body depth contained less than twice in distance from eye to C base 2

2a Scales large, visible to naked eye; orbit rim spiny ..... *Centriscops*
2b Scales microscopic; orbit rim without distinct spines ..... *Notopogon*

Genus ***Centriscops*** Gill, 1863

Body depth greater than length of head. Scales very spiny, giving fish a "furry" look. Dorsal profile S-shaped with a concavity above and just behind eye and a prominent hump above P. Two species, apparently restricted to the southern oceans; 1 species in our area.

147.1 *Centriscops obliquus*
Waite, 1911

Banded snipefish Balk-snipvis

Centriscops humerosus obliquus Waite, 1911: 170, Pl. 26 (New Zealand?). *Centriscops obliquus:* Mohr, 1937: 56*; Smith, **SFSA No. 365*.**

D VII+16-18; A 17-21; P 15-17. Snout length contained twice in body length. Orbit diameter 3.0-3.2 times in snout length. Distance from base of 1st D spine to 1st A ray more than body length.

Body orange, with 6 oblique dark bands. According to Menni & Miquelarena (1979) females differ greatly in colour pattern, having a series of wavy subhorizontal dark

147.1 *Centriscops obliquus:* 21.5 cm (off Cape Town).

stripes. Attains 21 cm. Originally described from a specimen in the Dominion Museum in Wellington. Also reported from Australia and Argentina; has been found in our waters from Cape Colombine to False Bay.

Genus ***Macroramphosus*** Lacepède, 1803

Body relatively elongate; depth (vertical at origin of pelvics) less than snout length. Scales imbricate (no skin visible between the scales). Length of D_2 base ½ or less that of A base. Ehrich (1976) has claimed that the 2 supposed species of *Macroramphosus* are examples of ecophenotypes, the slender *"gracilis"* form comprising mainly mesopelagic juveniles, and the deeper-bodied *"scolopax"* form being mainly epibenthic adults, but Clarke (1984) has questioned this interpretation.

147.2 *Macroramphosus scolopax*
(Linnaeus, 1758)
PLATE 24

Slender snipefish — Slank snipvis

Balistes scolopax Linnaeus, 1758: 329 (Mediterranean Sea). *Centriscus gracilis* Lowe, 1839: 86 (Madeira). *Macroramphosus gracilis:* Mohr, 1937: 33*; Smith, **SFSA No. 363***. *Macrorhamphosus scolopax:* Mohr, 1937: 36*; Smith, **SFSA No. 364**; Ehrich & John, 1973: 87; Ehrich, 1976: 253; 1977: 12. *Macrorhamphosus gracilis:* Ehrich & John, 1973: 87.

D VI-VIII+11-13; A 18-20; P 15-17. Body depth 3.8-5.9 in TL.

Reddish pink, silvery below. Attains 19 cm. Feeds on zooplankton (copepods and ostracods) and benthic invertebrates. Worldwide in tropical/subtropical waters; our records from Table Bay to Durban in 50 - 350 m.

147.2 *Macroramphosus scolopax:* 10 cm (off Cape Point).

Genus ***Notopogon*** Regan, 1914

Body depth (vertical at origin of pelvics) more than snout length. Scales lanceolate, very small and erect, giving the body a velvety feel. Length of D_2 base more than ½ that of A base. Peritoneum black. Five species (3 in our area), all restricted to the southern oceans.

KEY TO SPECIES

1a Distance from eye to origin of 2nd D spine distinctly less than distance from eye to C base; distance from base of 2nd D spine to 1st D soft-ray not more than base of soft D 2
1b Distance from eye to origin of 2nd D spine greater than or subequal to distance from eye to C base; distance from base of 2nd D spine to 1st D soft-ray more than soft D base ..... *N. xenosoma*

2a Eye diameter 4.2-5.2 in snout length; snout length 1.3-1.5 in body length (from rear edge of gill cavity to C base) ..... *N. macrosolen*
2b Eye 2.7-4.0 in snout; snout 1.6-1.9 in body length ..... *N. lilliei*

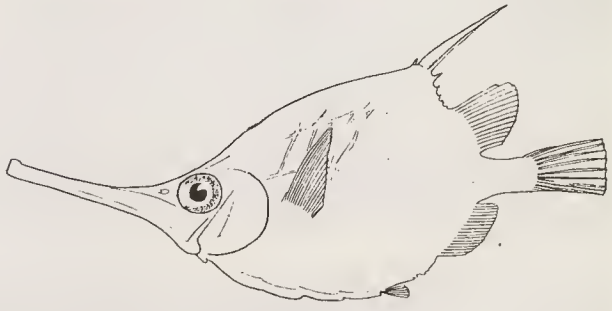
147.3 *Notopogon lilliei*
Regan, 1914

Round bellowsfish — Ronde blaasbalkvis

Notopogon lilliei Regan, 1914: 14 (New Zealand); 1914: 15*; Mohr, 1937: 50*; Smith, **SFSA No. 368.**

D VII/14-15; A 17-19; P 16-17. Body depth 1.6-1.9 in distance from eye to end of C; dorsal profile evenly convex, with a patch of short bristles above operculum; 2nd D spine length greater than A base, 1.5-2.0 in body depth.

Attains at least 23 cm. Known in our area from a single specimen caught off Natal; also reported from New Zealand and South Australia.



147.3 *Notopogon lilliei:* (after Mohr, 1937).

147.4 *Notopogon macrosolen*
Barnard, 1925
PLATE 24

Longsnout bellowsfish — Langsnoet-blaasbalkvis

Notopogon macrosolen Barnard, 1925: 498 (off Cape Town in 200 fms); 1925: 279*; Mohr, 1937: 52*; Smith, **SFSA No. 366***; Penrith, 1967: 528.

D VII/15; A 17-19; P 15-16. Body depth 1.9-2.2 in distance from eye to end of C; dorsal profile straight (or nearly so) from eye to 1st D spine, with a patch of short bristles on nape of adult males >20 cm; 2nd D spine longer than A base, 1.7- 2.5 in body depth. Possibly a synonym of *N. lilliei*.

Attains 33 cm. Northwest of Cape Town to Saldanha Bay in 200 - 500 m.

147.4 *Notopogon macrosolen:* 19.5 cm SL? type (off Table Bay).

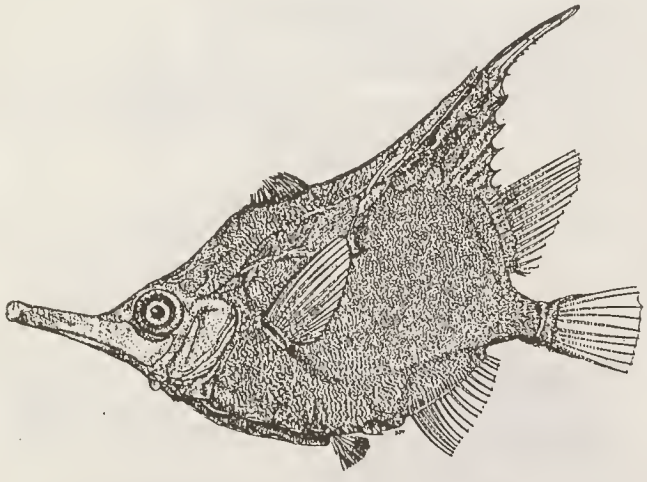
147.5 *Notopogon xenosoma*
Regan, 1914

Longspine bellowsfish — Langstekel-blaasbalkvis

Notopogon xenosoma Regan, 1914: 18 (Cape North, New Zealand); 1914: 15*. *Notopogon natalensis* Gilchrist, 1922: 57, Pl. 12, Fig. 2 (off Durban; types: RUSI 8349 & 8350). *Notopogon fernandezianus* (*non* Delfin): Mohr, 1937: 47* (in part; not Fig. 22); Smith, **SFSA No. 367.**

D VII/15-16; A 17-18; P 15. Body depth 1.8-2.0 in distance from eye to end of C; distance from base of 1st D spine to A origin equals distance from operculum to C base, and much greater than body depth; length of 2nd D spine about twice length of A base, and 1.2-1.5 in body depth. Our species differs in snout length (orbit 2.1-2.7 in snout) from the South American species *N. fernandezianus* (orbit 2.9-4.0 in snout, *fide* Mohr, 1937: 48; Menni & Miquelarena, 1979: 579).

Fresh colour: uniform brownish red. Attains 17 cm. Our specimens from Algoa Bay to Natal; also known from New Zealand.



147.5 *Notopogon xenosoma:* 14 cm syntype of *Notopogon natalensis* (off Natal).

Family No. 148: CENTRISCIDAE

by P.C. Heemstra

Shrimpfishes — **Garnaalvisse**

Body elongate, extremely compressed, razor-like, with sharp ventral edge; body encased by thin, transparent, bony plates. Rear end of body twisted ventrally, so that the dorsal fin is in the normal position of the caudal fin, which is displaced ventrally. Snout elongate, compressed; mouth very small, toothless. Fin rays unbranched.

Two genera; 4 or 5 species, one in our area. In *Centriscus* Linnaeus, 1758 the 1st dorsal fin spine is fused with the body armour plates.

Genus ***Aeoliscus*** Jordan & Starks, 1902

First D spine hinged at its base, slightly movable. Two species. *A. strigatus* (Günther, 1861) is not known from our area, but does occur at the Seychelles. It has a midlateral dark stripe from snout to C and lacks the small black spots usually present on *A. punctulatus*. The distance from soft D base to base (joint) of 1st D spine is greater than body depth, and body depth is 6.8-8.3 in SL. Often hide among spines of the sea urchin *Diadema*.

148.1 *Aeoliscus punctulatus*
(Bianconi, 1855)
PLATE 24

Shrimpfish — Garnaalvis

Amphisile punctulata Bianconi, 1855: 221, Pl. I, Fig. 2 (Mozambique). *Amphisyle brevispina* Peters, 1855: 450 (Inhambane and Mozambique Id., Mozambique). *Centriscus punctulatus:* Mohr, 1937: 27*. *Aeoliscus punctulatus:* Smith, **SFSA No. 369*.**

D III+10-11; A 12-13; P 11; V 4. Depth 5-7, head 2.5-2.8 in SL. Distance from soft D base to base of 1st D spine less than body depth.

Head and body pale green, with widely-spaced, small black spots. Attains 15 cm. These remarkable little fishes swim vertically, in a head-down position (incorrectly illustrated in frontispiece in Smith, **SFSA**). They are often on exhibit in the Durban Oceanarium, where they can be seen swimming in little shoals like miniature soldiers marching on parade. Known along east coast of Africa from Kenya to Algoa Bay; also in the Red Sea.

Order SCORPAENIFORMES

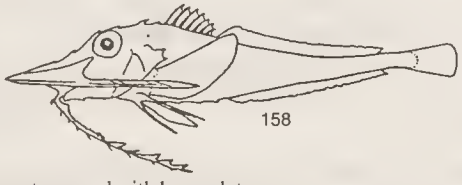
Body shape varies. All species have a bony ridge (suborbital stay) across the cheek that is usually firmly attached to the preopercle. Head usually spiny, sometimes armored with bony plates. Many are almost fully scaled, some unscaled; others have scales modified into bony plates. Most have a rounded pectoral fin and a square-cut or rounded caudal fin (rarely forked).

Usually under 30 cm, some reach 90 cm or more. They occur nearly worldwide in a variety of habitats. Most live on the bottom inshore or in moderate depths offshore, a few in the deep sea; many are well adapted for concealment. Some have venomous fin spines capable of inflicting painful wounds. The flesh is edible and often delicious. A few are of commercial importance, but many are rare. About 20 families, but classifications differ with regard to family limits. About 1 000 species.

KEY TO FAMILIES
(western Indian Ocean)

1a Head encased by expanded bones that are firmly attached to each other 2
1b Head not encased with bony armour 4

2a Body covered with bony plates ..... PERISTEDIIDAE (No. 158)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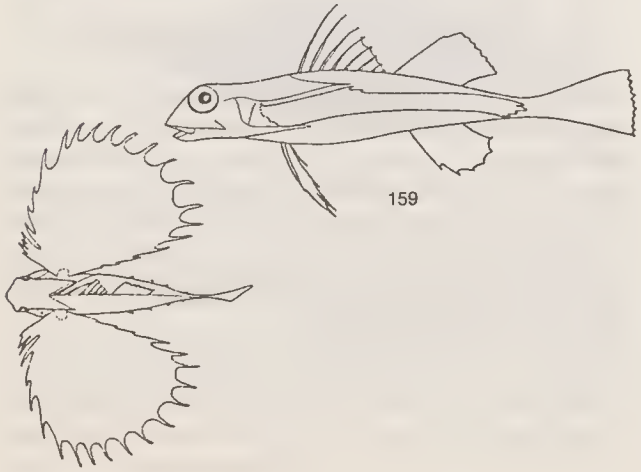
2b Body not covered with bony plates 3

3a Very long preopercular spine; 1 or 2 isolated dorsal spines on nape ..... DACTYLOPTERIDAE (No. 159)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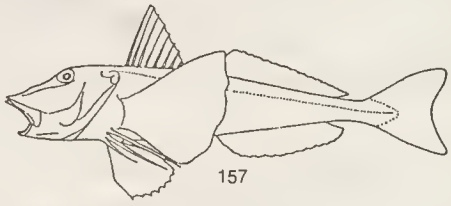
3b Short preopercular spine; no isolated dorsal fin spines on nape ..... TRIGLIDAE (No. 157)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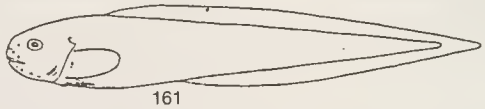
4a Pelvic fins absent or joined to form a disc ..... LIPARIDIDAE (No. 161)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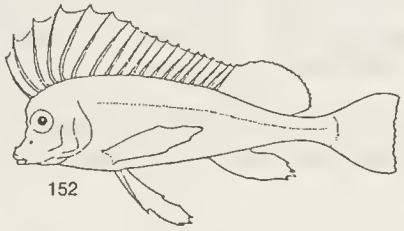
4b Pelvic fins present, normal 5

5a One nostril on each side ..... CONGIOPODIDAE (No. 152)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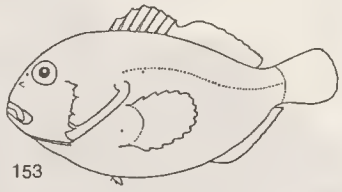
5b Two nostrils on each side 6

6a Body egg shaped; pelvic fins rudimentary ..... CARACANTHIDAE (No. 153)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6b Body oblong or elongate; pelvic fins moderate to large 7

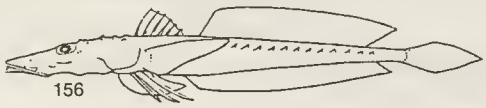
7a No anal spines ..... PSYCHROLUTIDAE (No. 160)

160

7b Anal spines present 8

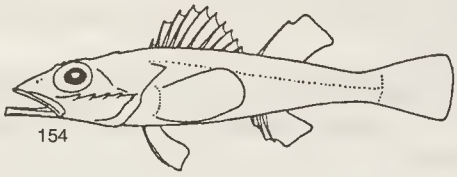
8a Two dorsal fins; head strongly flattened 9
8b One dorsal fin; head not strongly flattened 11

9a Row of spiny scutes along side ... HOPLICHTHYIDAE (No. 156)

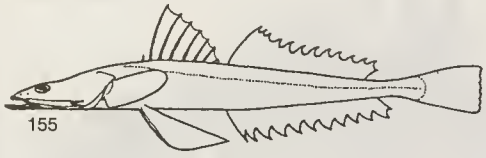


9b Body with normal scales 10

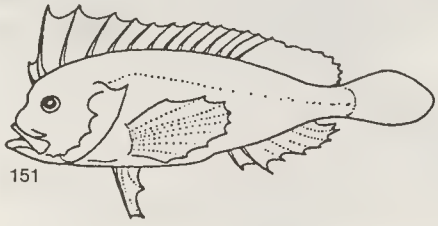
10a Pelvic fins below pectoral fin base; 3 anal fin spines ..... BEMBRIDAE (No. 154)



10b Pelvic fins posterior to pectoral fin base; no anal fin spines ..... PLATYCEPHALIDAE (No. 155)

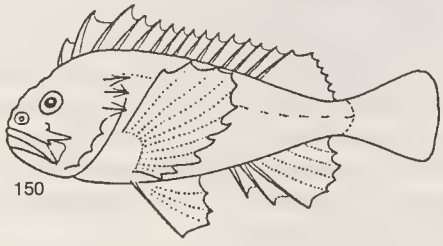


11a A fleshy papilla at front of isthmus . APLOACTINIDAE (No. 151)



11b No fleshy papillae at front of isthmus 12

12a Dorsal fin begins before or above eye ..... TETRAROGIDAE (No. 150)



12b Dorsal fin begins after eye ..... SCORPAENIDAE (No. 149)

Family No. 149: SCORPAENIDAE

by W.N. Eschmeyer

Scorpionfishes **Skerpioenvisse**

Body moderately compressed to robust. Head large, spiny. Preopercle margin with 3-5 spines. Usually a row of spines below eye on bony ridge attached to preopercle. Usually 2 (sometimes 1) spine on opercle. Other spines scattered on head. Eye moderate to large. One dorsal fin, usually strongly notched at rear of spinous part with 7-18 spines and 4-14 soft-rays; anal fin with 2-4 spines and 5-14 soft-rays; last dorsal and anal rays double. Pectoral fins with 11-23 rays; lower 1-3 rays sometimes as separate, free rays. Lateral line present; LSS = vertical series of scales, counted 2 or 3 rows above LL from 1st scale of LL to caudal fin base. The family limits are uncertain; Matsubara's (1943) classification is followed here, except that congiopodids, tetrarogids and aploactinids are treated as separate families. Most workers recognise a number of distinctive subfamilies, which are here arranged alphabetically.

KEY TO SUBFAMILIES
(Western Indian Ocean)

1a No overlapping scales on body 2
1b Typical overlapping scales on body (or body extremely compressed and scales as small spiny papillae) 4

2a P normal, lowermost rays not free from remainder of fin . . . . . SYNANCEIINAE
2b Lowermost 1-3 P rays free from remainder of fin 3

3a Lowermost P ray free . . . . . MINOINAE
3b Lowermost 2-3 P rays free . . . . . CHORIDACTYLINAE

4a D spines usually 15; lowermost P ray free . . . . . APISTINAE
4b D spines 12-14; no free P ray 5

5a LL a continuous trough, roofed by thin scales . . SETARCHINAE
5b LL of tubed scales (sometimes buried) 6

6a P not rounded, slightly bilobed, or upper rays longest . . . . . SEBASTOLOBINAE
6b P rounded, sometimes elongate 7

7a D spines usually very long, about equal to or longer than body depth; P usually reaches to rear of A or beyond . . . . . PTEROINAE
7b D spines short, usually less than ½ of body depth; P usually not reaching past front of A 8

8a Usually 12 or more D soft-rays; usually 1 or no spines on ridge below eye . . . . . SEBASTINAE
8b Usually 10 or fewer D soft-rays; usually several spines on ridge below eye . . . . . SCORPAENINAE

Subfamily APISTINAE

Elongate, scaled body. Most head spines weak. Very long spine on lachrymal bone. D spines 14-16; P elongate,

with 11-13 rays, lowermost ray free from remainder of fin. Two genera; Indo-West Pacific.

Genus ***Apistus*** Cuvier, 1829

One or 2 species; 1 in our area.

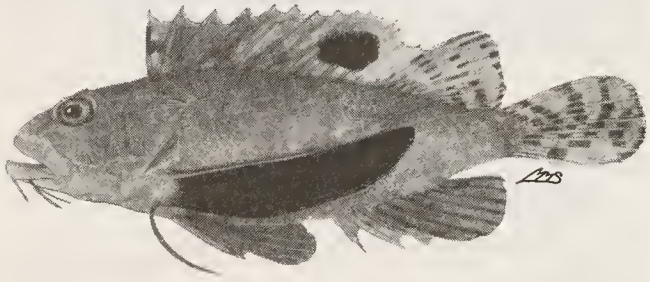
149.1 *Apistus carinatus*
(Bloch, 1801)

Bearded waspfish — Baardman-wespvis

Scorpaena carinata Bloch, 1801: 193. *Apistus faurei* Gilchrist & Thompson, 1908: 176. *Apistus carinatus*: Smith, **SFSA No. 1051*;** 1957: 84*.

D XIV-XVI,8-10; A III-IV,6-8; P 11-13. Depth 3-4. Scales small, LSS 65-85; 3 barbels on chin.

Bluish grey, belly pale. Large black spot on rear ½ of spinous D. Attains about 18 cm. Usually trawled at about 15 - 50 m. Natal northwards; coastal areas of Indo-West Pacific.



149.1 *Apistus carinatus*: 12.5 cm (off Natal).

Subfamily CHORIDACTYLINAE

Body and head nearly naked, without normal scales. Scattered buried scales on body, usually underlying warts or tufted lumps; about 13-15 buried LL scales. D XII-XVIII, 5-10; total spines and rays 21-27. A II,8-13. P usually 12, lowermost 2 or 3 rays entirely free. Two genera. Subfamily reviewed by Eschmeyer, Rama Rao & Hallacher (1979).

KEY TO GENERA
(Western Indian Ocean)

1a D spines 12-15; lowermost 3 P rays free . . . . . *Choridactylus*
1b D spines 15-18; lowermost 2 P rays free . . . . . *Inimicus*
(8 species; *I. filamentosus* (Cuvier, 1829) known from Red Sea, Zanzibar, Réunion, Mauritius and Maldives)

Genus ***Choridactylus*** Richardson, 1848

Two species; 1 in our area. *C. multibarbus* Richardson, 1848 lacking filamentous 1st P ray and having inner side of P encircled with black, is known from the Red Sea to China and the Philippines.

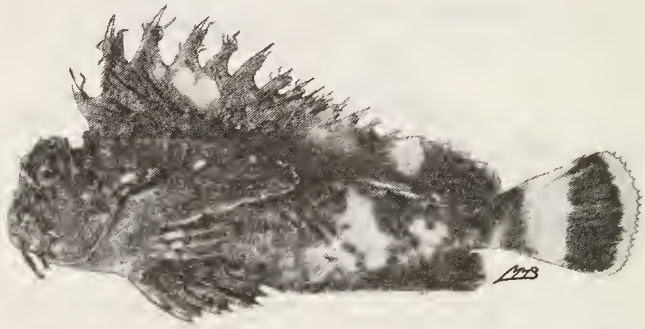
149.2 *Choridactylus natalensis*
(Gilchrist, 1902)
PLATE 27

Threestick stingfish — Driestok-steekvis

Choridactylodes natalensis Gilchrist, 1902: 101, Pl. 5, Figs. 1-2 (off Umhlanga River, 22-26 fms); Smith, **SFSA No. 1055*.** *Choridactylus natalensis*: Smith, 1958: 176*.

D XIII-XV,8-10, total 21-24; A II,8-10; P 12; LL 13-14. First P ray ends in a long filament.

Mostly brownish, mottled in brown, pink and yellow. Attains 14 cm. Taken in trawls in 35 - 75 m from Durban to Mozambique.



149.2 *Choridactylus natalensis*: 9 cm (off Natal).

Subfamily MINOINAE

Scales absent, except for buried LL tubes. D VIII-XII,8-14; total D spines + rays = 19-24. Two weak A spines; 7-11 A soft-rays. P rays normally 12; lowermost ray free from rest of fin. Subfamily reviewed by Eschmeyer, Hallacher & Rama Rao (1979) (see also Amaoka & Kanayama, 1981). One genus, *Minous* Cuvier, 1829, with 10 species; 1 in our area; 4 more in western Indian Ocean probably will be found in our area (especially *M. monodactylus*) and are included in the following key.

KEY TO SPECIES
(Western Indian Ocean)

1a 1st D spine equal to or longer than 2nd spine, well separated from 2nd spine . . . . . *M. monodactylus* (Bloch & Schneider, 1801) (Mauritius, to Red Sea)
1b 1st D spine usually less than ½ length of 2nd and sometimes extremely small, close to 2nd spine at base 2

2a P more than 50% of SL 3
2b P less than 46% of SL 4

3a A II,8-11, usually 10; posterior lachrymal spine points down and back . . . . . *M. inermis* Alcock, 1889 (Gulf of Oman, Arabian Sea to Burma)
3b A II,8-9; posterior lachrymal spine points down and forward . . . . . *M. longimanus* Regan, 1908 (Saya de Malha Bank, 95 - 125 m)

4a Inside of P with irregular black spots on a pale background . . . . . *M. coccineus*
4b Inside of P with pale spots on a dark background . . . . . *M. dempsterae* Eschmeyer, Hallacher & Rama Rao, 1979 (Gulf of Oman and off western India)

149.3 *Minous coccineus*
Alcock, 1890

Onestick stingfish — Eenstok-steekvis

Minous coccineus Alcock, 1890: 428 (India); *Minous superciliosus* Gilchrist & Thompson, 1908: 177 (South Africa); Smith, 1958: 175*. *Minous trachycephalus* (*non* Bleeker). Smith, **SFSA No. 1054***.

D X-XI,11-12, total 21-23; A II,9-10; P 12, lower ray free.

Note characteristic black spots on inside of P. Attains about 10 cm. Taken in trawls at about 50 m from Durban northwards; also in Red Sea, Arabian Sea and eastward to Gulf of Thailand. *M. monodactylus* has black streaks on inside of P and long 1st D spine.

149.3 *Minous coccineus*: ca. 11.5 cm (off Durban) and inside of pectoral fin.

Subfamily PTEROINAE

Body moderately compressed, scaled. Longest P rays usually reaching past A. D spines normally 12 or 13, usually longer than body depth. Indo-West Pacific to central Pacific. Five genera, 3 in our area. Lovely aquarium fishes, but their venomous fin spines can cause very painful wounds.

KEY TO GENERA

1a All P rays unbranched . . . . . *Pterois*
1b Some upper P rays branched 2
2a D spines short, about equal to length of D soft-rays and usually less than ½ body depth; lower jaw with serrate ridges and scales . . . . . *Brachypterois* (1 species, *B serrulatus* (Richardson, 1846) known from Gulf of Oman to Philippines and Japan)
2b D spines long, longer than length of D soft-rays and usually as long as body depth; lower jaw smooth and naked 3
3a A III,5 . . . . . *Dendrochirus*
3b A II-III,7-9 4
4a Large, thin bony crest above eye (males); A spines 3; P 15-18; no tentacle from lachrymal . . . . . *Ebosia* (2 species; *E. falcata* Eschmeyer & Rama Rao, 1977 known from Kenya, Somalia and India)
4b A spines 2 in adults (3 in young); P 18-21; a long tentacle from rear end of lachrymal . . . . . *Parapterois*

Genus *Dendrochirus* Swainson, 1839

Very similar to species of *Pterois* but with branched P rays. At least 5 species, 2 in our area.

KEY TO SPECIES

1a Mid-D spines usually longer than body depth; T-shaped (on its side) mark on C peduncle . . . . . *D. zebra*
1b Mid-D spines about equal to or a little shorter than body depth; no T-shaped mark on C peduncle . . . . . *D. brachypterus*

149.4 *Dendrochirus brachypterus*
(Cuvier, 1829)
PLATE 25

Shortfin turkeyfish — Kortvin-kalkoenvis

Pterois brachyptera Cuvier, *in* Cuv. & Val., 1829: 368 (no locality). *Dendrochirus brachypterus*: Smith, **SFSA No. 1050***; 1957: 82*.

D XIII,9-10; A III,5; P 17-18.

Body reddish, with vague broad bars. Rows of large spots form conspicuous bars on paired fins; median fins with small dark spots. Attains about 15 cm. From Transkei (32°S) northward to Red Sea and east to central Pacific.

149.4 *Dendrochirus brachypterus*: 9.5 cm (Inhaca Id.).

149.5 *Dendrochirus zebra*
(Cuvier, 1829)

Zebra turkeyfish — Sebra-kalkoenvis

Pterois zebra Cuvier, *in* Cuv. & Val., 1829: 270 (Mauritius). *Dendrochirus zebra:* Smith, **SFSA No. 1049;** 1957: 81*.

D XIII,10-11; A III,6-7; P 17.

Body reddish with about 5 dark bars, alternating with thin dark bars in larger specimens. Median fins with small dark spots. Long, banded tentacle usually present above eye. Dark spot on cheek. Attains about 20 cm. Off Durban in 30 fms (Smith, 1957), northwards to Red Sea and east to central Pacific; usually in shallow water.

149.5 *Dendrochirus zebra:* 14 cm (Seychelles).

Genus ***Parapterois*** Bleeker, 1876

Similar to *Pterois,* but only 2 A spines (appears like 3 in young), more P rays, and some P rays branched; C of large adults truncated, with upper and lower rays longest. Apparently only 1 species; see Smith (1957) and Matsubara (1943) for synonyms and more information.

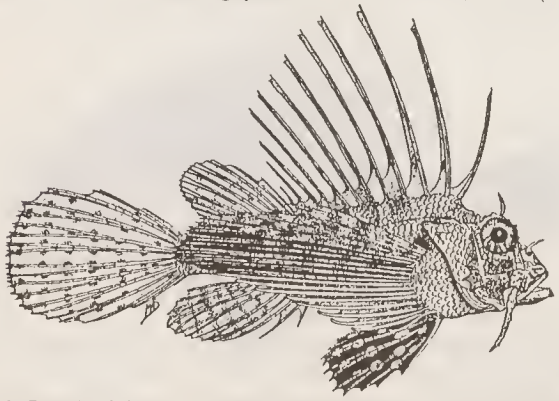
149.6 *Parapterois heterurus*
(Bleeker, 1856)

Blackfoot firefish — Swartvoet-vuurvis

Parapterois heterurus Bleeker, 1856: 33 (Ambon); 1876: 55, Pl. 1; Smith, 1957: 83*. *Pterois nigripinnis* Gilchrist, 1905: 2, Pl. 20 (Natal). *Pterois natalensis* von Bonde, 1923: 32, Pl. 8 (near Durban). *Pterois macrurus:* Smith, **SFSA No. 1046.**

D XIII,9; A II,7-8; P 18-21.

Attains about 20 cm. Trawled on soft bottom in coastal areas at depths of about 40 - 300 m; Natal coast northwards, across Indian Ocean to western Pacific.



149.6 *Parapterois heterurus:* 10 cm (off Natal).

Genus ***Pterois*** Oken, 1817

Body compressed. P with 12-17 unbranched rays reaching well past A . D spines longer than body depth in most species. Usually found on reefs, may be mostly nocturnal, remaining in caves and crevices during day. *Pteropterus* Swainson is a synonym; 7 species, 5 in our area.

KEY TO SPECIES

1a Scales on body cycloid; P 13-14 2
1b Scales on body ctenoid; P 15-17 3

2a Normally 14 P rays; soft D, C & A with small dark spots . . . . . *P. miles*
2b Normally 13 P rays; soft D, C & A mostly without spots . . . . . *P. russellii*

3a D spines 13; P rays 18-20 . . . . . *P. mombasae*
3b D spines 12; P rays 16-17 4

4a About 5 broad dark bars on body, bordered by white; broad horizontal stripe on C peduncle; tentacle above eye not banded . . . . . *P. radiata*
4b Numerous dark bars on body; thin diagonal bars on C peduncle; tentacle above eye banded with dark . . . . . *P. antennata*

149.7 *Pterois antennata*
(Bloch, 1787)
PLATE 25

Broadbarred firefish — Breëbalk-vuurvis

Scorpaena antennata Bloch, 1787: 21, Pl. 185 (no locality). *Pterois antennata:* Smith, **SFSA No. 1046a*.** *Pteropterus antennata:* Smith, 1957: 79*.

D XII,11-12; A III,6; P 16-17. Scales mostly ctenoid.

Reddish to tan, with many dark bars on body; median fins

149.7 *Pterois antennata:* 11.5 cm (N. Mozambique).

with scattered dark spots. Tentacle above eye usually long, with dark bands. Attains about 20 cm. Natal northwards and to central Pacific.

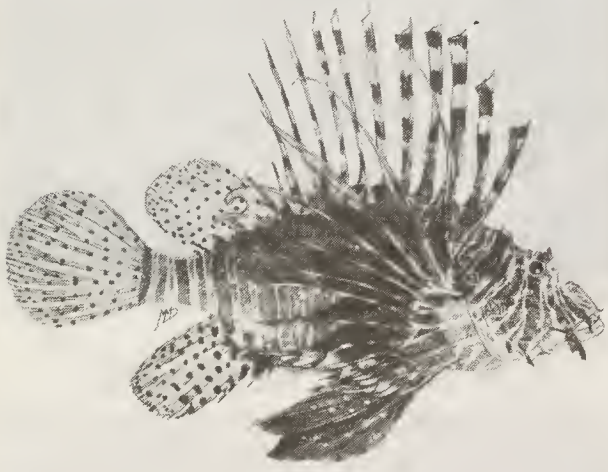
149.8 *Pterois miles*
(Bennett, 1828)
PLATE 25

Devil firefish — Duiwel-vuurvis

Scorpaena miles Bennett, 1828, Pl. 9 (Ceylon). *Pterois volitans* (*non* Linnaeus): Smith, **SFSA No. 1047***; 1957: 76*. *Pterois miles:* Smith, **SFSA No. 1047a.**

D XIII,9-11; A III,6; P 14 (rarely 13 or 15). Scales cycloid, small. In adults, many spinules on bones below eye.

Reddish or tan to grey, with numerous thin dark bars on body and head. Tentacle above eye occasionally faintly banded. Attains at least 31 cm. Port Alfred northwards to Red Sea and to eastern Indian Ocean. *Pterois volitans* (Linnaeus), normally with 11 D soft-rays and larger spots on median fins, is considered a separate species restricted to the central and western Pacific.



149.8 *Pterois miles:* 23 cm (Inhaca).

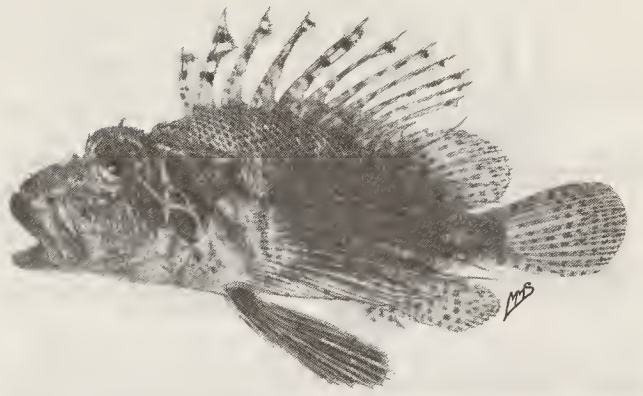
149.9 *Pterois mombasae*
(Smith, 1957)
PLATE 25

Deepwater firefish — Diepwater-vuurvis

Pteropterus mombasae Smith, 1957: 80, Fig. 7, Pl. 6, Fig. D (Mombasa).

D XIII,10; A III,6-7; P 18-20. Scales mostly ctenoid.

Upper ½ of P with large dark spots on inner surface. Mostly reddish brown, with alternating broad and thin dark bars separated by white on body. Dark spot on cheek. Tentacle above eye tiny to moderate, sometimes banded. Attains at least 16 cm. Rare, apparently on deeper reefs off Durban, Sri Lanka and New Guinea.



149.9 *Pterois mombasae:* 16 cm holotype (Kenya).

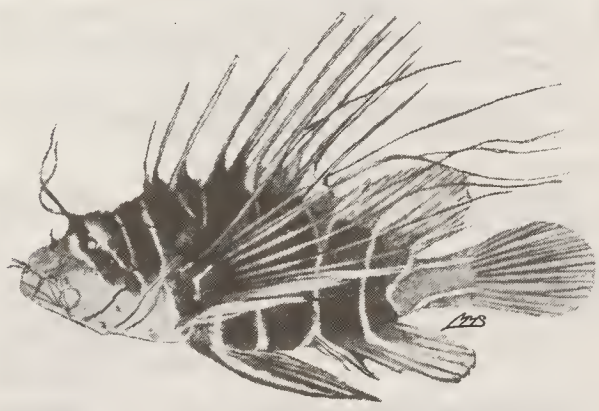
149.10 *Pterois radiata*
Cuvier, 1829
PLATE 25

Radial firefish — Straal-vuurvis

Pterois radiata Cuvier, *in* Cuv. & Val., 1829: 359 (Society Ids.); Smith, 1957: 79*.

D XII-XIII,11; A III,5-6; P 16. Scales mostly ctenoid.

Reddish to brownish, with about 5-6 broad dark bars on body, separated by pale lines; note horizontal dark area on C peduncle. Attains about 20 cm. Sodwana Bay northwards and to central Pacific.



149.10 *Pterois radiata:* 13 cm (Zanzibar).

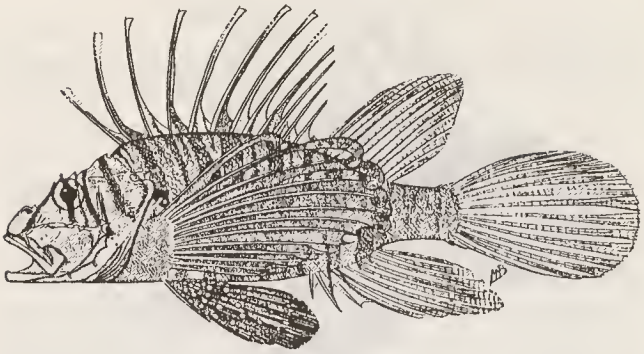
149.11 *Pterois russellii*
Bennett, 1831

Plaintail firefish — Skoonstert-vuurvis

Pterois russellii Bennett, 1831: 128 (India); Smith, **SFSA No. 1048***; 1957: 77*.

D XIII,10-11; A III,6-7; P 13. Scales cycloid.

Reddish, with numerous thin dark bars on body and head. Few or no spines on bones below eye. Attains about 30 cm. Natal coast northward and to western Pacific.



149.11 *Pterois russellii:* 24.5 cm (off Natal).

Subfamily SCORPAENINAE

Pectoral fins usually large, with no free rays. D XII-XIII,7-11; A III,5 (III,6 in *Taenianotus*); last D & A rays double; C rounded. Usually spiny-headed, with a row or ridge of spines under the eye. Found in all oceans, mostly in tropical areas. About 15 genera, 12 in western Indian Ocean, 11 in our area.

KEY TO GENERA

1a D spines 13 . . . . . *Scorpaenodes*
1b D spines 12 2

2a LL incomplete, only 1st 4-8 scales present . . . . . *Phenacoscorpius*
2b LL continuous (sometimes some scales rubbed off during capture) 3

3a Rear lachrymal spine strongly hooked forward . . . *Parascorpaena*
3b Rear lachrymal spine not strongly hooked forward 4

4a Scales as small spiny papillae (body extremely compressed) . . . . . *Taenianotus*
4b Scales normal 5

5a Scales cycloid 6
5b Scales ctenoid 7

6a Two barbel-like skin flaps on chin, 16 P rays . . . *Pogonoscorpius* (1 species, *P. seychellensis* Regan, 1908, known only from the Seychelles)
6b Skin flaps on head, but not 2 at chin; P rays 18 . . . . . *Rhinopias*

7a Prepelvic region unscaled or with deeply embedded scales . . . . . *Scorpaena*
7b Prepelvic region distinctly scaled 8

8a No branched P rays . . . . . *Pontinus*
8b Some upper P rays branched (unbranched in young) 9

9a Fourth D spine elongate in specimens over 6 cm in length; dark spot at front of D . . . . . *Iracundus*
9b No D spines especially elongate 10

10a Palatine teeth absent . . . . . *Scorpaenopsis*
10b Palatine teeth present 11

11a D soft-rays 8-10 (last ray double); shallow water . . . *Sebastapistes*
11b D soft-rays 9-11 (last ray double); deeper than 100 m . . . . . *Neomerinthe*

Genus ***Iracundus*** Jordan & Evermann, 1903

One species. Indian Ocean to central Pacific, but rather rare.

149.12 *Iracundus signifer*
Jordan & Evermann, 1903

Decoy scorpionfish — Lokaas-skerpioenvis

Iracundus signifer Jordan & Evermann, 1903: 210 (Hawaiian Ids.); Eschmeyer & Randall, 1975: 287*.

D XII,9; A III,5; P 17-19. LSS about 70.

Spot on D between spines 1-2 or 1-3; 4th D spine elongate in adults. Front part of D resembles a small fish and is moved about to attract (or perhaps distract) unwary prey (Shallenberger & Madden, 1973). Attains 11 cm. One taken off Sodwana Bay, Zululand. Known from scattered localities in the Indo-Pacific. Coral rubble areas in about 10 - 70 m.

149.12 *Iracundus signifer:* 9 cm SL (after Eschmeyer & Randall, 1975).

Genus ***Neomerinthe*** Fowler, 1935

Similar to *Pontinus,* but with some upper P rays branched (look carefully) and some internal differences. A few species, mostly in the Atlantic. Some Indo-Pacific species formerly placed in *Scorpaena* or *Sebastapistes* now referred to this genus (see Chen, 1981). Two species in our area.

KEY TO SPECIES

1a P 17; (Atlantic Ocean) . . . . . *N. folgori*
1b P 18-19; (Indian Ocean) . . . . . *N. nielseni*

149.13 *Neomerinthe folgori*
(Postel & Roux, 1964)

Scorpaena folgori Postel & Roux, 1964: 167, Figs. 1 & 2 (Cape Verde Ids.). *Neomerinthe folgori:* Eschmeyer, 1969: 44; Penrith, 1980: 60*.

D XII,11; A III,5; P 17; LSS about 85.

Mostly reddish. Attains 40 cm. One known from northern Namibia; also Cape Verde Ids. and coast of Mauritania, 180 - 310 m.

149.13 *Neomerinthe folgori:* 3 cm SL holotype (after Postel & Roux, 1964).

149.14 *Neomerinthe nielseni*
(Smith, 1964)

Spotfin scorpionfish — Kolvin-skerpioenvis

Sebastapistes nielseni Smith, 1964: 298, Pl. 30, Fig. C (off Durban, 405 m).

D XII,9-10; A III,5; P 18-19; LSS about 30-35.

Dark spot on rear of spinous D; dusky smudges on body; probably mostly red in life. Attains 14 cm. Several specimens trawled off Durban, 100 - 405 m.

149.14 *Neomerinthe nielseni:* 14 cm holotype (off Durban).

Genus ***Parascorpaena*** Bleeker, 1876

Body moderately compressed; scales cycloid. Head spines well developed; lachrymal bone with 2 spines over maxillary, posterior spine long and diagnostically curves outward and hooks forward (less hooked in young). D XII,8-10; P 14-18; LSS 35- 45. Palatine teeth present. Indo-West Pacific tropical areas. Recently revised by Eschmeyer & Rama Rao (in press); 4 species, 3 in western Indian Ocean, 2 in our area.

KEY TO SPECIES
(Western Indian Ocean)

1a Suborbital ridge with 2 spines, both posterior to eye; P 17- 18 (rarely 16) . . . . . *P. aurita* Rüppell, 1838 (Zanzibar northwards)

1b Suborbital ridge with 3 spines, 1st spine under eye; P 15-16 (rarely 14 or 17) 2

2a Spine below eye not below a long ridge that leads to 2nd spine . . . . . *Parascorpaena* sp. (Sri Lanka east to Philippines)

2b Spine below eye below a long ridge that leads to 2nd spine 3

3a Supraocular tentacle small to absent; colour pale; males with black spot between D spines 8-10; some teeth on lower jaw canine-like in large males (magnification needed) . . . . . *P. mcadamsi*

3b Supraocular tentacle usually long, much longer than orbit diameter; colour dark; no dark spot on spinous D; lower jaw teeth about same size . . . . *P. mossambica*

149.15 *Parascorpaena mcadamsi*
(Fowler, 1938)

Ocellated scorpionfish — Ogies-skerpioenvis

Scorpaena mcadamsi Fowler, 1938: 60, Fig. 24 (Philippines). *Parascorpaena maculipinnis* Smith, 1957: 57, Pl. 2, Fig. A (Bazaruto, Mozambique); 1961: 571, **No. 1037**a.

D XII,9; A III,5; P 15-17. Ridges between eyes diverge at rear, not encircling a pit.

Large black spot at rear of spinous D in large males; no spot or a weak one in females and juveniles. Attains about 6 cm. Sodwana Bay, Zululand, and Mozambique to Pacific. Shallow rocky areas.

149.15 *Parascorpaena mcadamsi:* 5.5 cm holotype of *P. maculipennis* (S. Mozambique).

149.16 *Parascorpaena mossambica*
(Peters, 1855)
PLATE 26

Golden scorpionfish — Goue skerpioenvis

Scorpaena mossambica Peters, 1855: 241 (Mozambique); Smith, **SFSA No. 1037***. *Scorpaena aurita* (*non* Rüppell): Smith, 1957: 57* (in part); 1961: 571, **No. 1037.** *Scorpaena durbanensis* (*non* Gilchrist & Thompson): Fowler, 1925: 253.

D XII,9; A III,5; P 14-16.

No dark spot on spinous D. Attains about 10 cm. Xora

149.16 *Parascorpaena mossambica:* 11 cm (Transkei).

and Sodwana Bay northwards, in shallow rocky areas; east Africa to central Pacific.

Genus ***Phenacoscorpius*** Fowler, 1938

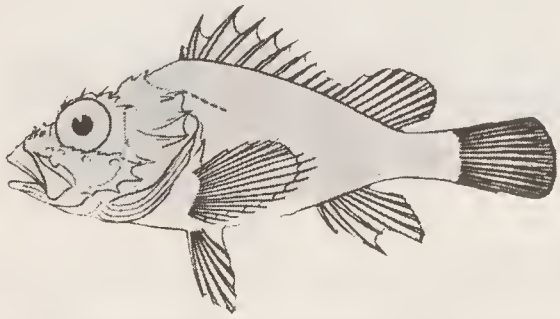
Body and head with ctenoid scales; LL incomplete, only 1st 4-10 scales present. Probably worldwide in tropics; rare. Three species; 1 in our area. *Phenacoscorpius nebulosus* Smith (1958: 77) is a synonym of *Sebastapistes strongia;* based on a specimen that had rear LL scales rubbed off. Deep water.

149.17 *Phenacoscorpius adenensis*
Norman, 1939

Phenacoscorpius adenensis Norman, 1939: 94, Fig. 29 (Gulf of Aden); Smith, 1957: 69*.

D XII,9; A III,5; P 17; LSS about 45.

A rare deep-water species known from 32°S and near Buffalo River, 480 - 550 m. Trawled.



149.17 *Phenascorpius adenensis:* 10 cm holotype (after Norman, 1939).

Genus ***Pontinus*** Poey, 1860

Offshore species, with no branched P rays. D XII,9-10. About 20 species; 2 in our area.

KEY TO SPECIES

1a P 17-18, usually 18; (Atlantic Ocean) . . . . . *P. leda*
1b P 16; (Indian Ocean) . . . . . *P. nigerimum*

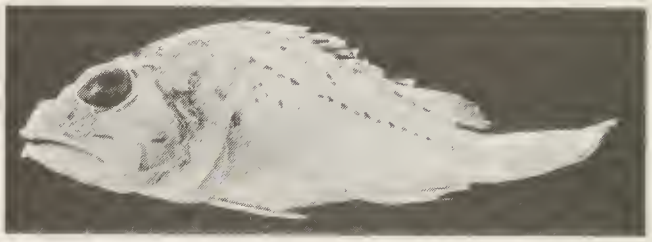
149.18 *Pontinus leda*
Eschmeyer, 1969

Speckled deepwater scorpionfish — Gespikkelde diepwater-skerpioenvis

Pontinus leda Eschmeyer, 1969: 38, Fig. 5a (Gulf of Guinea); Penrith, 1980: 61*.

D XII,9; A III,4-5; P 17-18; LSS 40-47. Short tentacle above eye.

Head, body and fins reddish; irregular black specks on dorsolateral parts of head and body, and on D and C. Attains about 25 cm. Taken in trawls on the west coast as far south as 18°45′S in 100 - 400 m; also northward to Gulf of Guinea.



149.18 *Pontinus leda:* 13 cm SL holotype (after Eschmeyer, 1969).

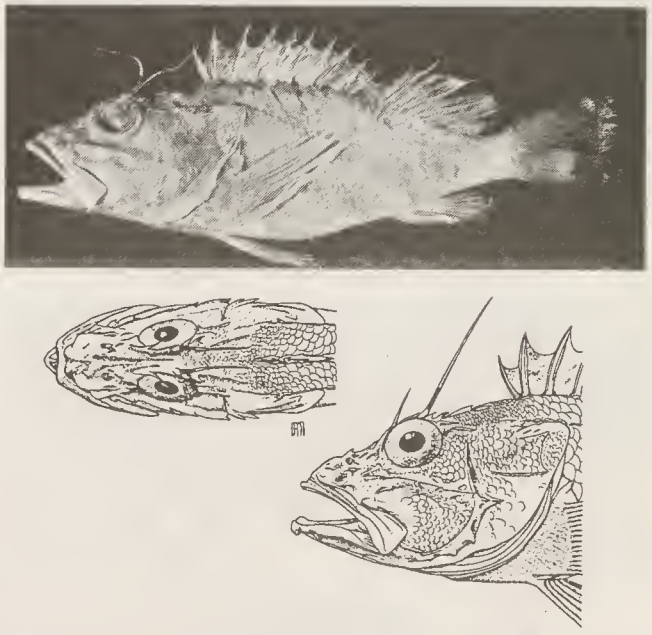
149.19 *Pontinus nigerimum*
Eschmeyer, 1983

Blacklash scorpionfish — Swartwimper-skerpioenvis

Pontinus nigerimum Eschmeyer, 1983: 1, Fig. 1 (off Natal).

D XII,9; A III,5; P 16; LSS about 45.

Colour in life probably mostly reddish. Note large tentacle above eye, with black lower portion. One specimen known, off Natal in 146 m. Other species of *Pontinus* may occur in western Indian Ocean; an undescribed species from Mauritius has pale tentacles above the eye.



149.19 *Pontinus nigerimum:* 15.5 cm holotype and head (off Natal).

Genus ***Rhinopias*** Gill, 1905

Body scales cycloid; head naked. Five species; 1 in our area. Reviewed by Eschmeyer et al. (1973), 1 additional species added by Condé (1977).

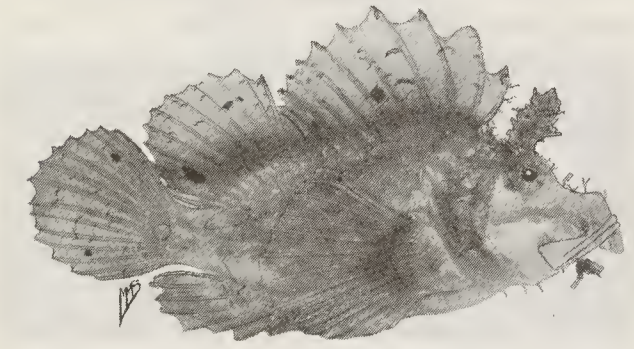
149.20 *Rhinopias frondosa*
(Günther, 1891)
PLATE 28

Popeyed scorpionfish Peuloog-skerpioenvis

Scorpaena frondosa Günther, 1891: 482, Pl. 39 (Mauritius). *Rhinopias frondosa:* Smith, 1957: 62*; 1966: 74*; Eschmeyer et al., 1973: 295*.

D XII,9; A III,5; P 16; LSS 70-75. Body compressed, deep; eye set high on head; snout long, depressed before eye.

Attains 23 cm. Off Durban, north along African coast and east to Japan and Caroline Ids.; rare.



149.20 *Rhinopias frondosa:* 5 cm (off Durban).

Genus ***Scorpaena*** Linnaeus, 1758

Body stout; chest naked. Resembles *Sebastapistes, Scorpaenopsis* and *Parascorpaena,* but they have the prepelvic area with obvious scales. About 25 species, but only 1 in our area; more common in Atlantic and eastern Pacific.

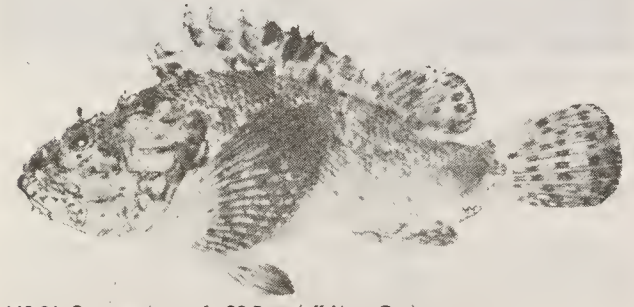
149.21 *Scorpaena scrofa*
Linnaeus, 1758
PLATES 27 & 28

Bigscale scorpionfish Grootskub-skerpioenvis

Scorpaena scrofa Linnaeus, 1758: 266 (Mediterranean); Smith, 1957: 51*; Smith, 1961: 571, **No. 1040;** Eschmeyer, 1969: 69*. *Scorpaena natalensis* Regan, 1906: 5, Pl. 5 (Natal); Smith, **SFSA No. 1040*.**

D XII,9; A III,5; P 18-20; LSS about 45. Pit on midline behind eyes.

Dark spot often present on spinous D. Attains about 30 cm. Algoa Bay to off Natal in about 55 - 90 m. South African species thought to be the same as population in Mediterranean and eastern North Atlantic.



149.21 *Scorpaena scrofa:* 20.5 cm (off Algoa Bay).

Genus ***Scorpaenodes*** Bleeker, 1857

Small fishes with 13 short D spines and D soft-rays 8-10; A normally III,5; last D & A rays double. P 15-20, some rays branched. Scales ctenoid. See Eschmeyer (1969) for generic synonyms. Worldwide in tropical areas, most are found on reefs. About 15 species in Indian Ocean, 8 in our area. Some deep-living Indian Ocean species not yet reported from our area are treated by Eschmeyer & Rama Rao (1972).

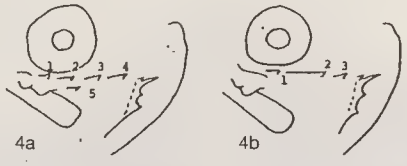
KEY TO SPECIES

1a Middle P rays abruptly longer than those above; nasal spine absent 2
1b P wedge-shaped; nasal spine normally present 3

2a Usually 15 P rays and 8 D soft-rays; LSS about 30 (count made 1 or 2 rows above LL) . . . . . *S. minor*
2b Usually 16 P rays and 9 D soft-rays; about 40 LSS . . . . *S. albaiensis*

3a LSS 29-35; D soft-rays usually 8 4
3b LSS 38-50; D soft-rays usually 9 5

4a P 17-18; 4 spines in row below eye, plus extra spine below main ridge . . . . . *S. hirsutus*



4b P 18-20, 3 spines on ridge below eye . . . . . *S. kelloggi*

5a At least 5 spines on ridge below eye, and often 10 or more; small skin flaps on body and heavily scaled, giving "furry" appearance . . . . . *S. parvipinnis*
5b 3 or fewer spines in row under eye; few or no skin flaps on body 6

6a A dark spot on lower cheek area (subopercle) . . . . . *S. littoralis*
6b No dark spot on lower cheek area 7

7a Dark spot on rear of spinous D; triangular dark mark on P; sometimes a dark area on upper cheek area (opercle) . . . . . *S. varipinnis*
7b No dark spot on rear of spinous D; no dark mark on P; usually a prominent dark area on opercle . . . . . *S. guamensis*

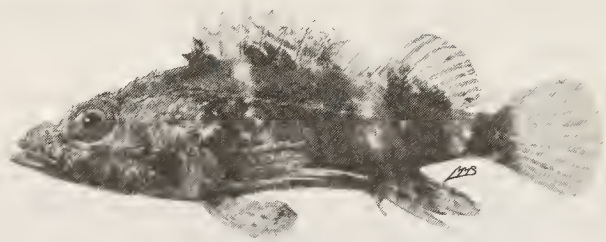
149.22 *Scorpaenodes albaiensis*
(Evermann & Seale, 1907)

Longfingered scorpionfish Langvinger-skerpioenvis

Hypomacrus albaiensis Evermann & Seale, 1907: 102, Fig. 20 (Philippines); Smith, 1957: 68*; 1957: 397*. *Hypomacrus africanus* Smith, 1958: 178 (Zanzibar); 1961: 571, **No. 1045a.**

D XIII-XIV,9-10; P 16-17; LSS 40-43.

Attains about 8 cm. Bazaruto north in western Indian Ocean; scattered localities in western Pacific. Rare. On reefs.



149.22 *Scorpaenodes albaiensis:* 8 cm (Zanzibar).

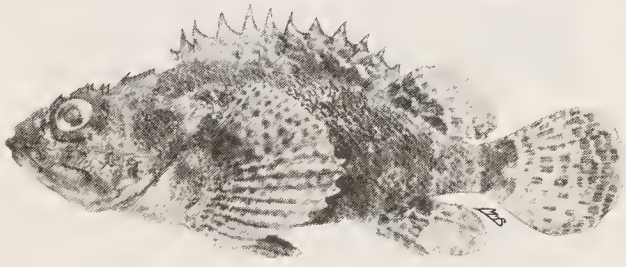
149.23 *Scorpaenodes guamensis*
Quoy & Gaimard, 1824

Guam scorpionfish — Guamse skerpioenvis

Scorpaena guamensis Quoy & Gaimard, 1824: 326 (Guam). *Scorpaenodes guamensis:* Smith, **SFSA No. 1044a*;** 1957: 65*.

D XIII,8-9; A III,4-5; P 18-19; LSS about 42-44.

Attains 12 cm. Common from Transkei northwards and throughout Indo-West Pacific. Shallow reefs and rocky areas. Probably distinct from *S. scaber* (Ramsey & Ogilby, 1886); see discussion by Smith (1957: 66). Most specimens from our area clearly referable to *guamensis*.



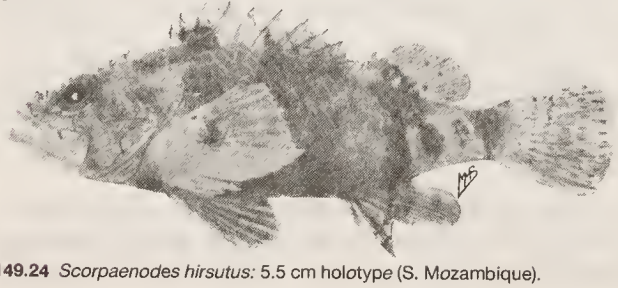
149.23 *Scorpaenodes guamensis:* 12 cm (Transkei).

149.24 *Scorpaenodes hirsutus*
(Smith, 1957)
PLATE 28

Hairy scorpionfish — Harige skerpioenvis

Parascorpaenodes hirsutus Smith, 1957: 63, Pl. 1, Fig. E, Fig. 5 (Bazaruto, Mozambique). *Parascorpaenoides hirsutus:* Smith, 1961: 571, **No. 1043c.** *Scorpaenodes hirsutus:* Eschmeyer & Randall, 1975: 277*.

D XIII,8-9; P 17-19; LSS about 30. Similar to *kelloggi,* which has spotted C.



149.24 *Scorpaenodes hirsutus:* 5.5 cm holotype (S. Mozambique).

Attains 5 cm. Sodwana Bay northwards; scattered localities in Indo-West Pacific to Hawaii and Tahiti.

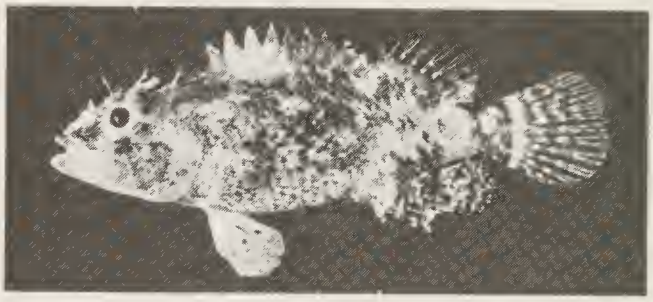
149.25 *Scorpaenodes kelloggi*
(Jenkins, 1903)

Dwarf scorpionfish — Dwerg-skerpioenvis

Sebastopsis kelloggi Jenkins, 1903: 494, Fig. 37 (Hawaii). *Scorpaenodes kelloggi:* Eschmeyer & Randall, 1975: 279*.

D XIII,7-8; P 18-20; LSS about 30.

C spotted. Attains about 5 cm. Sodwana Bay and scattered localities in Indo-Pacific, east to Hawaii and Tahiti.



149.25 *Scorpaenodes kelloggi:* 4 cm SL (after Eschmeyer & Randall, 1975).

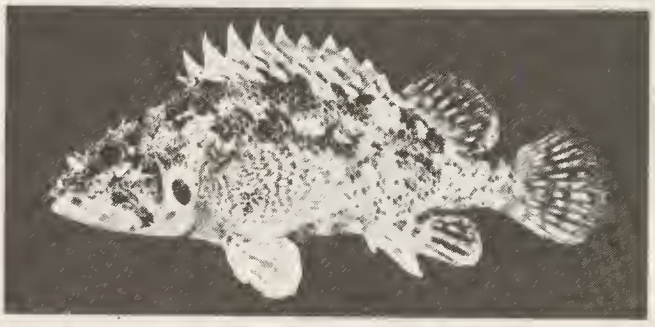
149.26 *Scorpaenodes littoralis*
(Tanaka, 1917)

Cheekspot scorpionfish — Wangkol-skerpioenvis

Sebastella littoralis Tanaka, 1917: 10 (Japan). *Scorpaenodes littoralis:* Eschmeyer & Randall, 1975: 282*.

D XIII,9; P 17-19; LSS about 45.

Dark spot on subopercle usually well marked. Attains 8 cm. A few specimens from deep reefs off Natal; also scattered localities in Indo-West Pacific.



149.26 *Scorpaenodes littoralis:* 8 cm SL (after Eschmeyer & Randall, 1975).

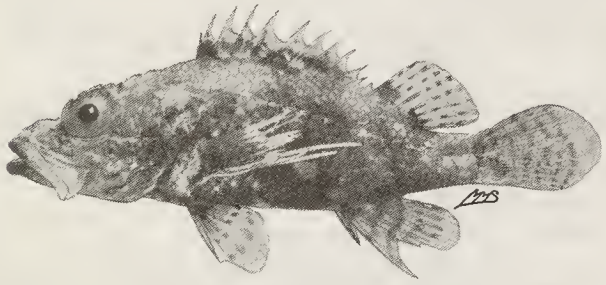
149.27 *Scorpaenodes minor*
(Smith, 1958)

Minor scorpionfish — Kleiner skerpioenvis

Hypomacrus minor Smith, 1958: 178, Pl. 8, Fig. L (Bazaruto, Mozambique); 1961: 571, **No. 1045b.** *Hypomacrus brocki* Schultz, 1966: 39, Figs. 138, 143 (Dutch East Indies, Marshall Ids., Philippines).

D XII-XIV,7-9; P 14-16; LSS about 30. Note elongate middle P rays, as in *S. albaiensis*.

Attains 5 cm. Bazaruto northwards, also scattered localities in Pacific Ocean.



149.27 *Scorpaenodes minor*: 4 cm holotype (S. Mozambique).

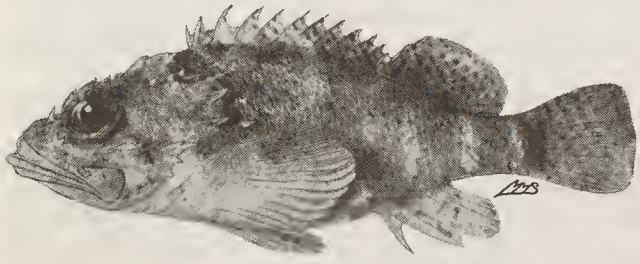
149.28 *Scorpaenodes parvipinnis*
(Garrett, 1863)
PLATES 26 & 28

Coral scorpionfish — Koraal-skerpioenvis

Scorpaena parvipinnis Garrett, 1863: 105 (Hawaii). *Scorpaenodes parvipinnis*: Smith, 1957: 67*; Eschmeyer & Randall, 1975: 280*. *Paronescodes asperrimus* Smith, 1958: 177 (on *Scorpaenodes parvipinnis*: Smith, 1957: 67, Fig. 5, Pl. 1, Fig. a (La Digue, Seychelles); 1961: 571; **No. 1044d.**

D XIII,9; P 17-19; LSS 48-50.

Attains about 13 cm. Durban northwards; widespread on coral reefs throughout Indo-West Pacific.



149.28 *Scorpaenodes parvipinnis*: 12 cm (Seychelles).

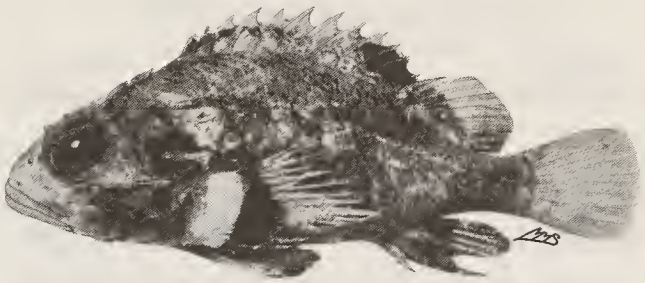
149.29 *Scorpaenodes varipinnis*
Smith, 1957
PLATE 26

Blotchfin scorpionfish — Vlekvin-skerpioenvis

Scorpaenodes varipinnis Smith, 1957: 65, Fig. 5, Pl. 3, Fig. D (Zanzibar).

D XIII,8; P 17-18; LSS 38-40.

Attains about 7 cm. Sodwana Bay and northward in western Indian Ocean; also a few localities in western Pacific. Rare.



149.29 *Scorpaenodes varipinnis*: 7.5 cm holotype (Zanzibar).

Genus ***Scorpaenopsis*** Heckel, 1837

Large, robust, mostly inshore fishes. D normally XII,9; A III,5; P rays 15-20. Scales ctenoid. No palatine teeth. About 20 species; 7 in our area. Genus revised by Eschmeyer & Rama Rao (in press).

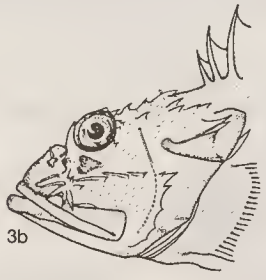
KEY TO SPECIES

1a Body high behind head, humpbacked; dark spot on inside of P 2
1b Back arched, but no noticeable hump; no prominent dark spot on inside of P 3

2a Inside of P with a subterminal dark blotch (interrupted by pale fin rays and covering 1-6 interradial membranes) but no subterminal dark band; usually 18 P rays . . . . . *S. diabolus*

2b Inside of P with a large dark spot near upper base and a broad subterminal dark band; usually 17 P rays . . . . . *S. gibbosa*

3a Upper opercular spine single 4
3b Upper opercular spine split into 2 or more spinous points 6



4a P rays usually 20; LSS about 60 . . . . . *S. oxycephala*
4b P rays 17-18; LSS 40-50 5

5a Ridge across front of occiput, followed by a pit; no extra spines overlying tympanic spines . . . . . *S. venosa*
5b Virtually no occipital pit; extra spines overlie tympanic spines . . . . . *Scorpaenopsis* sp.

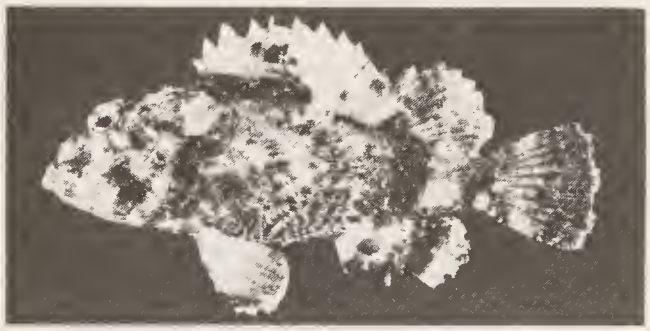
6a P rays usually I8; 2nd A spine less than or about equal to length of 3rd when spines are depressed . . . . . *S. brevifrons*
6b P rays 16 (1 specimen known) . . . . . *S. gilchristi*

149.30 *Scorpaenopsis brevifrons*
Eschmeyer & Randall, 1975
Bigmouth scorpionfish Grootmond-skerpioenvis

Scorpaenopsis brevifrons Eschmeyer & Randall, 1975: 299, Figs. 14-15 (Hawaii).

D XII,9; A III,5; P 17-19; LSS 40-45. First 3 D spines increase in length evenly. Orbit diameter slightly larger than snout length. Lachrymal bone with 3-4 spines over maxillary.

Attains 11 cm. Sodwana Bay, northward; also at scattered localities in Indo-Pacific; a separate population in Hawaii. Coral and rocky areas from shore to 30 - 35 m.



149.30 *Scorpaenopsis brevifrons*: 10.5 cm SL holotype (after Eschmeyer & Randall, 1975).

149.31 *Scorpaenopsis diabolus*
Cuvier, 1829
PLATE 28
False stonefish Vals steenvis

Scorpaenopsis diabolus Cuvier, *in* Cuv. & Val., 1829: 312 (Pacific); Eschmeyer & Randall, 1975: 305*. *Scorpaenopsis gibbosa*: Smith, SFSA **No. 1042** (in part; not fig.); 1957: 59* (in part).

D XII,9; A III,5; P I7-19; LSS 43-48. Snout longer than orbit diameter. Width between eyes wider than orbit diameter.

Attains at least 22 cm. Xora northwards. Widespread in Indo-West Pacific. Shallow coral and rocky areas.

149.32 *Scorpaenopsis gibbosa*
Bloch & Schneider, 1801
PLATE 26
Humpback scorpionfish Boggel-skerpioenvis

Scorpaena gibbosa Bloch & Schneider, 1801: 192, Pl. 44 (uncertain locality). *Scorpaena nesogallica* Cuvier, *in* Cuv. & Val., 1829: 315 (Mauritius). *Scorpaenopsis gibbosa*: Smith, SFSA **No. 1042*** (in part); 1957: 59* (in part). *Scorpaenopsis rosea* (*non* Day): Smith, SFSA **No. 1041***.

D XII,9; A III,5; P I6-19; LSS about 45. Snout and interorbital width about equal to orbit diameter.

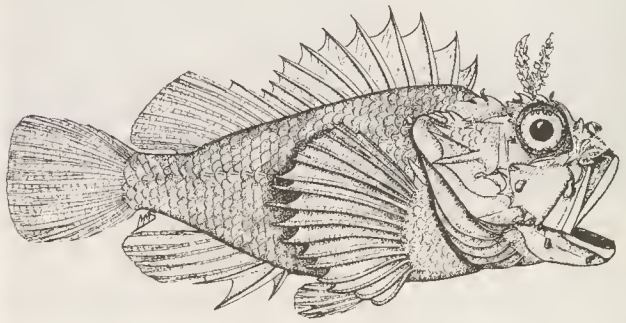
Attains at least 10 cm. Transkei northwards; Indian Ocean and Red Sea.

149.33 *Scorpaenopsis gilchristi*
(Smith, 1957)
Gilchrist's scorpionfish Gilchrist se skerpioenvis

Dendroscorpaena gilchristi Smith, 1957: 61, Fig. 4 (off Tugela River, 14 fms); 1961: 571, **No. 1043a.**

D XII,9; A III,5; P I6; LSS 34.

Attains 6 cm. Known only from 1 specimen.



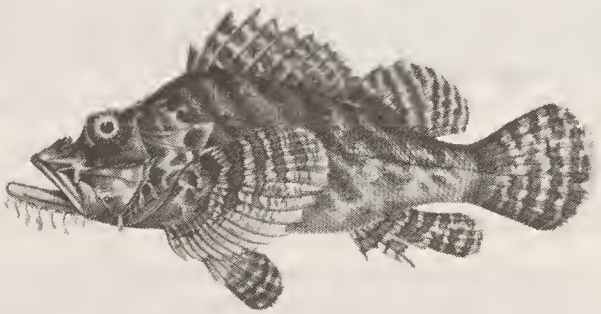
149.33 *Scorpaenopsis gilchristi*: 7.5 cm holotype (off Natal).

149.34 *Scorpaenopsis oxycephala*
Bleeker, 1849
Smallscale scorpionfish Kleinskub-skerpioenvis

Scorpaenopsis oxycephala Bleeker, 1849: 7 (Batavia); Eschmeyer & Rama Rao (in press).

D XII,9; A III,5; P 19-20; LSS more than 60. First D spine short, 2nd almost as long as 3rd and more than twice 1st. Orbit smaller than snout length. A similar, small species with the same D spine lengths is known from 1 specimen off Sodwana Bay and a few Indian Ocean localities. It has 17 P rays and LSS about 45.

Attains 30 cm. Sodwana Bay and scattered localities in Indo-Pacific. Coral reefs and rocky areas, shore to 35 m.



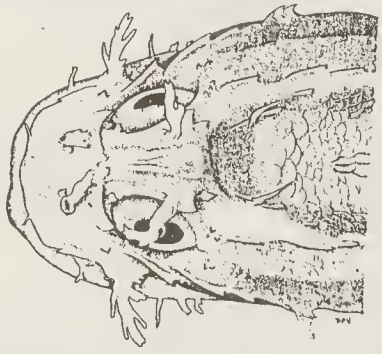
149.34 *Scorpaenopsis oxycephala*: ca. 29.5 cm type (after Bleeker, 1876).

149.35 *Scorpaenopsis* sp.
Spinycrown scorpionfish Stekelkroon-skerpioenvis

(To be described by Eschmeyer & Rama Rao, in press.)

D XII,9; A III,5; P 17-18; LSS about 45-50. First 3 D spines increase in length evenly, 1st about ½ 2nd. Only *Scorpaenopsis* with extra spines above tympanic spines. Orbit equal to or slightly larger than snout length.

Attains 16 cm. Sodwana Bay northwards, throughout Indo-Pacific.



149.35 *Scorpaenopsis sp.*: dorsal view of head of 9.5 cm SL specimen (off Natal).

149.36 *Scorpaenopsis venosa*
(Cuvier, 1829)
PLATE 25
Raggy scorpionfish Lappies-skerpioenvis

Scorpaena venosa Cuvier, *in* Cuv. & Val., 1829: 317 (India). *Scorpaena durbanensis* Gilchrist & Thompson, 1909: 236, Pl. 4, Fig. 3 (off Durban); Smith, **SFSA No. 1040** (in part, synonymy). *Scorpaenopsis cirrhosa:* Smith, **SFSA No. 1043*.** *Dendroscorpaena cirrhosa:* Smith, 1961: 571, **Nos. 1041 & 1043** (in part).

D XII,9; A III,5; P 16-18; LSS about 50. First 3 D spines increase in length evenly. Ridges between eyes nearly straight, ending abruptly at front edge of pit on top of head behind eyes.

Attains 18 cm. Durban northwards and scattered localities in Indo-Pacific.

Genus ***Sebastapistes*** Gill, 1877

Dorsal normally XII,9; A III,5; P 15-17. Scales ctenoid; breast scaled. Lachrymal bone with 2-5 spines. Indo-West Pacific, shallow water; 7 species, 4 in our area. Recently reviewed by Eschmeyer & Rama Rao (in press).

KEY TO SPECIES

1a Coronal spines present ..... *S. mauritiana*
1b Coronal spines absent 2

2a Two spines on lachrymal bone; a ridge before lower opercular spine ..... *S. strongia*
2b Lachrymal bone with 3-5 spines; lower opercular spine preceded by scaled area, no ridge 3

3a Body with large pale areas ..... *S. cyanostigma*
3b Body and rear fins with dark spots ..... *S. tinkhami*

149.37 *Sebastapistes cyanostigma*
(Bleeker, 1856)
PLATE 26
Yellowspotted scorpionfish Geelspikkel-skerpioenvis

Scorpaena cyanostigma Bleeker, 1856: 385, 400 (Indonesia). *Scorpaena albobrunnea* Günther, 1874: 77 (Pelew Ids.). *Scorpaena kowiensis* Smith, 1935: 224 (Port Alfred); ? **SFSA No. 1039** (in part, not Fig.); 1957: 54*.

D XII,9; A III,5-6; P 15-16; LSS 42-45. Usually 5 spines on lachrymal bone.

No dark bars on underside of head. Large yellow spots over most of body, also small white dots. Attains about 7 cm. Port Alfred northwards to Red Sea and east to central Pacific. Coral reefs and rocky areas.

149.37 *Sebastapistes cyanostigma*: 8 cm (S. Mozambique) and dorsal view of head of 4.5 cm holotype of *S. kowiensis* (Port Alfred).

149.38 *Sebastapistes mauritiana*: 9.5 cm (Transkei) and dorsal view of head of 6 cm SL specimen (Natal).

149.38 *Sebastapistes mauritiana*
(Cuvier, 1829)
PLATE 28

Spineblotch scorpionfish — Stekel-skerpioenvis

Scorpaena mauritiana Cuvier, *in* Cuv. & Val., 1829: 322 (Mauritius). *Scorpaena megastoma* Sauvage, 1878: 127, Pl. 1, Fig. 7 (Réunion). *Scorpaena kowiensis* (*non* Smith): Smith, **SFSA No. 1039***; 1957: 54 (in part, not Fig. D, on Pl. 2). *Sebastapistes nuchalis*: Smith, 1957: 54*; 1961: 571, **No. 1039a.**

D XII,9; A III,5; P 15-16; LSS 42-45. Usually 3 spines on lachrymal bone.

Weak dark bars on underside of head. Usually a dark spot on spinous D. Attains 8 cm. Transkei northwards; scattered Indo-Pacific localities. Coral reefs and rocky areas.

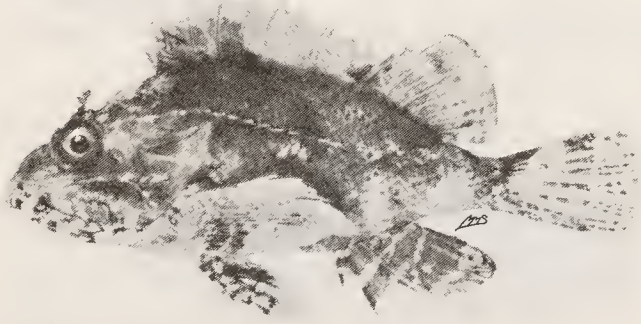
149.39 *Sebastapistes strongia*
(Cuvier, 1829)

Barchin scorpionfish — Balkken-skerpioenvis

Scorpaena strongia Cuvier, *in* Cuv. & Val., 1829: 323 (Ile Strong, Caroline Ids.). *Scorpaena tristis* Klunzinger, 1870: 802 (Red Sea). *Kantapus oglinus* Smith, 1947: 817 (Inhaca Id.); **SFSA No. 1035***; 1957: 55*. *Phenacoscorpius nebulosus* Smith, 1958: 77, Pl. 8 (Bazaruto); 1961: 571, **No. 1045e.**

D XII,8-9; A III,5; P 14-17; LSS about 44. Often a long tentacle above eye. Dark bars on lower jaw and usually a dark area below 1st 3 D spines.

Attains about 6 cm. Transkei northwards; widespread in Indo-Pacific. Coral reefs and rocky areas.



149.39 *Sebastapistes strongia*: 7 cm (Kenya).

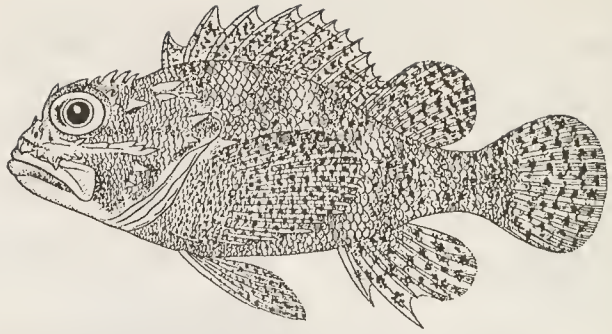
149.40 *Sebastapistes tinkhami*
(Fowler, 1946)

Darkspotted scorpionfish — Donkerspikkel-skerpioenvis

Scorpaena tinkhami Fowler, 1946: 208, Fig. 72 (Riu Kiu Ids.).

D XII,9; A III,5; P 15-16; LSS about 50. Usually 5 spines on lachrymal bone.

Dark spotted, especially on rear of body and rear fins. Attains 8 cm. Rare. Sodwana Bay, evidently on deeper reefs. Also known from western and South Pacific, tends to be subtropical rather than tropical.



149.40 *Sebastapistes tinkhami*: 7 cm holotype (after Fowler, 1946).

Genus ***Taenianotus*** Lacepède, 1802

Body very compressed, deep. No spines below eye. Scales modified into small spiny papillae. One species; variable in colour.

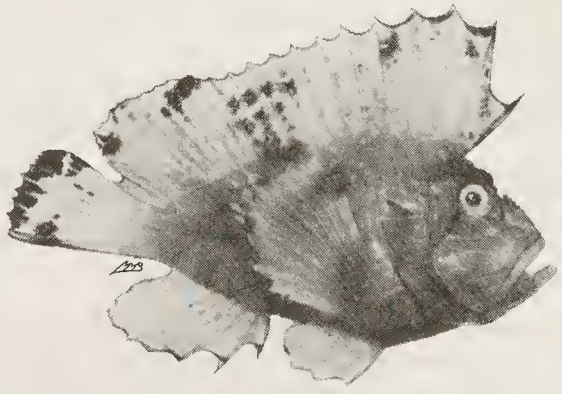
149.41 *Taenianotus triacanthus*
Lacepède, 1802
PLATE 28

Paperfish — Papiervis

Taenianotus triacanthus Lacepède, 1802: 305, (no locality); Smith, 1955: 26; 1958: 171*; 1961: 571: **No. 1032a;** Eschmeyer & Randall, 1975: 285*.

D XII,10-11; A III,5-6; P 14-15. Soft D attaches part way out on C.

Tan to reddish or brownish. Attains about 10 cm. Durban northwards and to central Pacific. Usually inshore, on sand bottom.



149.41 *Taenianotus triacanthus*: 5.5 cm (Inhaca Id.).

Subfamily SEBASTINAE

Head spines poorly developed, several on top of head, 1 or none under eye. D soft-rays 11 or more, other scorpaenids normally have 10 or fewer. Nearly worldwide, more common in temperate waters. Four genera, 2 in our area.

KEY TO GENERA

1a D spines 12; A soft-rays usually 5½ . . . . . *Helicolenus*
1b D spines 13 or 14; A soft-rays usually 6½ . . . . . *Sebastes*

Genus ***Helicolenus*** Goode & Bean, 1896

About 15 species; 1 in our area.

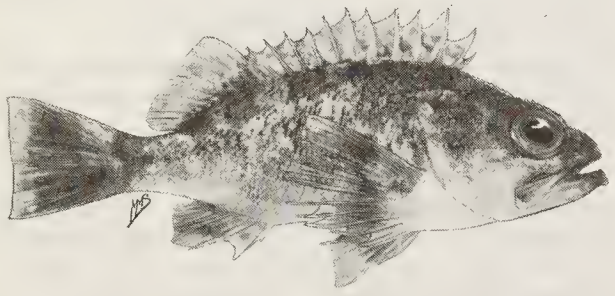
149.42 *Helicolenus dactylopterus*
(Delaroche, 1809)
PLATE 27

Jacopever Jakopewer

Scorpaena dactyloptera Delaroche, 1809: 337, Pl. 22 (Spain). *Sebastes maculatus* Cuvier, *in* Cuv. & Val., 1829: 343 (South Africa). *Helicolenus maculatus:* Smith, **SFSA No. 1034*;** 1957: 86*. *Helicolenus dactylopterus dactylopterus:* Eschmeyer, 1969: 94*.

D XII,12-13; A III,5; P 18-20; upper part of P truncate, lower rays free at tip.

Mostly pinkish, with faint dusky bars; Y-shaped dark bar between soft D and A; inside of mouth blackish. Attains at least 31 cm. Walvis Bay to Natal in 55 - 550 m; also throughout Atlantic (see Eschmeyer, 1969, and Barsukov, 1973, who recognise subspecies).



149.42 *Helicolenus dactylopterus:* 35 cm (Algoa Bay).

Genus ***Sebastes*** Cuvier, 1829

About 110 species; most confined to the North Pacific; 1 in our area.

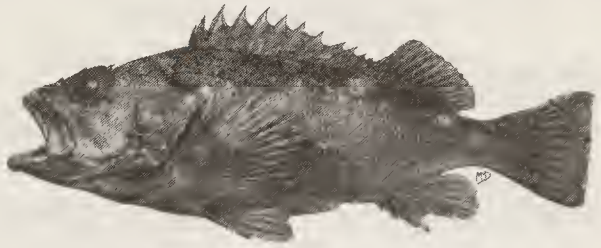
149.43 *Sebastes capensis*
(Gmelin, 1788)
PLATE 27

False jacopever Vals jakopewer

Scorpaena capensis Gmelin, *in* Linnaeus, 1788: 1219. *Sebastichthys capensis:* Sivertson, 1946: 19*; Davies, 1949: 26; Smith, **SFSA No. 1045*.** *Sebastes capensis:* Eschmeyer & Hureau, 1971: 578.

D XIII-XIV,13-14; A III,6; P 18; P wedge-shaped.

Reddish to brownish, with 5-6 pale spots on upper back. Attains at least 37 cm. Taken by hand lines and trawls in about 20 - 275 m from Cape to Saldanha Bay. Also occurs at Gough and Tristan da Cunha islands and possibly off southern and western South America (see Eschmeyer & Hureau, 1971).



149.43 *Sebastes capensis:* 30 cm (Lambert's Bay).

Subfamily SEBASTOLOBINAE

Three genera. Deep-living; mostly in temperate areas.

Genus ***Trachyscorpia*** Ginsburg, 1953

Three species, 1 in our area.

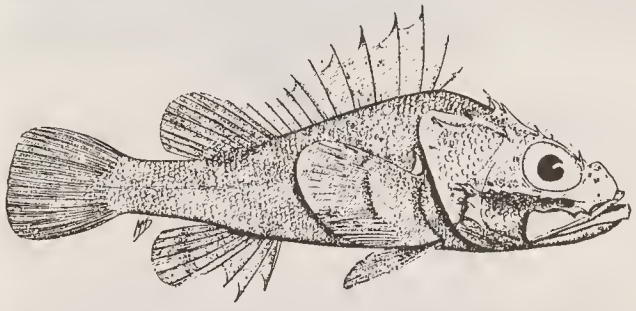
149.44 *Trachyscorpia capensis*
(Gilchrist & Von Bonde)

Cape scorpionfish Kaapse skerpioenvis

Scorpaena capensis Gilchrist & Von Bonde, 1924: 18 (South Africa). *Sebastosemus capensis:* Smith, **SFSA No. 1044*.** *Trachyscorpia (Mesoscorpia) capensis:* Eschmeyer, 1969: 50*.

D XIII,8-9; A III,5; P 20-23; LSS about 60. Strong spines on head.

Reddish. Attains about 35 cm. Cape to St. Helena bay, the same or a similar species in southern Australia. Trawled in about 450 - 1 025 m.



149.44 *Trachyscorpia capensis:* 17 cm (off west coast of South Africa).

Subfamily SETARCHINAE

Lateral line a continuous trough covered by thin membranous scales. Scales small, cycloid. Bones weakly ossified. Worldwide in tropical to temperate areas. Reviewed

by Eschmeyer & Collette (1966); also see Eschmeyer & Randall, 1975. Five species in 3 genera; 1 species known in our area, and another likely to be found here.

KEY TO GENERA

1a A rays usually 6½; orbit diameter about ½ interobital width . . . . . *Ectreposebastes* (*E. imus* Garman, 1899 known from off Kenya, and both sides of Atlantic and Pacific oceans.)

1b A rays usually 5½; orbit diameter about equal to interorbital width . . . . . *Setarches*

Genus ***Setarches*** Johnson, 1862

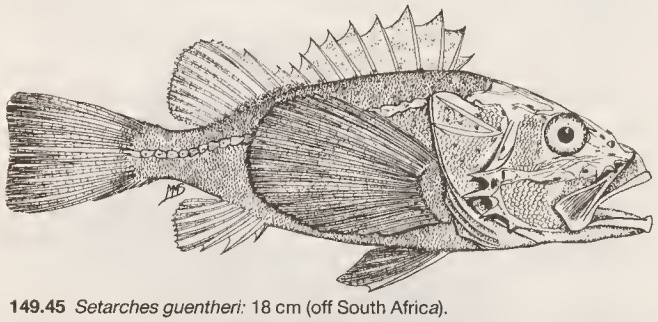
Two species; 1 in our area. *Setarches longimanus* (Alcock, 1894), from the Andaman Sea, has the 2nd preopercular spine much shorter than the 1st or 3rd.

149.45 *Setarches guentheri* Johnson, 1862

Setarches güntheri Johnson, 1862: 177 (Madeira); Smith, 1957: 85*. *Setarches marleyi* Fowler, 1935: 398 Figs. 28-29 (Natal). *Setarches longiceps* (*non* Alcock): Smith, **SFSA No. 1036*.** *Setarches guntheri:* Smith, 1961: 571, **No. 1036.** *Setarches guentheri:* Eschmeyer & Collette, 1966: 357*.

D XII,9-10; A III,5; P 20-25 (21-23 in our area).

Attains 23 cm. Trawled at about 400 m. Occurs nearly worldwide in warm seas. Lives near or on bottom but feeds in the water column.



149.45 *Setarches guentheri:* 18 cm (off South Africa).

Subfamily SYNANCEIINAE

Scales not apparent. No free P rays. Indo-West Pacific. Subfamily reviewed by Eschmeyer & Rama Rao (1973). Six genera, 10 species; 1 species known in our area, and another likely to be found here.

KEY TO GENERA
(Western Indian Ocean)

1a D spines 15-17; V I,3 . . . . . *Pseudosynanceia* (*P. melanostigma* Day, 1875; Persian Gulf and Arabian Sea)

1b D spines 12-14; V I,3 or I,4 . . . . . *Synanceia*

Genus ***Synanceia*** Bloch & Schneider, 1801

The most venomous of all fishes. The grooved dorsal fin spines are needle sharp and penetrate the careless wader's foot with ease. In this process the enveloping skin is forced down, compressing the gland on the spine, and the venom is forced into the wound under great pressure. Pain starts immediately and rapidly becomes intolerable. Stonefish stabs are often fatal within an hour or two. Immediately soaking the wound in hot water, as hot as the victim can bear, will relieve the pain and destroy the venom. The wound should be kept in the hot water for 30-90 minutes.

Stonefishes (as the name implies) are very well camouflaged and can be expected on shallow coral reefs throughout the Indo-Pacific region. They often lie half-buried in sand, and usually will not move unless they are actually touched. N.B. Wading on coral reefs must be done with the utmost caution. Four or 5 species; 1 in our area.

149.46 *Synanceia verrucosa* Bloch & Schneider, 1801
PLATE 27

Stonefish — Steenvis

Synanceia verrucosa Bloch & Schneider, 1801: 195, Pl. 45 (India); Eschmeyer & Rama Rao, 1973: 357*. *Synanceja verrucosa:* Smith, **SFSA No. 1052*.** *Synanceichthys verrucosus:* Smith, 1958: 173*.

D XII-XIII,5-7; A III,5-6; P 17-19; LL 8-10, buried. Globular; body covered with "warts". Eyes far apart, with deep depression between; pit below eye. P very large, fan-like.

Attains 35 cm. Most widespread stonefish; Red Sea and tropical Indo-Pacific, south to Durban; shallow water among coral rubble and reefs. *S. nana* Eschmeyer & Rama Rao, 1973, with 14-15 P rays, is known from the Persian Gulf and Red Sea.

149.46 *Synanceia verrucosa:* top: 29 cm; bottom: 2.5 cm (both N. Mozambique).

Family No. 150: TETRAROGIDAE

by S. Poss

Waspfishes **Wespvisse**

Small to moderate-sized benthic fishes, usually covered with small, deeply embedded scales. Dorsal fin originates on head. Usually 2 or 3 pairs of upper pharyngeal tooth plates. Pseudobranch well developed, with 10-25 filaments. Vertebrae 24-29.

Restricted primarily to the Indo-West Pacific area from shore to depths of 300 m. About 40 species in 15 genera; all are extremely venomous and should be considered dangerous. Closely related to the Scorpaenidae and considered part of that family by many authors. Indian Ocean species reviewed by Smith (1957).

KEY TO GENERA

1a Body strongly compressed; covered with small scales; V I,5; D origin over or before front margin of eye; D and A rays branched ..... *Ablabys*

1b Body not strongly compressed; naked, except for LL scales; V I,3; D origin over rear margin of eye; D and A rays unbranched ..... *Coccotropsis*

Genus ***Ablabys*** Kaup, 1873

Three species; 1 in our area. *Amblyapistus* Bleeker, 1874 is a synonym.

150.1 *Ablabys binotatus*

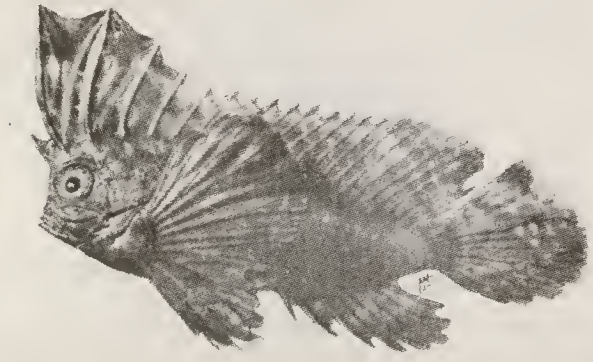
(Peters, 1855)
PLATE 29

Redskinfish Rooihuidvis

Apistus binotatus Peters, 1855: 241 (Mozambique). *Amblyapistus marleyi* Regan, 1919: 202, Fig. 5 (Durban). *Amblyapistus binotatus:* Smith, **SFSA No. 1032*;** 1958: 170*. *Amblyapistus taenionotus* (*non* Cuvier): Smith, **SFSA No. 1033.**

D XV,8-9; A III,5; P 11-12; LL 22-26; GR (0-2)+(3-6). Depth 2.8-3.2, head 2.7-3.2, predorsal 5.9-8.3 in SL.

Dark brown, with prominent white or silvery blotch on body above P, and often with irregular yellow or black markings. Attains 15 cm. From Xora River mouth to Zanzibar; subtidally in sheltered areas among weeds.



150.1 *Ablabys binotatus:* 12 cm (Inhaca Id.).

Genus ***Coccotropsis*** Barnard, 1927

One species, found only off South Africa.

150.2 *Coccotropsis gymnoderma*

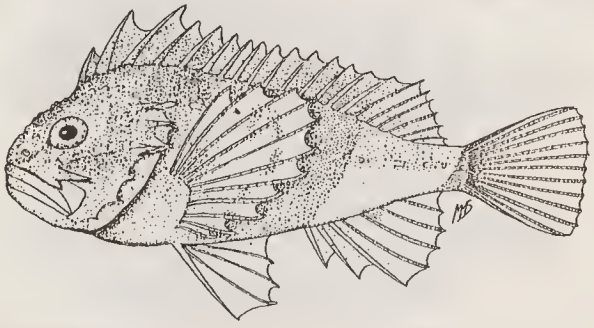
(Gilchrist, 1906)
PLATE 27

Smoothskin scorpionfish Gladdevel-skerpioenvis

Tetraroge gymnoderma Gilchrist, 1906: 147, Pl. 37 (Cape St. Blaize). *Coccotropsis gymnoderma:* Barnard, 1927: 751; Smith, **SFSA No. 1031*;** 1958: 169*.

D XIV-XVI,5-6; A III,3-6; P 11-12; LL 8-11; GR (1-3)+(5-9). Depth 2.5-3.0, head 2.3-2.8, predorsal 3.7-4.3 in SL.

Brownish red, with white blotch covering belly and rear ⅓ of body. Attains 40 mm. Taken from the Cape to Algoa Bay in 9 - 108 m; common in rotenone collections.



150.2 *Coccotropsis gymnoderma:* 3 cm (off Cape south coast).

Family No. 151: APLOACTINIDAE

by S. Poss

Velvetfishes **Ferweelvisse**

Small benthic fishes sometimes covered with modified scales that form spinous points. Fin rays unbranched. A fleshy papillose extension present on anterior part of isthmus in all but two genera. Spines on head usually blunt. A single pair of upper pharyngeal tooth plates. Pseudobranch with 0-15 filaments. Vertebrae 25-33.

Velvetfishes occur in the Indo-West Pacific region; most species are found from shore to depths of 100 m and are extremely rare. Fifteen genera, with 38 species, most of which were recently characterised by Poss & Eschmeyer (1978).

KEY TO GENERA

1a V I,3; A spines without conspicuous venom gland; D XII-XIII,9-10 ..... *Cocotropus*

1b V I,2; each A spine with a conspicuous venom gland; D XIV-XVI,7-9 ..... *Ptarmus*

Genus ***Cocotropus*** Kaup, 1858

Ten species; 1 in southern Africa.

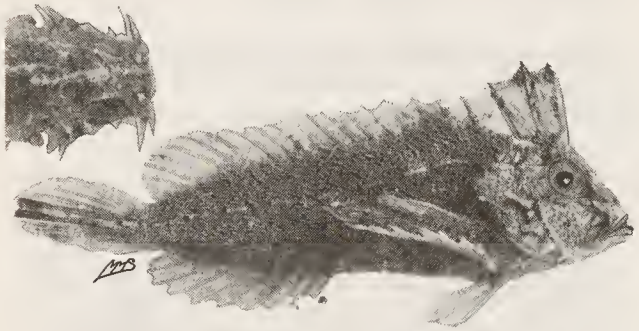
151.1 *Cocotropus monacanthus*
(Gilchrist, 1906)

Roughskin scorpionfish — Ruvel-skerpioenvis

Tetraroge monacanthus Gilchrist, 1906: 145, Pl. 37 (coast of Natal). *Coccotropus monacanthus:* Smith, SFSA **No. 1029*;** 1958: 168*.

D XII-XIII,9-10; A I,7-8; P 12-13; LL 10-12; GR (0- 1)+(4-6). Depth 2.7-3.4; head 2.6-2.9; predorsal 5.9-6.2. Head and body covered with modified scales, each forming a spinous point. Lachrymal bone with 2 blunt spines.

Colour in life unknown. Known only from 4 specimens (largest 38 mm) from off Natal and 1 from off Tanzania.



151.1 *Cocotropus monacanthus:* 3 cm holotype and dorsal view of head (off Natal).

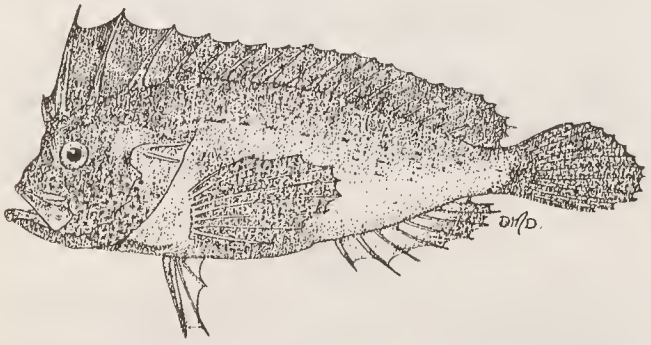
Genus ***Ptarmus*** Smith, 1947

Two species; 1 in southern Africa. *P. gallus* (Kossman & Rauber, 1877) is endemic to the Red Sea; it has fewer LL scales and 10 P rays.

151.2 *Ptarmus jubatus*
(Smith, 1935)

Crested scorpionfish — Kuif-skerpioenvis

Coccotropus jubatus Smith, 1935: 223, Pl. 19, Fig. B (Natal). *Ptarmus languidus* Smith, 1947: 816 (Inhaca Id.). *Ptarmus gallus* (*non* Kossman & Rauber): Smith, 1958: 167*; Smith, 1961: 571, **No. 1030.** *Ptarmus jubatus:* Smith, SFSA **No. 1030*.**



151.2 *Ptarmus jubatus:* 8 cm (Inhaca Id.).

D XIV-XVI,7-9; A II,6-7; P 9; LL 8-11; GR (0-3)+(5-7). Depth 2.3-2.4; head 2.4-2.8; predorsal 6.2-7.7. Scales absent, except for LL. Lachrymal bone with 2 small rather sharp spines.

Colour in life light brown to nearly black. Attains 85 mm. Inshore in weedy areas along Natal coast northward to Porto Amelia, Mozambique.

Family No. 152: CONGIOPODIDAE

by S. Poss

Horsefishes — **Perdvisse**

Body compressed, snout notably pronounced, strongly so in some species. A single nostril on each side. Gill openings reduced to a small slit; anal spines weak and head partly armed with bony plates in all but one Australian species. Vertebrae 30-39.

About 10 species confined to cool waters of the southern hemisphere. Four genera, 1 in southern Africa.

Genus ***Congiopodus*** Perry, 1811

Six species; both of our species are endemic to southern Africa.

KEY TO SPECIES

1a No spines on snout above mouth; LL obscure; A rays 7-8 ..... *C. torvus*

1b Snout with spines above mouth; LL with 19-25 scales; A rays 9-10 ..... *C. spinifer*

152.1 *Congiopodus spinifer*
(Smith, 1839)
PLATE 29

Spinenose horsefish — Stekelneus-perdvis

Agriopus spinifer Smith, 1839, Pl. 3 + text (South Africa). *Congiopodus spinifer:* Smith, 1961: **No. 1059*;** Smith & Smith, 1966: 136*.

D XIX-XXI,11-14; A 9-10; P 9; LL 19-25; GR 8-9. Depth 3.0-3.2; head 3.4-3.7; predorsal 5.0-5.3. P longer than V. Spine on nasal bone; 3 spines on lachrymal bone above mouth. Skin rough, covered with modified scales that form spinous points.

Body brown, with irregular light spots, paler below. Young pale brown, with irregular brown markings. Attains 35 cm. Taken at depths of 55 - 146 m from Walvis Bay to Natal. At times taken in numbers by trawlers. Flesh edible but rarely eaten.

152.2 *Congiopodus torvus*
(Gronovius, 1772)
PLATE 29

Smooth horsefish — Gladde perdvis

Blennius torvus Gronovius, 1772: 47, Pl. 3 (Indian Ocean). *Congiopodus torvus:* Smith, SFSA **No. 1060*;** Wheeler, 1958: 239*; Smith & Smith, 1966: 136*; Karrer, 1973: 243.

D XX-XXI,13-15; A 7-8; P 9; LL obscure pores only; GR 8-9. Depth 3.0; head 4.1; predorsal 6.0. P shorter than V. No spines on lachrymal bone above mouth. Skin papillose in young, smooth in adults.

Light brown with irregular darker brown markings in young; adults darker brown. Attains 76 cm. Taken in depths of 10 - 146 m from Namibia to Pondoland.

Family No. 153: CARACANTHIDAE

by W.N. Eschmeyer

Coral crouchers **Koraalskuilers**

Small, nearly oval body. Dorsal fin continuous or with a notch; 6-8 spines, 11-14 soft-rays. Pectoral fins small, 13-15 rays. Pelvic fins tiny, 1 spine and usually 3 soft-rays. Body covered with papillae. Scales restricted to lateral line, base of dorsal fin, and as spinules between bony lumps on top of head. Usually 5-6 preopercular spines.

These small fishes live among branches of coral, especially the genera *Acropora* and *Poecillopora*. They use their pectoral fins to brace themselves between fingers of coral. Usually captured when coral is removed from water. Rarely seen except by researchers. Tropical Indo-Pacific, shallow water. One genus, *Caracanthus* Kröyer, 1844, and 4 species, 2 in our area. Recently revised by Eschmeyer (in press).

KEY TO SPECIES

1a Spinous and soft D continuous, not notched or only slightly notched; 1 long spine and 2 lumps on lachrymal bone before eye; no spots on body ..... *C. unipinna*

1b A notch between spinous and soft D; 1 long spine and 1 lump on lachrymal bone before eye; pale spots (red in life) on body, some spots usually run together giving a reticulated pattern ..... *C. madagascariensis*

153.1 *Caracanthus madagascariensis*

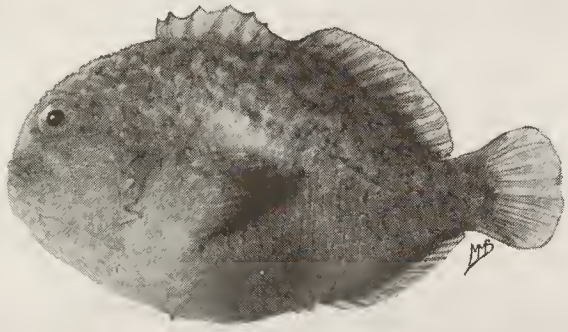
(Guichenot, 1869)

PLATE 27

Spotted croucher Gespikkelde koraalskuiler

Crossoderma madagascariensis Guichenot, 1869: 195, Pl. 12, Fig. 1 (Madagascar). *Caracanthus maculatus* (*non* Gray): Smith, 1957: 395; 1958: 172*; 1961: 571, **No. 1053a.**

D VII-VIII,12-13; A II,11-12; P 13-15.



153.1 *Caracanthus madagascariensis:* 4 cm (N. Mozambique).

Greyish, with reddish spots. Attains about 50 mm. Tropical western and central Indian Ocean, south to Sodwana Bay.

153.2 *Caracanthus unipinna*

(Gray, 1831)

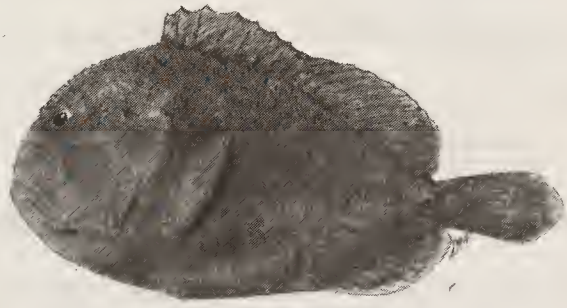
PLATE 27

Coral croucher Koraalskuiler

Micropus unipinna Gray, 1831: 20 (Pacific Seas). *Centropus staurophorus* Kner, 1860: 532, Fig. 1 (Zanzibar). *Micropus longipinnis* Jatzow & Lenz, 1898: 505, Fig. 2, Pl. 34. *Caracanthus zeylonicus* (*non* Day): Smith, 1931: 157; **SFSA No. 1053*.** *Caracanthus unipinna:* Smith, 1957: 385; 1961: 571, **No. 1053.** *Caracanthus unipinnis:* Smith, 1958: 172*.

D VII-VIII,12-13; A II,11-12; P 12-13.

Nearly uniform brownish or greyish, darker on back. Attains about 50 mm. Tropical waters throughout Indo-Pacific; reaches Sodwana Bay.



153.2 *Caracanthus unipinna:* 3.5 cm (Assumption Id.).

Family No. 154: BEMBRIDAE

by L.W. Knapp

Deep-water flatheads **Diepwater-platkoppe**

Elongate fishes with head slightly depressed. Mouth large, with fine teeth on jaws, vomer and palatines. Bony ridges of head bearing spines. Gill membranes free from isthmus, branchiostegal rays 7. Two dorsal fins well separated. Spinous dorsal fin with 9-11 spines; soft dorsal fin 0-I,7-13; anal fin 0-III,4-15. Ventral fins below pectoral fin base, set close together, with 1 spine and 5 soft-rays. Vertebrae 26-27. Lateral line complete.

Reddish fishes found at depths of about 150 - 665 m. Indo-Pacific from South Africa to Gulf of Aden, Japan, Hawaii and the Nasca Ridge off Peru. Approximately 3 genera with a total of 5 species; 1 species in our area.

Genus ***Parabembras*** Bleeker, 1874

Two species; 1 from our area.

154.1 *Parabembras robinsoni*
Regan, 1921
PLATE 29

African deep-water flathead — Afrikaanse diepwater-platkop

Parabembras robinsoni Regan, 1921: 418 (Natal); Barnard, 1927: 936; Smith, **SFSA No. 1062*.**

D X-XI+I,8-9; A III,5; P 19-21; LL 38-41; GR (5-8)+(13-17). Head 2.3-2.4. Bony ridge crossing cheek below eye with 4-5 stout spines. Preocular spines small, 2-3. Tip of lower jaw with a small bony projection pointing downward.

Attains 24 cm. Found only from Durban to southern Mozambique in 200 - 600 m.

154.1 *Parabembrops robinsoni:* dorsal view of head of 15.5 cm SL specimen (Natal).

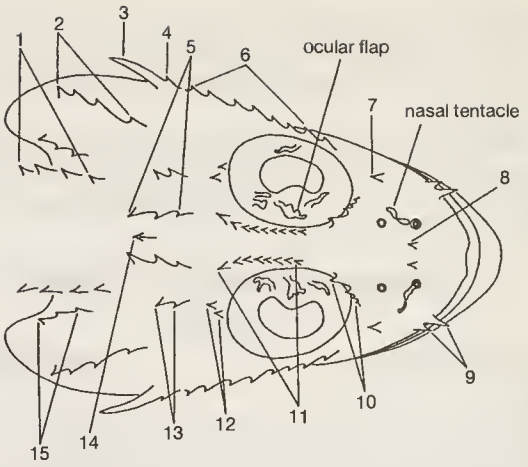
Family No. 155: PLATYCEPHALIDAE

by L.W. Knapp

Flatheads — **Platkoppe**

Elongate fishes with head moderately to strongly depressed. Mouth large, lower jaw longer than upper. Fine teeth on jaws, vomer and palatines in most, stout canines present in a few species. Bony ridges of head usually bearing spines or serrations. Gill-rakers few, short or mere stubs. Gill membranes free from isthmus, branchiostegal rays 7. Two dorsal fins well separated. Spinous dorsal fin with 8-10 spines, the 1st spine short and scarcely connected to the second. Soft dorsal and anal fins with 10-15 rays; the last ray double (split to the base) but counted as a single ray. Pelvic fins thoracic in position, set far apart towards sides of body, with 1 spine and 5 soft-rays. Vertebrae 27, usually 11+16 or 12+15. Lateral line complete.

Adults usually dark above and pale below, the dark colours with various shades of brown, grey or black; brighter hues of reddish, purplish or greenish in some. Benthic fishes frequently found on mud or sand bottoms of continental shelf at depths to about 300 m; most species in 10 - 100 m; a second group of species is associated with rocky shores or coral reefs. Many species are excellent eating, a few attain a size of 70 cm or greater. Primarily Indo-Pacific (1 species found in Gulf of Guinea, 1 in eastern Mediterranean). Approximately 12 genera with a total of 60 species; 7 genera and 11 species in our area.



Names of spines and ridges: 1. nuchals, 2. lower operculars, 3. preopercular (lower preopercular spine(s) not shown), 4. supplemental preopercular, 5. parietals, 6. suborbitals, 7. preorbital, 8. nasal, 9. lacrimals, 10. preoculars, 11. supra-orbitals, 12. postoculars, 13. pterotics, 14. supraoccipital, 15. upper operculars. N.B. Few species have all the spines shown here.

KEY TO GENERA

1a LL 68-82; teeth on vomer in 1 transverse patch; soft D rays 13 ..... *Platycephalus*
1b LL 34-60; teeth on vomer in 2 separate patches; soft D rays usually 11-12 2

2a LL 34-40 ..... *Onigocia*
2b LL 48-60 3

3a Bony ridges above and below eye bearing small spines or serrae ..... *Sorsogona*
3b Bony ridges above and below eye bearing larger spines 4

4a All or most pored scales of LL bearing a backward directed spine ..... *Grammoplites*
4b Pored scales of LL on rear half of body without spines 5

5a Bony ridge crossing cheek below eye with a single spine below rear of eye ..... *Papilloculiceps*
5b Bony ridge crossing cheek below eye with 2 or more spines 6

6a Bony ridge crossing cheek below eye with 3 spines (1 in front of eye, 1 below middle of eye, 1 below rear margin of eye; rarely a minute 4th spine behind eye); number of scale series slanting downward and backward above LL greater than number of pored LL scales ..... *Cociella*
6b Bony ridge below eye with more than 3 spines; number of scale rows slanting downward and backward above LL about the same (may differ by 1 or 2) as the number of LL scales ..... *Thysanophrys*

Genus *Cociella* Whitley, 1940

Three species; 2 in our area.

KEY TO SPECIES

1a Soft D & A rays usually 11; GR 1+(4-6) ..... *C. crocodila*
1b Soft D & A rays usually 12; GR (2-3)+(7-9) ..... *C.* sp.

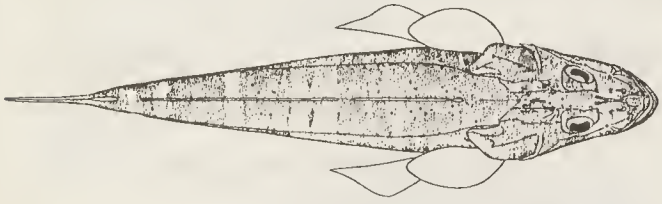
155.1 *Cociella crocodila*
(Tilesius, 1812)

Crocodile flathead — Krokodil-platkop

Platycephalus crocodilus Tilesius, 1812, Pl. 59, Fig. 2 (Nagasaki, Japan); Barnard, 1927 (in part); Fowler, 1934: 488 (in part); Smith, **SFSA No. 1064** (in part). *Platycephalus punctatus* Cuvier, *in* Cuv. & Val., 1829: 243 (Ceylon); Gilchrist & Thompson, 1911: 36 (Natal). *Platycephalus malabaricus* Cuvier, *in* Cuv. & Val., 1829: 245 (India); Gilchrist & Thompson, 1909: 253 (in part).

D I/VIII+11; A 11; P 19-21; LL 53-55. Head 2.6-3.0.

Usually brownish, with many small dark spots on upper body. Back crossed by 4 or 5 dark brown bands in most. Spiny D with a broad black band near edge and small black spots below, other fins more or less darkly spotted. Attains 50 cm. From near shore to 100 m. Widespread, from Durban northward and from Red Sea to Japan and Guadacanal.



155.1 *Cociella crocodila:* 33 cm (after Matsubara & Ochiai, 1955).

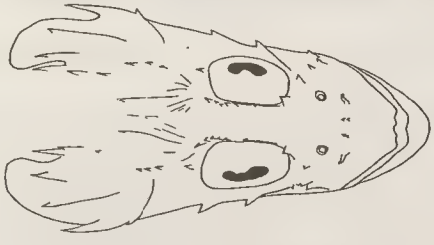
155.2 *Cociella* sp.

Spotfin flathead — Kolvin-platkop

Platycephalus malabaricus (*non* Cuvier): Gilchrist & Thompson, 1909: 253; Fowler, 1925: 255. *Platycephalus tentaculatus* (*non* Rüppell): Fowler, 1925: 255. *Platycephalus crocodilus* (*non* Tilesius): Barnard, 1927: 933 (in part); Fowler, 1934: 488 (in part); Smith, **SFSA No. 1064** (in part).

D I/VIII+12; A 12; P 19-21; LL 52-55. Head 2.8-3.1.

Body usually brownish or greyish, with a few dark spots in some. Fins blackish with dark spots often present; spiny D pale (dusky in alcohol), with large dark spots throughout. Attains 50 cm. East London north to Madagascar and Oman from near shore to about 150 m.



155.2 *Cociella* sp.: dorsal view of head of 12 cm SL specimen.

Genus ***Grammoplites*** Fowler, 1904

Four species, 1 in our area.

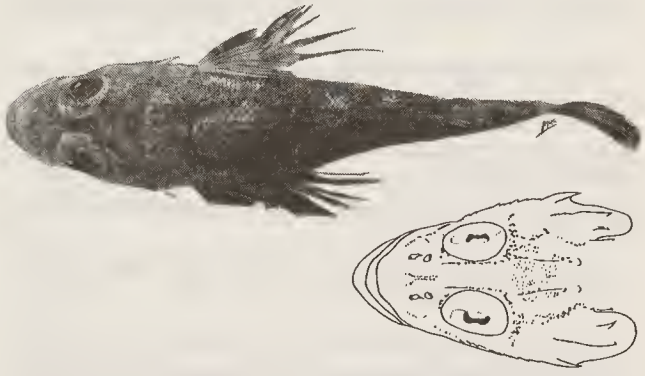
155.3 *Grammoplites portuguesus*
(Smith, 1953)

Thorny flathead — Doring-platkop

Platycephalus scaber (*non* Linnaeus): Gilchrist & Thompson, 1908: 193; Barnard, 1927: 935; Smith, **SFSA No. 1069.** *Thysanophrys portuguesus* Smith, 1953: 17, Pl. 1, Fig. 3 (Maputo); Smith, **SFSA No. 1069a*.**

D I/VIII+12; A 12; P 20-22; LL 51-53; GR 2+(9-10). Head 2.4-2.7. Three or 4 preocular spines. Numerous papillae on lips.

Generally dark brown, lighter below. Attains 17 cm. Taken by trawl in 20 - 70 m. Known only from Durban to Beira.



155.3 *Grammoplites portuguesus:* 15 cm and dorsal view of head of holotype (S. Mozambique).

Genus ***Onigocia*** Jordan & Thompson, 1913

Five species, 1 in our area.

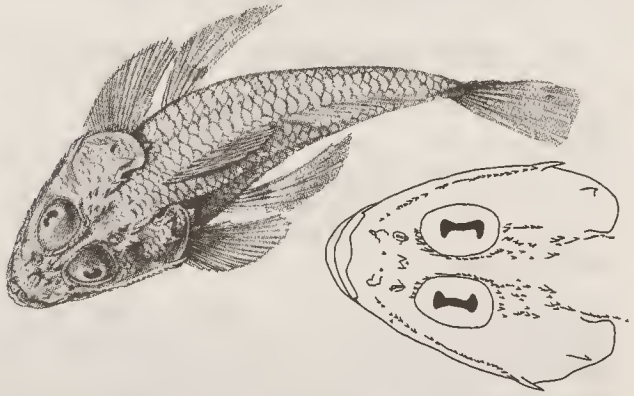
155.4 *Onigocia oligolepis*
(Regan, 1908)
PLATE 30

Large-scale flathead — Grootskub-platkop

Platycephalus oligolepis Regan, 1908: 238, Pl. 29, Fig. 4 (Cargados Carajos).

D I/VIII+11; A 11; P 22-23; LL 34-40; GR 1+4. Head 2.4-2.7.

Body pale tan, whitish below; back crossed by a broad



155.4 *Onigocia oligolepis:* ?20 cm syntype (after Regan, 1908) and dorsal view of head of 8 cm SL specimen (Natal).

dark band at spiny D and 2 or 3 smaller dark bands posteriorly; prominent black blotch on V. Attains 10+ cm. Three specimens are known from Natal; the type from St. Brandon Shoals.

Genus ***Papilloculiceps*** Fowler & Steinitz, 1956

Two species, 1 from our area.

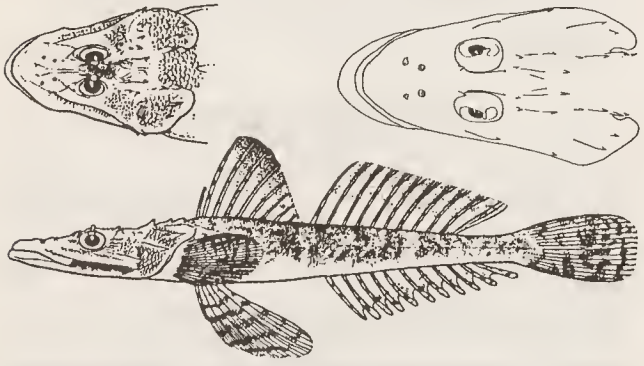
155.5 *Papilloculiceps longiceps*
(Ehrenberg, 1829)
PLATE 29

Madagascar flathead — Madagaskar-platkop

Platycephalus longiceps Ehrenberg, *in* Cuv. & Val., 1829: 255 (Massawa, Red Sea). *Platycephalus tentaculatus* Rüppell, 1838: 104, Pl. 26, Fig. 2 (Red Sea); Regan, 1908: 247 (Kosi Bay); Smith, **SFSA No. 1066*** (Fig. 1066, taken from Günther, is *Platycephalus beauforti* Knapp, 1973 of the Pacific). *Platycephalus grandidieri* Sauvage, 1873: 56 (Zanzibar & Madagascar); Smith, **SFSA No. 1065*.** *Platycephalus papilloculus* Fowler, 1935: 399, Figs. 32 & 33 (Durban).

D I/VIII+11; A 11; P 21-22; LL 52-56; GR 1+(4-5). Head 2.6- 3.0. A finger-like papilla on top of eye.

Body mottled with brownish or greenish above, whitish below; C with 3 or 4 dark bands, other fins with large dark blotches. Attains 70 cm. Found on sand near coral reefs in 1 -15 m. Widespread, from Durban north through Red Sea.



155.5 *Papilloculiceps longiceps:* 26 cm holotype *of Platycephalus papilloculus* (Durban; after Fowler, 1935); top right: dorsal view of head *of* 17 cm specimen (Seychelles).

Genus ***Platycephalus*** Bloch, 1795

Thirteen species, 1 in our area.

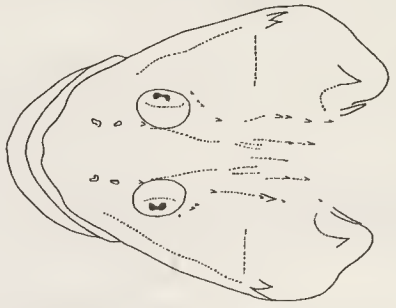
155.6 *Platycephalus indicus*
(Linnaeus, 1758)
PLATE 29

Bartail flathead — Balkstert-platkop

Callionymus indicus Linnaeus, 1758: 250 (Asia). *Cottus insidiator* Forsskål, 1775: 25 (Red Sea). *Cottus madagascariensis* Lacepède, 1801: 231, 248, Pl. 11, Fig. 1 (Madagascar). *Platycephalus insidiator:* Regan, 1908: 247; Gilchrist & Thompson, 1908: 194. *Platycephalus indicus:* Barnard, 1927: 932; Smith, **SFSA No. 1063*.**

D I/VIII/I+13; A 13; P 18-20; LL 68-82; GR (2-3)+(5-7). Head 2.9-3.2. Head bearing smooth bony ridges, a small preocular spine and 2 preopercular spines, the lower slightly longer.

Adults brownish or greyish above, whitish below; C with 2 or 3 horizontal black stripes. Attains 100 cm. Found in estuaries and shallow water to about 15 m. Good eating. Widespread, from Mossel Bay northward; eastern Mediterranean and Red Sea to Japan and Australia.



155.6 *Platycephalus indicus:* dorsal view of head *of* 18.5 cm SL specimen (Knysna).

Genus ***Sorsogona*** Herre, 1934

Four species, 1 in our area.

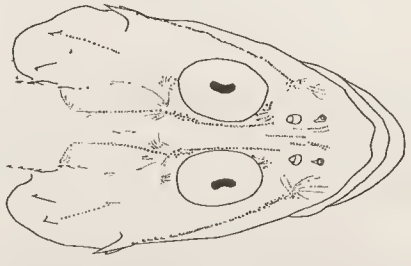
155.7 *Sorsogona prionota*
(Sauvage, 1873)
PLATE 30

Halfspined flathead — Halfstekel-platkop

Platycephalus prionotus Sauvage, 1873: 57 (Red Sea). *Platycephalus townsendi* Regan, 1905: 323, Pl. 1, Fig. 1 (Karachi & Muscat). *Platycephalus heterolepis* Barnard, 1927: 77 (Delagoa Bay); 1927: 934*. *Platycephalus tuberculatus* (*non* Cuvier): Smith, **SFSA No. 1068.**

D I/VIII+12; A 12-13; P 19-22; LL 50-54 (the first 15-20 with small spines); GR (2-4)+(7-10). Head 2.6-2.9.

Body brownish with 4 or 5 vague dark bands crossing back. Spiny D dusky brown, other fins more or less dark spotted. Dark purple area with a network of light lines found under opercular flap. Attains 22 cm. Found at depths of 1 - 61 m. Delagoa Bay northward to Karachi and through the Red Sea.



155.7 *Sorsogona prionota:* dorsal view of head of 16.5 cm SL holotype of *Platycephalus heterolepis* (Inhaca Id.).

Genus ***Thysanophrys*** Ogilby, 1898

Seven species; 4 in our area.

KEY TO SPECIES

1a Finger-like papilla on upper surface of eye; A 13-14, rarely 12 ..... *T. celebica*
1b No papilla on eye; A rays usually 12 2

2a Preorbital spine present; A 12; bony interorbital width 6-7 in snout length ..... *T. chiltonae*
2b Preorbital spine absent; bony interorbital width 2-5 in snout length 3

3a Papillae on the edges of lips, D soft-rays usually 11 ..... *T. otaitensis*
3b No papillae on lips, D soft-rays usually 12 ..... *T. arenicola*

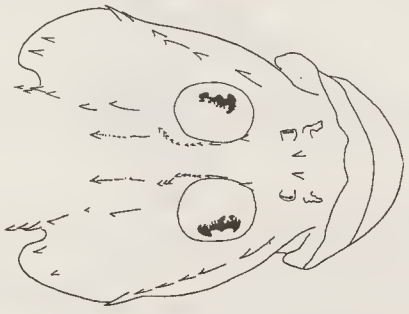
155.8 *Thysanophrys arenicola*
Schultz, 1966
PLATE 30

Sand flathead — Sand-platkop

Thysanophrys arenicola Schultz, 1966: 60, Fig. 148, Pl. 130, Figs. B & C (Marshall Ids.).

D I/VIII+11-12; A 12; P 19-22; LL 51-54; GR 1+(4-5). Head 2.7- 3.2.

Colour pattern similar to that of *T. otaitensis*. Attains 23 cm. Found over sand near coral reefs in 1 - 15 m. Natal north to Seychelles; Chagos Archipelago, Indonesia, Australia, Philippines and Marshall Ids.



155.8 *Thysanophrys arenicola:* dorsal view of head of 14 cm SL specimen (Natal).

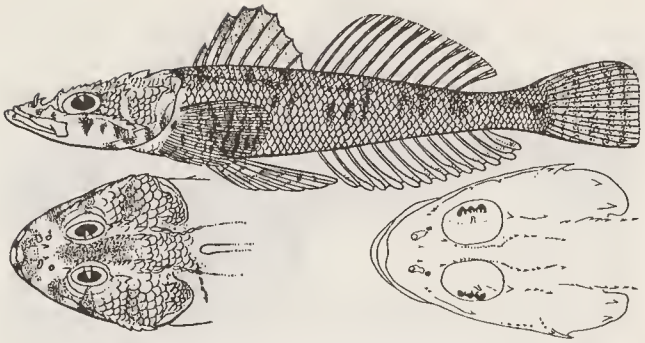
155.9 *Thysanophrys celebica*
(Bleeker, 1854)

Quarterspined flathead — Kwartstekel-platkop

Platycephalus celebicus Bleeker, 1854: 450 (Manado). *Platycephalus pristis* Peters, 1855: 433 (Mozambique); Barnard, 1927: 934; Smith, **SFSA No. 1067.** *Platycephalus heterolepis* (*non* Barnard): Fowler, 1934: 488. *Grammoplites pristis:* Fowler, 1935: 398*. *Platycephalus horai* de Beaufort, 1957: 83, Fig. 1A (New Guinea).

D I/VII-VIII+12-14; A 12-14; P 19-20; LL 49-52; GR 1+(3-5). Head 2.7-3.1.

Brownish, with 3 or 4 dark bands crossing back. Common in shallow water from Durban north to Zanzibar. Also known from Persian Gulf to Philippines and Australia.



155.9 *Thysanophrys celebica:* 16 cm (after Fowler, 1935); bottom right: dorsal view of head of 10.5 cm specimen (Zanzibar).

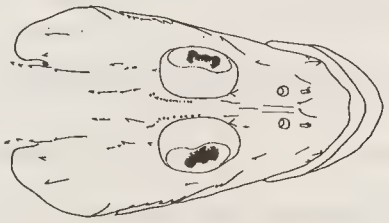
155.10 *Thysanophrys chiltonae*
Schultz, 1966
PLATE 30

Longsnout flathead — Langsnoet-platkop

Thysanophrys chiltonae Schultz, 1966: 57, Figs. 146 & 147 (Marshall Ids.).

D I/VII-VIII+11; A 12; P 19-21; LL 50-57; GR 1+(5-6). Single preorbital spine; bony interorbital width contained 4-6 times in eye diameter.

Body and head mottled with dark brown and buff; fin rays with dark brown or black spots; dark brown saddle blotch on top of C peduncle. Attains 23 cm. Over sand near coral reefs in depths of 1 - 30 m. Red Sea and Indo-West Pacific from northern Natal to Australia, Fiji, Philippines and the Marquesas Ids.



155.10 *Thysanophrys chiltonae:* dorsal view of head of 13 cm SL specimen (Natal).

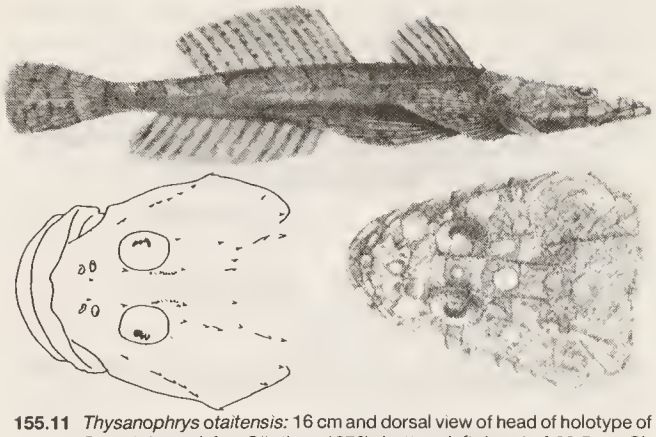
155.11 *Thysanophrys otaitensis*
(Parkinson, 1829)

Fringelip flathead — Fraiinglip-platkop

Cottus otaitensis Parkinson, *in* Cuv. & Val., 1829: 241 (Tahiti); Fowler, 1949: 109. *Platycephalus malayanus* Bleeker, 1853: 498 (Sumatra). *Platycephalus variolusus* Günther, 1876: 167, Pl. 109, Fig. A (Samoa). *Thysanophrys papillolabium* Schultz, 1966: 55, Fig. 145, Pl. 130, Fig. A (Marshall Ids.).

D I/VIII+11-12; A 12; P 20-22; LL 51-53; GR 1+(5-6). Head 2.8-3.1.

Body often mottled with brown and white blotches above, whitish below. Back crossed by 4 or 5 dark bands, sometimes indistinct. Attains 25 cm. Found over sand near coral reefs at depths of 1 - 15 m. Natal north to Seychelles; also throughout tropical Indo-Pacific.



155.11 *Thysanophrys otaitensis:* 16 cm and dorsal view of head of holotype of *P. variolosus* (after Günther, 1876); bottom left: head of 20.5 cm SL specimen (Natal).

Family No. 156: HOPLICHTHYIDAE

by M.M. Smith

Spiny flatheads **Stekel-platkoppe**

Broad, depressed, rather spiny head with bony ridge across cheek to preopercle. Elongate, tapering body; no scales, a row of spiny scutes along side. Two separate dorsal fins; anal fin without spine; 3-4 lower pectoral rays detached; pelvics widely separated.

Curious small fishes of fairly deep water of the Indo-Pacific. One genus, *Hoplichthys* Cuvier, 1829 with several species, 1 known in our area.

156.1 *Hoplichthys acanthopleurus*

Regan, 1908
PLATE 30

Spiny flathead Stekel-platkop

Hoplichthys acanthopleurus Regan, 1908: 239, Pl. 28, Fig. 5 (Seychelles); Smith, **SFSA No. 1061***. *Hoplichthys langsdorfi* (*non* Cuvier): Gilchrist & Thompson, 1914: 74.

D VI+14-15; A 16-18; P 13+3, lower detached rays as long as V; GR 2+12; LL of 27 spiny scutes (consisting of 1-2 small spines below each strong spine) along each side; maxilla extends to below front margin of eye; a patch of spines behind angle of jaws; ridges on head denticulate; dorsal rays in male filamentous.

Attains 18 cm. Rare, tropical western Indian Ocean; taken in 120 - 300 m off Natal.

Family No. 157: TRIGLIDAE

by P.C. Heemstra

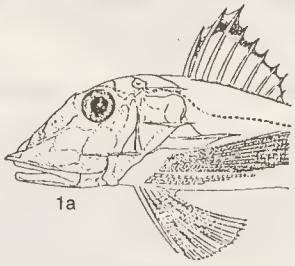
Gurnards **Knorhane**

Body elongate, fusiform, with a row of spines along each side of dorsal fin bases. Scales small, ctenoid and imbricate, or rudimentary and more or less embedded. Head large, encased in bony plates; no barbels on lower jaw. Pectoral fin with lower 3 rays free and enlarged, used as feelers. Dorsal fin divided into separate spinous and soft-rayed fins. Ventral fins wide apart, situated below pectoral fin base, with 1 spine and 5 rays. Caudal fin with 11 or 12 principal rays and 9 or 10 branched rays. Maxilla covered by preorbital bone. Branchiostegal rays 7; gills 4, a slit behind the last; gill-rakers short and not very numerous. Swimbladder generally present, used in sound production.

The American name "sea robins" and the Afrikaans "knorhane" come from the bird-like chirping noise some species make when they are taken from the water. Gurnards live on the bottom, feeling for food with the detached pectoral rays. Some occur in fair numbers and are of commercial importance, the flesh being firm and delicious. This family comprises some 50-60 species; the genera here recognised are not well defined. Head length is measured from premaxillary symphysis to end of operculum; eye diameter and interorbital width are measured from bony edge of orbits.

KEY TO GENERA

1a Cleithral spine length (measured from edge of operculum) much greater than eye diameter; swimbladder with thin walls . . . . . *Trigla*

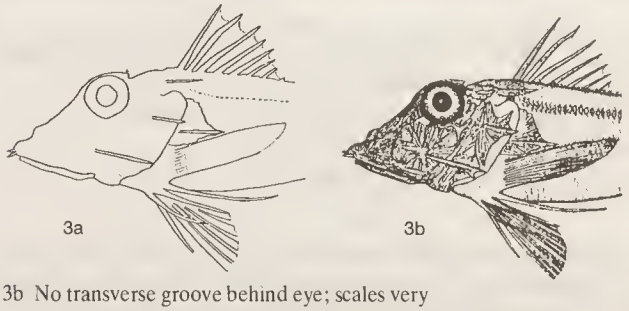


1b Cleithral spine length less than or subequal to eye diameter; swimbladder with thick walls 2

2a LL with numerous subvertical branches extending above and below main series of spiny LL scales; scales on body small, ctenoid, embedded . . . . . *Trigloporus*

2b LL not as above 3

3a Head with a transverse groove above and just behind eye; scales relatively large, imbricate, fewer than 70 in LL . . . . . *Lepidotrigla*



3b No transverse groove behind eye; scales very small, cycloid, more or less embedded . . . . . *Chelidonichthys*

Genus ***Chelidonichthys*** Kaup, 1873

LL scales normal, without keels, spines or vertical expansions; opercular spine not, or barely, reaching past margin of operculum; band of minute sharp teeth on jaws and vomer. Vertebrae 33-36. Three species in our area; *C. gabonensis* (Poll & Roux, 1955) is a west African species that extends south to Angola.

KEY TO SPECIES

1a Total soft D + A rays = 34 to 36 . . . . . *C. queketti*
1b Soft D + A rays = 29 to 33 2

2a Breast fully scaled; body scales imbricate, 6-8 rows between LL and D_2 origin; total GR 5-8 plus rudiments . . . . . *C. gabonensis*
2b Breast naked; body scales more or less embedded, 12-15 rows between LL and D_2 origin; total GR 8-18 plus rudiments 3

3a Interorbital width 0.5-1.7 in orbit diameter; lower GR 13-18 plus rudiments . . . . . *C. capensis*
3b Interorbital width 1.5-2.2 in orbit diameter; lower GR 8-10 plus rudiments . . . . . *C. kumu*

157.1 *Chelidonichthys capensis*
(Cuvier, 1829)
PLATE 31

Cape gurnard — Kaapse knorhaan

Trigla capensis Cuvier, *in* Cuv. & Val., 1829: 55 (Cape of Good Hope); Smith, **SFSA No. 1083*;** Smith & Smith, 1966: 80*. *Chelidonichthys capensis:* Richards, 1968: 96*; Trunov & Malevany, 1974: 370; Hecht, 1977: 373; Heemstra, 1982: 292.

D VIII-IX+15-17; A 14-16; P 10-11+3; lower GR 13-18 plus rudiments. Head 2.8-3.3 in SL; eye 3.9-5.0 in head. Preorbitals rounded in front, with 4-6 short spines. P reaches vertical at 7th A ray. Vertebrae 33 or 34.

Attains 70 cm. Known only from Cape Fria (SWA) to Maputo, in 10 - 390 m. An excellent food-fish and an important commercial species caught mainly by the trawlers; feeds mainly on fishes.

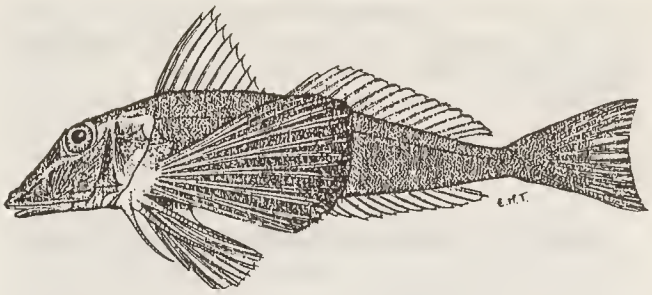
157.2 *Chelidonichthys kumu*
(Lesson, 1829)
PLATE 31

Bluefin gurnard — Blouvin-knorhaan

Trigla kumu Lesson, *in* Cuv. & Val., 1829: 50 (New Zealand); Lesson, 1830: 214, Pl. 19; Smith, **SFSA No. 1082;** Smith & Smith, 1968: 80*. *Chelidonichthys kumu:* Heemstra, 1982: 292.

D IX-X+15-16; A 14-16; P 10-11+3; lower GR 8-10 plus rudiments. Head 3.0-3.5 in SL; eye 3.7-4.3, snout 2.1-2.3 in head. Preorbitals and opercular spine as in *C. capensis*. P reaches vertical at 7th A ray.

Attains 60 cm. Indo-West Pacific, common in Australia and New Zealand; also reported from Korea and Japan; in our area from the Cape to Delagoa Bay in 1 - 200 m. Often found in rivers.



157.2 *Chelidonichthys kumu:* 21.5 cm SL (Port Alfred).

157.3 *Chelidonichthys queketti*
(Regan, 1904)
PLATES 30 & 31

Lesser gurnard — Kleiner knorhaan

Trigla queketti Regan, 1904: 128 (Natal); Smith, **SFSA No. 1084*.** *Chelidonichthys queketti:* Heemstra, 1982: 294.

D IX+18-19; A17-18; P 10-11+3; GR 10-12 plus rudiments. Head 3.3-3.7 in SL; eye 3.4-3.7, snout 2.1-2.4 in head; interorbital width 1.2-1.5 in orbit. Preorbitals with 1 or more smaller spines mostly covered by skin and medial to the large outer spine. P reaches above 1st-3rd A rays. Vertebrae 36.

Attains 35 cm. Table Bay to Natal, from shore out to 150 m.

Genus ***Lepidotrigla*** Günther, 1860

Indian Ocean species of this genus were revised by Richards & Saksena (1977). Two species in our area; *L. cadmani* Regan, 1915, a west African species reaching southern Angola, and *L. spiloptera*, Günther, 1880, a widely distributed Indo-Pacific species reported from Zanzibar, are extralimital species likely to be found in our area and are included in the key.

KEY TO SPECIES

1a Scales cycloid; 1st D spine smooth; breast scaly; D_2 13-15; A 13-15 . . . . . *L. cadmani*
1b Scales ctenoid; 1st D spine serrate; D_2 15-17; A 14-17 2

2a Bony sub-horizontal ridge on preopercle; lower GR 5-7 plus rudiments . . . . . *L. multispinosa*
2b No ridge on preopercle; lower GR 7-9 plus rudiments 3

3a Rostral spines subequal; 12-16 scales in vertical series from A origin to LL; 3rd D spine 2.0-2.3 times orbit diameter . . . . . *L. faurei*
3b Lateral rostral spines largest; 19-21 scales between A origin and LL; 3rd D spine 1.4-1.8 times orbit diameter . . . . . *L. spiloptera*

157.4 *Lepidotrigla faurei*
Gilchrist & Thompson, 1914

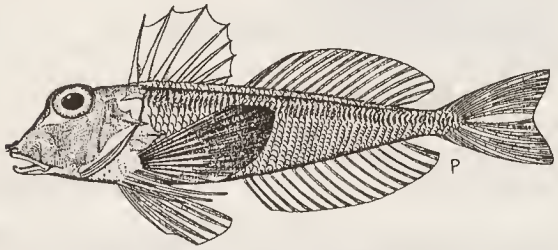
Prickly gurnard — Prikkel-knorhaan

Lepidotrigla faurei Gilchrist & Thompson, 1914: 75 (off Tugela River in 40 & 63 fms); Smith, **SFSA No. 1077;** Richards & Saksena, 1977: 216*;

Heemstra, 1982: 292. *Lepidotrigla natalensis* Gilchrist & Thompson, 1914: 76 (off Tugela River in 40 fms); Smith, **SFSA No. 1078***. *Lepidotrigla stigmapteron* Fowler, 1934: 487, Fig. 46 (Durban).

D VIII-IX+15-17; A 15-16; P 11+3; lower GR 7-9 plus rudiments; LL 57-64. Head 2.7-3.3 in SL; eye 3.1-3.8 in head; interorbital width 1.5-1.8 in eye. Preorbitals with 4-6 spines in front. P 1.2-1.4 in head, reaches above 3rd-6th A rays.

Attains 18 cm. Durban northwards to India in 70 - 120 m.



157.4 *Lepidotrigla faurei:* 16 cm (off Natal).

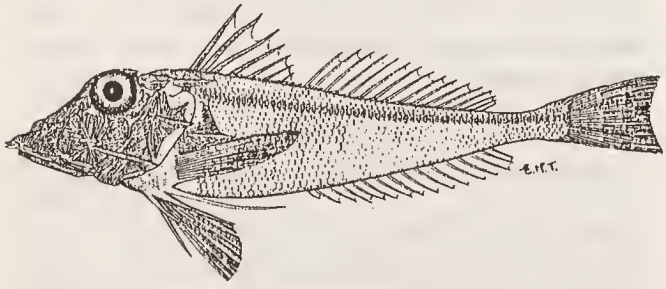
157.5 *Lepidotrigla multispinosa*
Smith, 1934

Spiny gurnard — Stekel-knorhaan

Lepidotrigla multispinosus Smith, 1934: 326 (Natal?); Smith, **SFSA No. 1079***; Richards & Saksena, 1977: 220; Heemstra, 1982: 292.

D VIII-IX+15-16; A 16-17; P 11+3; LL 59-64. Head 2.9-3.1 in SL; eye 3.3-4.0 in head; interorbital width 1.4-1.6 in eye. Preorbitals with 10-12 small spines in front. P 1.2-1.4 in head, reaching vertical at 4th A ray.

Attains 16 cm. Natal, Kenya and Mozambique in 230 - 295 m.



157.5 *Lepidotrigla multispinosa:* 12.5 cm SL (off Natal).

Genus ***Trigla*** Linnaeus, 1758

Cleithral spine reaches vertical at base of 6th D spine; opercular spine reaches well past opercular margin; horizontal ridge present on preopercle; scales very small, ctenoid. One species in our area.

Smith (**SFSA No. 1081**) included *Trigla hirundo* Linnaeus in the southern African fauna, based on the record of Schnakenbeck (1931) from Walvis Bay. The specimens in question were probably *Chelidonichthys capensis,* which Schnakenbeck (incorrectly) considered a synonym of *Trigla hirundo.* According to Richards (1968), *T. hirundo* is a synonym of *C. lucerna* (Linnaeus), a species not known south of Cape Verde.

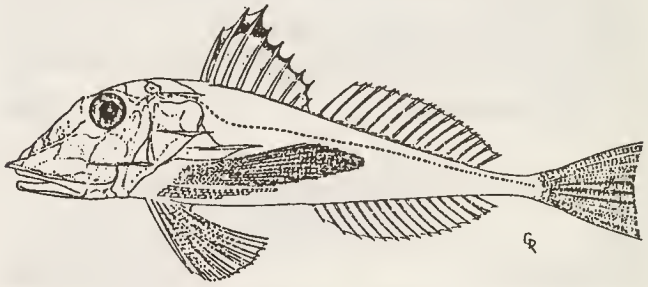
157.6 *Trigla lyra*
Linnaeus, 1758

Lyre gurnard — Lier-knorhaan

Trigla lyra Linnaeus, 1758: 300 ("Mari Britannica"); Smith, **SFSA No. 1080**; Richards, 1968: 82*; Trunov & Malevany, 1974; Heemstra, 1982: 292.

D IX-X+15-16; A 15-16; P 12+3; GR 7 plus rudiments; vertebrae 31-32. Head 2.8-3.0 in SL; eye 3.6-4.5 in head; interorbital width 0.9-1.5 in orbit. P reaches above 3rd to 6th A rays.

Attains at least 47 cm, perhaps 60 cm. A common eastern Atlantic and Mediterranean species, its southern limit appears to be Walvis Bay; occurs in 100 - 480 m.



157.6 *Trigla lyra:* 25.5 cm SL (after Richards, 1968).

Genus ***Trigloporus*** Smith, 1934

Body covered by a complex system of branching tubules; LL scales with several spines; opercular spine barely exceeds margin of operculum; no ridge on preopercle. Heemstra (1982) recognises 2 subspecies; adult *T. lastoviza lastoviza* (Bonnaterre) of the eastern Atlantic (south to Angola) have longer P (40-46% SL, reaching past vertical at 8th A ray), larger eye (bony orbit diameter 8-10% SL) and longer cleithral spines (6-7% SL).

157.7 *Trigloporus lastoviza africanus*
Smith, 1934
PLATE 31

African gurnard — Afrikaanse knorhaan

Trigla (Triglopǫrus) africana Smith, 1934: 334, Pl. 23 (Port Alfred); Richards & Saksena, 1980. *Trigloporus africanus:* Smith, **SFSA No. 1085***. *Trigloporus lastoviza africanus:* Heemstra, 1982: 293.

D X+15-17; A 15-17; P 10+3; GR 6-8 plus rudiments; vertebrae 35; LL 67-70, each scale with 2-5 spines. Head 3.5- 3.7 in SL; eye 3.8-4.1 in head, 7.0-7.6% SL; cleithral spine length 3.7-5.3% SL; interorbital width 1.2-1.4 in eye; P 1.0-1.3 times head length, 28-37% SL, not reaching past vertical at 4th A ray.

Attains 22 cm. Known only from St. Sebastian Bay to Port Alfred in 35 - 150 m.

Family No. 158: PERISTEDIIDAE

by P.C Heemstra

Armoured gurnards **Gepantserde knorhane**

Head and body flattened ventrally, completely encased in bony plates; front of snout with 2 flat bony processes projecting forward. Pectoral fin with lower 2 rays free and enlarged, used as feelers. Dorsal fin divided into spinous and soft-rayed fins. Ventral fins wide apart, situated below base of pectorals, with 1 spine and 5 rays. Caudal fin with 9 or 10 branched rays. Maxilla covered by preorbital bone. Branchiostegal rays 7; gills 4, a slit behind the last; gill-rakers short and not numerous. A series of barbels on lower jaw.

Some authors include the peristediids as a subfamily of the Triglidae. About 4 genera and 20-30 species; they inhabit the lower shelf/upper slope regions of all oceans between the 60° latitudes. Two genera are represented in our area: *Satyrichthys,* with a well-developed preopercular spine, and *Peristedion,* in which the preopercular spine is very small or absent.

Genus ***Peristedion*** Lacepède, 1802

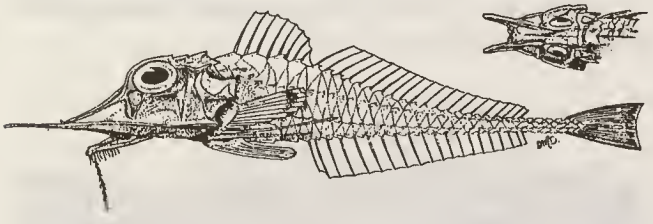
Several species, 1 in our area.

158.1 *Peristedion weberi*
Smith, 1934
PLATE 30

Peristedion weberi Smith, 1934: 329, Pl. 21 (off Delagoa Bay; 260 fms); Smith, **SFSA No. 1075*;** Miller, 1974: 67*; Heemstra, 1982: 292.

D VIII/20; A 20-23; P 11-13+2; GR (4-6)+(19-22); LL plates 34-37. Head length (from premaxillary symphysis to end of opercular spine) 2.6-2.9, body depth 5.2-7.1 in SL; eye 4.3-4.6, interorbital width 4.3-5.0 in head.

Colour in alcohol: body grey, mottled darker above; prominent black blotch at tip of P; dusky mark at base and dorsally in axil of P; D spines, rays and margin of fin black. Attains 15 cm. Northern Natal to Somalia in 170 m.



158.1 *Peristedion weberi:* 18.5 cm holotype (off Inhaca Id.).

Genus ***Satyrichthys*** Kaup, 1873

Several species, 2 in our area.

KEY TO SPECIES

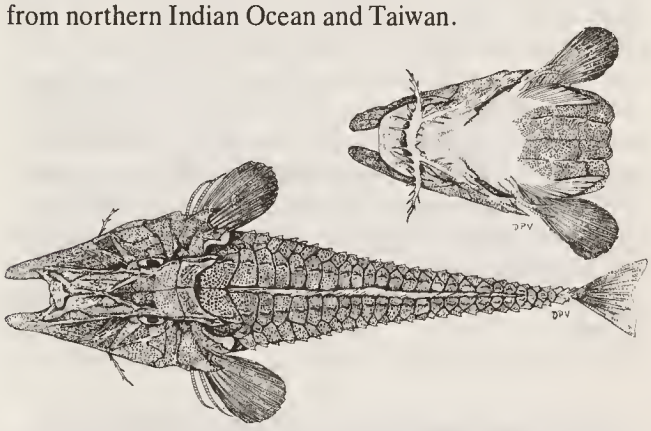
1a A 14-16 . . . . . *S. adeni*
1b A 21 . . . . . *S. investigatoris*

158.2 *Satyrichthys adeni*
(Lloyd, 1907)

Peristethus adeni Lloyd, 1907: 8 (Gulf of Aden). *Peristedion adeni:* Smith, **SFSA No. 1074*.** *Satyrichthys adeni:* Miller, 1974: 61*; Heemstra, 1982: 292.

D VII-VIII+13-16; A 14-16; P 12-14+2; LL 27-30 ; GR (4-6)+(17-20). Filamentous lip barbel reaches to below eye. Rostral exsertions changing shape with growth; configuration of preopercular spine variable; 5 small spines on snout. Head length 2.1-2.4, body depth 4.3-5.7 in SL; eye 4.2-6.0, interorbital width 4.0-5.8 in head.

Anterior D spines and margin of 1st D dusky. Attains 70 cm. Mossel Bay to Delagoa Bay in 58 - 295 m; also known from northern Indian Ocean and Taiwan.



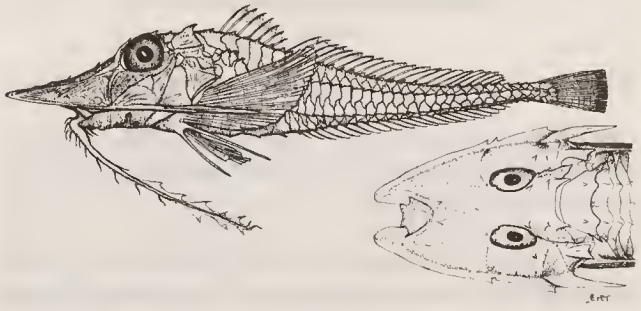
158.2 *Satyrichthys adeni:* 14.5 cm and ventral view of head of 48 cm specimen (both off Algoa Bay).

158.3 *Satyrichthys investigatoris*
(Alcock, 1898)

Peristethus investigatoris Alcock, 1898: 152 (Andaman Sea). *Satyrichthys investigatoris:* Heemstra, 1982: 292*.

D VII+22; A 21; P 14+2; LL 35-36; GR iii,(3-4)+22; head length 2.6-2.8 in SL; eye 4.9-5.2 in head; interorbital width 1.2 in eye, 6.0 in head; filamentous lip barbel reaches well past base of preopercular spine.

P, spinous D and margin of soft D blackish. Attains 20



158.3 *Satyrichthys investigatoris:* 16 cm SL (off Durban).

cm. Off Durban in 550 m. Miller (1974) reckons this species may be synonymous with *Peristethus hians* Gilbert & Cramer (1897).

Family No. 159: DACTYLOPTERIDAE

by W.N. Eschmeyer

Helmet gurnards **Helmknorhane**

Body squarish, tapering behind. Head large, blunt, with bones united to form a bony helmet; preopercle spine very long. Mouth small, on underside of head.

Although these benthic fishes are often called "flying gurnards", they cannot fly or glide out of the water. The greatly enlarged pectoral fins have led to the erroneous impression, often repeated in books on fishes, that dactylopterids are able to fly or glide in air in the manner of the true flying fishes (Family Exocoetidae). The body is heavy and the fins weak, and dactylopterids probably use their pectoral fins in defence displays, courtship or possibly feeding behaviour; the greatly enlarged fins of most gurnards (Family Triglidae) and some scorpionfishes (Family Scorpaenidae) are probably used in the same ways. Two genera and 7 species; 1 genus in our area; genus *Dactylopterus* confined to the Atlantic. Family reviewed by Eschmeyer (in press).

Genus ***Dactyloptena*** Jordan & Richardson, 1908

Indo-Pacific. Six species, 2 in our area.

KEY TO SPECIES

1a Two free D spines, 1st just behind head, 2nd midway between 1st spine and remainder of spinous D . . . . . *D. orientalis*

1b One free D spine (just behind head), then a wide gap to remainder of spinous D . . . . . *D. peterseni*

159.1 *Dactyloptena orientalis*

(Cuvier, 1829)

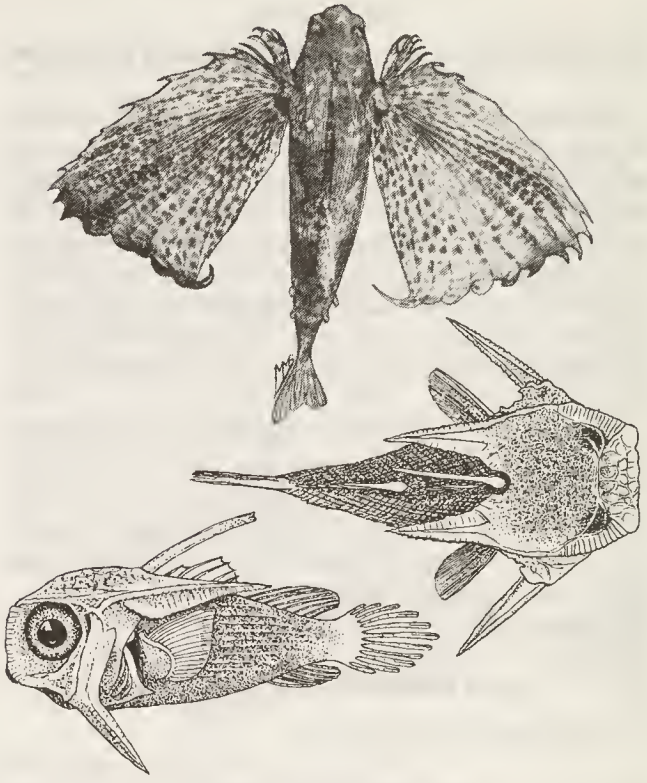
PLATE 31

Helmet gurnard Helmknorhaan

Dactylopterus orientalis Cuvier, *in* Cuv. & Val., 1829: 134, Pl. 86 (India). *Dactyloptena orientalis:* Smith, **SFSA No. 1076*.**

D I+I+V+i,8; A 6; P 32-35.

Young to about 3 cm often taken near surface. Attains 38 cm. Most common helmet gurnard in our area and most widespread family member; Port Elizabeth northwards; east to central Pacific. Adults usually trawled at moderate depths.



159.1 *Dactyloptena orientalis:* dorsal and lateral views of 0.6 cm juvenile (drawn after Weber, 1913) and 29 cm adult (Kenya).

159.2 *Dactyloptena peterseni*

(Nyström, 1887)

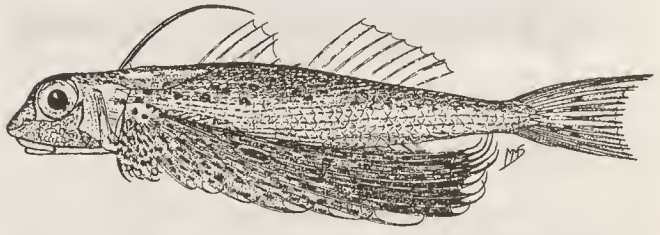
PLATE 31

Starry helmet gurnard Ster-helmknorhaan

Dactylopterus peterseni Nyström, 1887: 24 (Japan). *Diacocus peterseni:* Smith, 1953: 522, **No. 1076a*;** Smith & Smith, 1966: 137*.

D I+V+i,8; A 6; P 32-34.

Attains about 30 cm. East London and Delagoa Bay; also across northern Indian Ocean to Japan. Benthic, adults usually trawled in about 50 - 200 m.



159.2 *Dactyloptena peterseni:* 20 cm (East London).

Family No. 160: PSYCHROLUTIDAE

by J.S. Nelson

Fatheads **Vetkoppe**

Large head, body tapers abruptly behind (fish generally tadpole-shaped). Skin loose in most species (usually covering dorsal and anal fins, making it difficult to count rays). Body naked (in South African species) or with plates bearing prickles; cirri present or absent. Interorbital space wide, usually much greater than exposed eye diameter. Most species with continuous dorsal fin, first portion spiny and often hidden in skin. Pelvic fins small and slender, with 1 minute spine and 3 soft-rays. Lateral line with 20 or fewer pores (may be microscopic). Conical teeth in several rows on upper and lower jaws; teeth present or absent on head of vomer. System of well-developed bony arches under skin on cranium which may or may not bear well-developed spines. Colour usually brown or in shades of black and white.

Adults usually benthic and trawled between 100 and 1 600 m. About 7 genera with 29 species, 4 in our area. The South African species were formerly in the nominal Family Cottunculidae (now placed in synonymy with Psychrolutidae). Some workers prefer to include Psychrolutidae in Cottidae. The systematics of several genera in this family, particularly *Ebinania* and *Psychrolutes* of South African genera, are poorly known and the species composition is subject to change. Reviewed, in part, by Nelson (1977, 1982).

KEY TO GENERA

1a Interorbital area with spines; vomerine teeth present in adults (may be absent in specimens under about 8 cm) . . . . . *Cottunculus*

1b Interorbital area smooth (convex, soft, and without spines); vomerine teeth present or absent 2

2a Vomerine teeth present . . . . . *Ebinania*

2b Vomerine teeth absent . . . . . *Psychrolutes*

Genus ***Cottunculus*** Collett, 1875

Five species; 1 in our area.

160.1 *Cottunculus spinosus*
Gilchrist, 1906

Cottunculus spinosus Gilchrist, 1906: 149, Pl. 38 (Cape Point); Gilchrist, 1922: 78; Nelson, 1982: 1473. *Cottunculoides spinosus*: Barnard, 1927: 924; Smith, **SFSA No. 1056*.**

D IV,10; A 10; P 16. Depth 4.5; head 2.5. Several spinous projections on head, the largest being the occipital pair. Vomerine teeth absent in 78 mm holotype but it is assumed that adults have vomerine teeth (the species is more similar to *Cottunculus* than to *Psychrolutes* (=*Cottunculoides)* in its general appearance).

Pale brown when preserved. Original material trawled from 1 460 and 2 180 m off Cape Point but all museum specimens are apparently lost.

160.1 *Cottunculus spinosus*: 4.5 cm holotype (off Cape Point; after Gilchrist, 1906).

Genus ***Ebinania*** Sakamoto, 1932

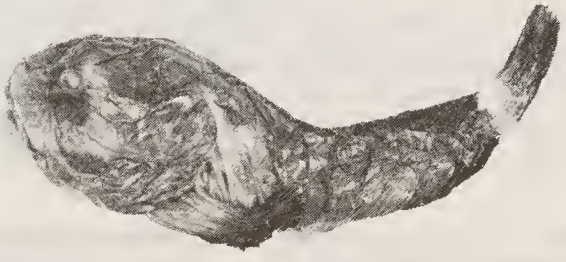
Five species; 1 in our area.

160.2 *Ebinania costaecanarie*
(Cervigon, 1961)

Cottunculus costae-canarie Cervigon, 1961: 125, Figs. 5-7 (southern Morocco). *Cottunculus brephocephalus*: Da Franca & Da Franca, 1969: 4. *Ebinania costaecanarie*: Nelson, 1982: 1482*.

D usually VIII,16 or 17; A 12 or 13; P 22-24. Depth 2.8-3.4; head length 1.9-2.4; head width 2.4-2.7. Cirri absent. Terminal chin pore single.

Blackish to dark brown or brown, lighter underneath. Attains at least 30 cm. One specimen from 600 m off northwestern South Africa; Morocco to Namibia.



160.2 *Ebinania costaecanarie*: 25 cm SL (off Namibia).

Genus ***Psychrolutes*** Günther, 1861

One species of *Psychrolutes* (formerly placed in *Cottunculoides*) was previously thought to occur in South Africa. This was based on the conclusion that the holotype of Gilchrist's *P. macrocephalus* was conspecific with the common form previously referred to as *P. inermis*. However, a reexamination of the holotype of *P. inermis* strongly suggests that these 2 species are distinct. Six species; 2 in our area.

KEY TO SPECIES

1a Terminal chin pore single ..... *P. inermis*
1b Terminal chin pore paired ..... *P. macrocephalus*

160.3 *Psychrolutes inermis*
(Vaillant, 1888)

Cottunculus inermis Vaillant, 1888: 365, Pl. 28, Fig. 2 (Banc d'Arguin, Mauritania). *Psychrolutes inermis:* Nelson, 1982: 1489* (in part).

Similar in meristic and morphometric characters to *P. macrocephalus*. Differs from *P. macrocephalus* in having a minute, unpaired terminal chin pore and in one of the head bones (also appears to occur in deeper water and attain a larger size).

Entire body dark brown. Attains at least 36 cm. Known only from a few specimens from off Mauritania, western South Africa and the Mozambique Channel to as deep as 1 550 m. Specimens reported as *P. inermis* from off Japan probably represent a distinct species.

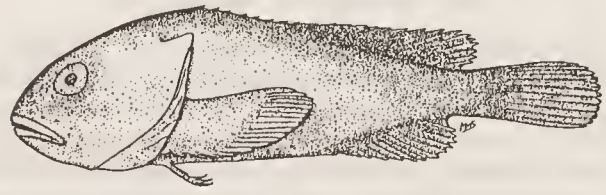
160.3 *Psychrolutes inermis:* 8.5 cm holotype (after Vaillant, 1888).

160.4 *Psychrolutes macrocephalus*
(Gilchrist, 1904)

Cottunculus macrocephalus Gilchrist, 1904: 7 (near Cape Town). *Cottunculoides inermis* (non Vaillant): Smith, **SFSA No. 1058***. *Cottunculoides macrocephalus:* Smith, **SFSA No. 1057***. *Psychrolutes inermis* (*non* Vaillant): Nelson, 1982: 1489*, in part.

D VI-VIII,I6-19; A 12-14; P 19-21. Depth 3.0-3.6; head length 2.1-2.7; head width 2.5-3.2. Cirri present on head, short and sparse. Terminal chin pore paired.

Entire body brown (preserved specimens may be badly bleached). Attains about 30 cm. Occasionally trawled between at least 450 and 650 m. Known only from South Africa.



160.4 *Psychrolutes macrocephalus:* 23 cm (off South Africa).

Family No. 161: LIPARIDIDAE

by D.L. Stein

Snailfishes **Slakvisse**

Body tadpole-like, head blunt. Skin fragile, scales completely absent. A bony suborbital stay beneath eye extending from snout to preopercle. Dorsal and anal fins single, spineless, continuous with caudal fin. Pectoral fins with or without notch; if notched, lower rays may appear to be pelvic fins. Pelvic fins lost or modified to form a ventral sucking disc.

Liparidids occur in cold waters of all oceans but are most abundant and diverse in the North Pacific, North Atlantic and Antarctic. Species occur from estuaries and tide pools down to over 7 000 m. They are of no commercial imporance. The Cyclopteridae, a northern hemisphere family with about 26 species, is put in the same family as the liparidids by Nelson (1984). About 15 genera and some 150 species; 2 genera and 6 species represented in our area.

KEY TO GENERA

1a Ventral sucking disc present ..... *Careproctus*
1b Ventral sucking disc absent ..... *Paraliparis*

Genus *Careproctus* Kröyer, 1861

Nostrils single, on each side of snout; ventral sucking disc present, developed to various degrees. P with or without a notch. Gill slit completely above P or extending ventrally in front of dorsalmost P rays. About 50 species described, most from the northern North Pacific. Two species in our area.

KEY TO SPECIES

1a Peritoneum pale; eye diameter contained 5 times in head length; body depth greater than length of head ..... *C. griseldea*
1b Peritoneum dark brown; eye 3.7-4.0 in head; body depth less than head length ..... *C. albescens*

161.1 *Careproctus albescens*
Barnard, 1927

Careproctus albescens Barnard, 1927: 76 (off Cape Point); 1927: 925; Smith; **SFSA No. 1070.**

D ca. 50; A ca. 45; P 35; pyloric caeca 12. Head length 3.75, body depth 4.75 in SL. Eye 3.75 in head. Most teeth simple, but a few with lateral lobes. Ventral disc 5.0 in head; distance from disc to anus greater than disc length. Lowest P rays not greatly elongated.

In preservative, body whitish, peritoneum dark brown. Attains 10 cm. Known only from off Cape Point in 1 150 - 1 460 m.

161.2 *Careproctus griseldea*
Lloris, 1982

Careproctus griseldea Lloris, 1982: 106, Figs. 2 & 3 (off Namibia, 24°59′S; depth 600 m).

D 55; A 48; P 34, of which the lower 12 or 13 are free. Head length 4.2-5.0, body depth 3.6-4.0 in SL. Teeth villiform, simple, lanceolate, slightly curved. Ventral disc 5 in head length. Lower P rays not elongated.

Colour in life: reddish, median fins darker; peritoneum pale. Attains 23 cm. Known only off southern Namibia in 600 - 615 m.

161.2 *Careproctus griseldea*: 12.5-22.5 cm type to show coloration; front of head to show pores (Walvis Bay; after Lloris, 1982).

Genus ***Paraliparis*** Collett, 1878

Nostrils single; ventral sucking disc absent. P usually notched, often deeply; rays of lower lobe often appear as pelvic fin. Gill slit usually above P. About 50 species described, almost all from 200 - 4 300 m in the North Pacific, Atlantic, equatorial Pacific and Antarctic. Three species occur in South African waters.

KEY TO SPECIES

1a Mouth oblique; D less than 39 ..... *P. micrurus*
1b Mouth horizontal; D more than 40 2

2a D 45-48; teeth simple, lanceolate, in narrow band; P 17-18 ..... *P. australis*
2b D 60-66; teeth simple, stout, in single series; P 20-24 3

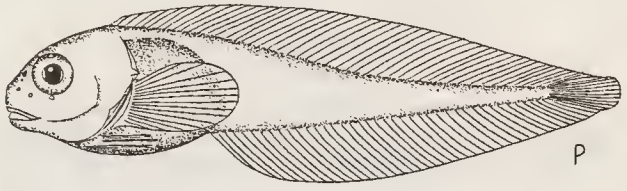
3a Colour black or dark brown; premaxillary teeth extend less than ½ way to oral cleft ..... *P. wilsoni*
3b Colour white, only snout and fins dark; premaxillary teeth extend more than ½ way to oral cleft ..... *P. copei*

161.3 *Paraliparis australis*
Gilchrist, 1904

Paraliparis australis Gilchrist, 1904: 107* (off Cape of Good Hope); Smith, **SFSA No. 1072***; Karrer, 1973: 245.

D 45-48; A 40-43; P 17-18. Pyloric caeca at least 5. Head about 4 in SL, maximum body depth 4-5. Eye 3-4 in head, diameter less than snout length. Mouth horizontal, large, less than 2.0 in head length. Teeth lanceolate, in narrow band in each jaw. P upper lobe of 13 closely-spaced rays, lower lobe of 4 similar rays, the two lobes separated by a wide gap containing a single, possibly rudimentary, ray which is closer to the lower lobe than to the upper.

In alcohol, body, mouth and branchial cavity pale. Peritoneum dark brown. Stomach and pyloric caeca pale. Reaches at least 50 mm SL. Known only from off Walvis Bay and Cape Point in 300 - 570 m.



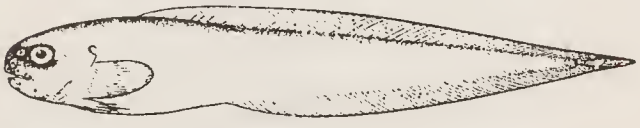
161.3 *Paraliparis australis*: 4 cm (off Saldanha Bay).

161.4 *Paraliparis copei*
Goode & Bean, 1896

Paraliparis copei Goode & Bean, 1896: 279, Fig. 253 (off Delaware, U.S.A.); Barnard, 1927: 926; Smith, **SFSA No. 1073***.

D 60-66; A 55-59; P 20-22; pyloric caeca about 6. Head 5.7-6.9, body depth 5.5-6.5. Eye 3.8-4.1 in head, less than snout length. Mouth horizontal, cleft short. Teeth uniserial in jaws; a few "extra" teeth near mandibular symphysis. Upper jaw teeth extend more than halfway to oral cleft on each side; a narrow toothless gap present at centre of jaw. P notch deep, upper lobe of 13-17 rays, lower lobe of 3-4 rays, the two lobes separated by 2-4 widely-spaced rays. Rudimentary pores absent.

In alcohol, body white or pale; snout, lower jaw, mouth, branchial cavity and peritoneum dusky or blackish. Stomach pale; posterior portion of intestine apparently pale except where it enters the body wall. Reaches 17 cm TL. Northwest Atlantic, Azores and South Africa. Off Cape Point in 1 646 - 1 829 m.



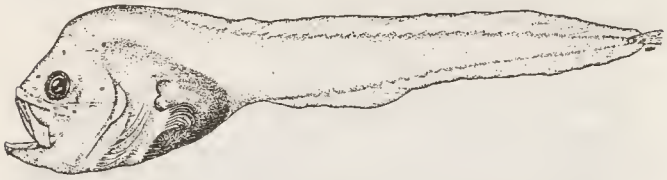
161.4 *Paraliparis copei*: 16.5 cm SL holotype (after Goode & Bean, 1896).

161.5 *Paraliparis micrurus*
(Barnard, 1927)

Psednos micrurus Barnard, 1927: 76; 1927: 927*; Smith, **SFSA No. 1071.**
Paraliparis micrurus: Stein, 1979: 5*.

D 36-37; A 28-31; P 14; pyloric caeca ca. 6. Head 4.0-4.5 in SL; body tapering rapidly behind head. P small, divided into separate lobes with a single short ray equidistant from either lobe.

Body brownish; inside of mouth, branchial cavity and peritoneum dark; stomach blackish. Attains 45 mm SL. Cape of Good Hope, southern Indian Ocean and South Pacific.



161.5 *Paraliparis micrurus:* 3.5 cm SL male.

161.6 *Paraliparis wilsoni*
Richards, 1966

Paraliparis wilsoni Richards, 1966: 171, Fig. 1 (off Gabon, west Africa).

D about 63; A about 56; P 21-24. Pyloric caeca about 6. Head 5.9-6.8 in SL, maximum body depth about 4.5. Eye about 4.1 in head, diameter less than snout length. Mouth horizontal, cleft short. Premaxillary teeth uniserial, small stout canines extending only about half way or less to oral cleft. A wide toothless gap present at upper jaw centre. Mandibular teeth uniserial; a few "extra" teeth present near symphysis. P notch moderately deep, upper lobe of 15-18 rays, lower lobe of 4-5 rays. Lobes separated by 1-2 rays spaced distinctly wider in notch. Rudimentary pores present.

In alcohol, body blackish; head, fins, mouth, branchial cavity and peritoneum black. Stomach pale; posterior part of intestine black. Reaches at least 26 cm SL. Known only from off Gabon and Namibia, in 900 - 1 134 m.

161.6 *Paraliparis wilsoni:* 21.5 cm SL holotype (after Richards, 1966).

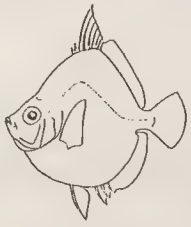
Order PERCIFORMES

The Perciformes is the largest order of fishes, comprising about 150 families and some 7 800 species (Nelson, 1984). About one third of all fish species are perciforms. This order is an unnatural (polyphyletic) assemblage of acanthopterygians that have attained a vaguely defined "grade" of evolution and lack the specialisations of the various derivative orders (e.g. Scorpaeniformes). Without any unique specialised characters to serve as diagnostic features of this order, membership of the Perciformes is uncertain at best. Thus the Callionymidae and Caproidae are here included in the Perciformes, whereas Gosline (1968) excludes the Callionymidae and Rosen (1984) assigns the Caproidae to the Tetraodontiformes! Likewise, Gosline (1968) includes the Ophidiiformes as a suborder of the Perciformes, but here they are accorded ordinal status.

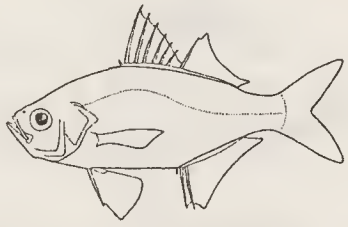
Most perciforms have the following characters in common: dorsal, anal and pelvic fin spines present; pelvic fins with a spine and 5 or fewer soft-rays (usually 1,5); caudal fin skeleton with 5 or fewer hypurals; no free second ural centrum; caudal fin with 17 or fewer principal rays; no adipose fin; scales (usually) ctenoid; gills 4, a slit behind the last; branchiostegal rays 7 or fewer.

There are 95 families of perciforms represented in our area. Because of the large number of families, the superficial similarity of many families, the great morphological diversity within some families and the relatively minor anatomical features that distinguish some families, a workable dichotomous key to the families (as constructed for the other orders) would be exceedingly tedious to use. In lieu of such a key, we shall simply list the families with a few of their salient diagnostic features and give a diagrammatic illustration (or illustrations) of representative species for each family. To identify an individual perciform fish, it will probably be more expeditious to run it through the Fin Formula Key to Bony Fishes at the end of the book. This Key was originally constructed by J.L.B. Smith for this very purpose.

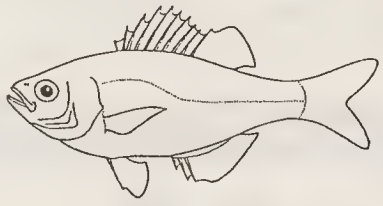
No. 162: CAPROIDAE. D VIII-IX,25-30; A III,25-27; C branched rays 10; scales small, ctenoid.



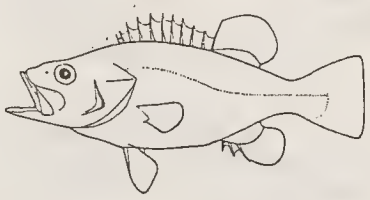
No. 163: AMBASSIDAE. D VI-VII/8-11; A III,8-11; 6 branchiostegal rays.



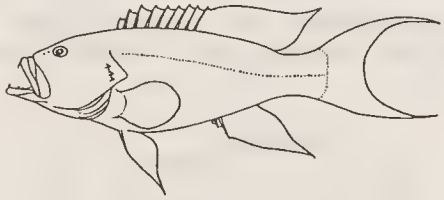
No. 164: KUHLIIDAE. D X,9-12; A III,9-11; preopercle and preorbital bones serrate; opercle with 2 flat spines.

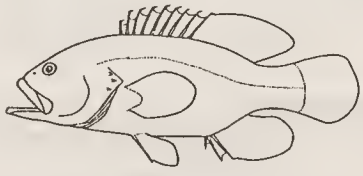


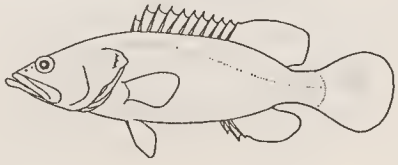
No. 165: POLYPRIONIDAE. D XI-XII,11-12; A III,9-10; opercle with distinct horizontal ridge ending in a short spine.



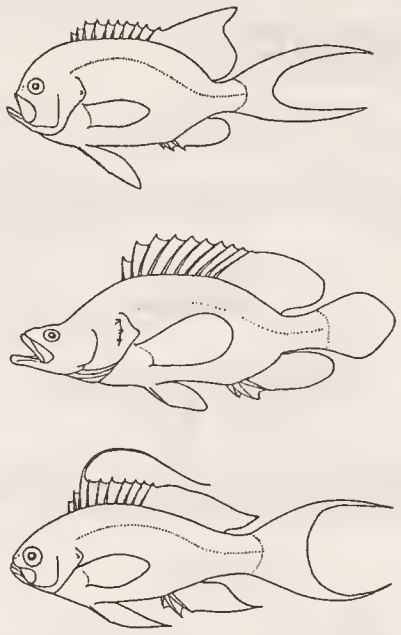
No. 166: SERRANIDAE. D VII-XII,(/)10-19; A III,6-10; maxilla exposed; vomer with teeth; no molars or incisiform teeth; opercle usually with 3 flat spines; no V axillary scale.



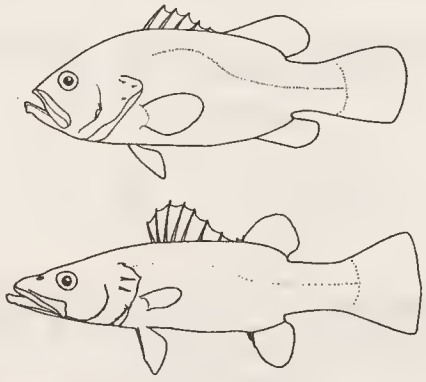




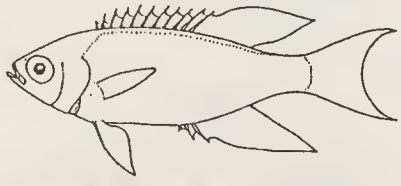
No. 166: SERRANIDAE (cont.)



No. 167: GRAMMISTIDAE. D VII-IX,(+)10-14; A II-III,8-9; upper edge of opercle attached to body; skin with thick bitter-tasting mucus.



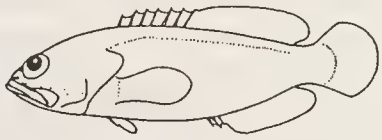
No. 168: CALLANTHIIDAE. D XI,10-11; A III,10; opercle with 1 or 2 flat spines; preopercle smooth; LL runs near base of D, incomplete.



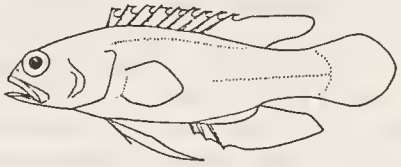
No. 169: PSEUDOCHROMIDAE. D I-III,21-37; A I-III,13-19; D and A spines weak; V I,3-5; LL incomplete or interrupted.

No. 170: ACANTHOCLINIDAE. D XVIII-XX,3-5; A VIII-X,3-5; V I,2.

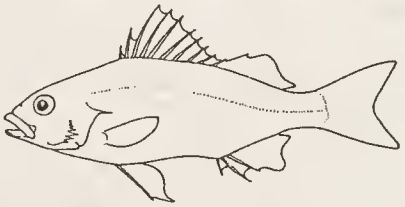
No. 171: PSEUDOGRAMMIDAE. D VI-VIII,19-25; A III,15-24; median fins scaly.



No. 172: PLESIOPIDAE. D X-XIII,6-10; A III,8-9; V I,4; preopercle smooth; no spines on opercle; LL interrupted.

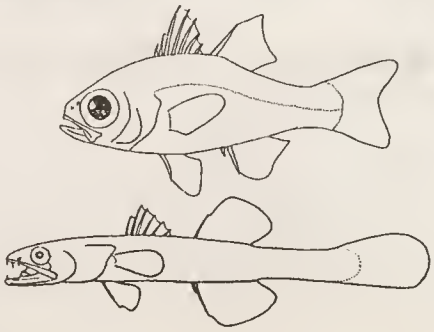


No. 173: TERAPONIDAE. D XI-XIII,9-11; A III,7-10; preopercle serrate; opercle with 2 spines; maxilla not reaching past middle of eye.

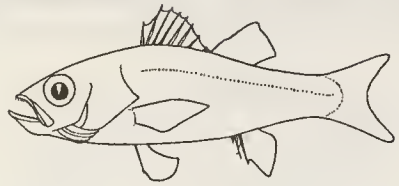


No. 174: PRIACANTHIDAE. D X,10-15; A III,11-16; C branched rays 14; maxilla and lower jaw scaly; no V axillary scale.

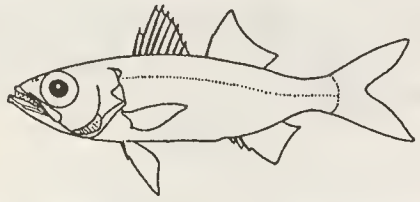
No. 175: APOGONIDAE. D VI-VIII+I,7-14; A II,8-18; usually only 1 spine on opercle.



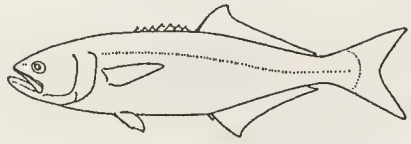
No. 176: ACROPOMATIDAE. D VII-X+(/)I,9-10; A II-III,6-8; 2 or 3 spines on opercle.



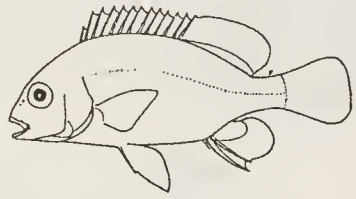
No. 177: SCOMBROPIDAE. D VIII-IX+I,13-14; A III,12-13; scales cycloid; median fins scaly; maxilla scaly, with large supramaxilla.

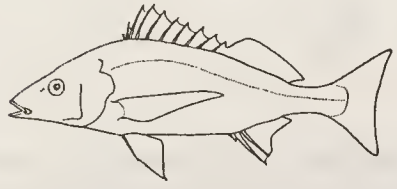


No. 178: POMATOMIDAE. D VII-VIII+I,23-28; A II,23-27; anal fin spines minute, embedded.

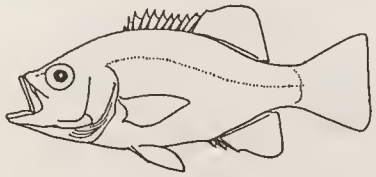


No. 179: HAEMULIDAE. D XI-XIV,13-25; A III,6-13; head scaly except snout and chin; no teeth on roof of mouth; maxilla hidden when mouth is closed; opercle with 1 indistinct point posteriorly

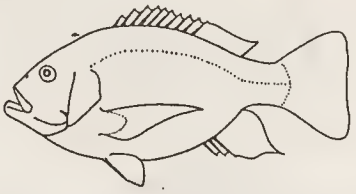


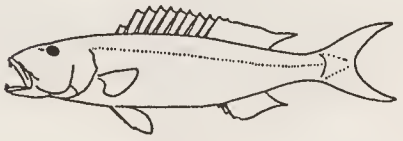


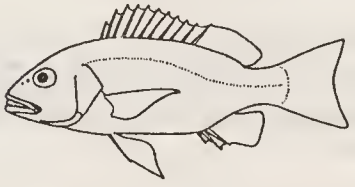
No. 180: DINOPERCIDAE. D X-XI,17-19; A III,13; opercle with 2 acute points posteriorly; median fins scaly; head scaly except snout; vomer and palatines with teeth; no V axillary scale.



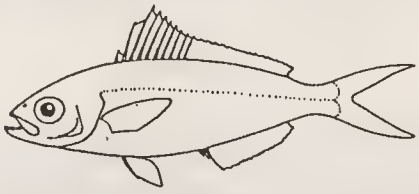
No. 181: LUTJANIDAE. D X-XII,10-17; A III,7-11; scales ctenoid; snout, preorbital and lower jaw naked, cheeks scaly; maxilla mostly covered by preorbital when mouth is closed; premaxilla with a broad-based midlateral process; V axillary scale well developed; opercle with 1 or 2 indistinct points posteriorly.



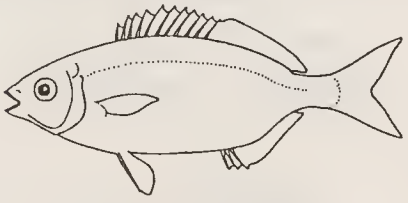


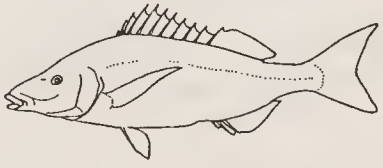


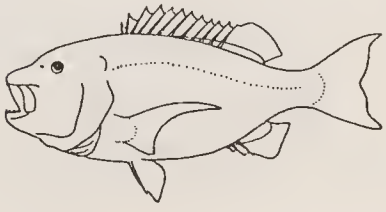
No. 182: CAESIONIDAE. D IX-XII,14-15; A III,11-13; upper jaw protrusile; maxilla naked; premaxilla with 1 or 2 finger-like midlateral processes; V axillary scale well developed.



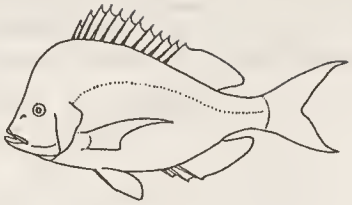
No. 183: SPARIDAE. D X-XIII,8-16; A III,7-15; preopercle smooth; rear end of premaxilla grooved to receive tip of maxilla; teeth conical or incisiform, some species with molars; no teeth on vomer or palatines; opercle with 1 or 2 indistinct points posteriorly.

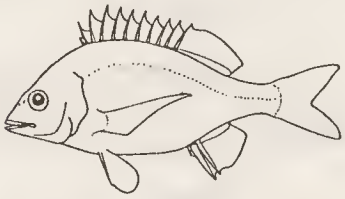




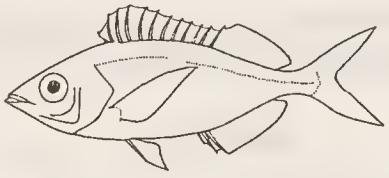


No. 183: SPARIDAE (cont.)

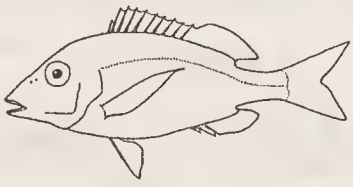


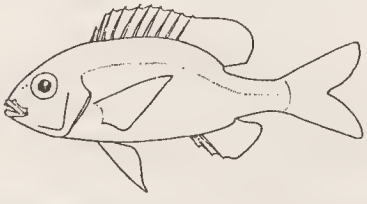


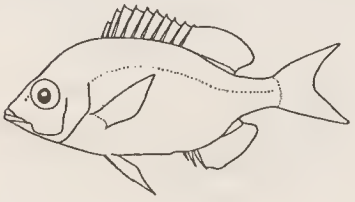
No. 184: CENTRACANTHIDAE. D XI-XII,9-13; A III,7-12; upper jaw highly protusile; no midlateral process on premaxilla; maxilla naked and covered by preorbital when mouth is closed; preopercle smooth; opercle with 1 point posteriorly; V axillary scale well developed.



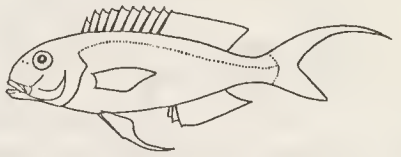
No. 185: LETHRINIDAE. D X,9-11; A III,8-10; preopercle smooth; maxilla naked, hidden by preorbital when mouth is closed; upper jaw protrusile; no midlateral process on premaxilla; no teeth on roof of mouth; opercle with 1 point posteriorly; V axillary scale well developed.

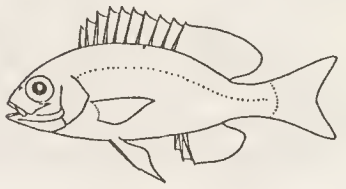




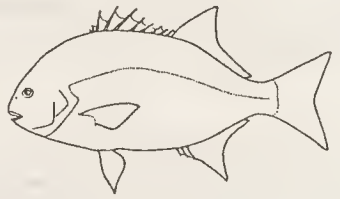


No. 186: NEMIPTERIDAE. D X,9-10; A III,6-7; maxilla mostly covered by preorbital when mouth is closed; premaxilla with a low midlateral process; no teeth on roof of mouth; opercle with 1 point posteriorly; V axillary scale present.

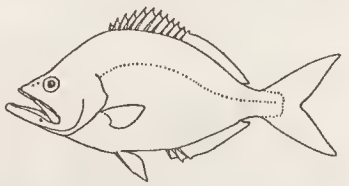




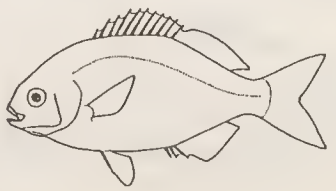
No. 187: CORACINIDAE. D X,18-23; A III,13-14; scales small, ctenoid, covering body and median fins; head scaly except front of snout; jaws with outer row of strong, curved incisors; no teeth on roof of mouth; gill membranes joined to isthmus.



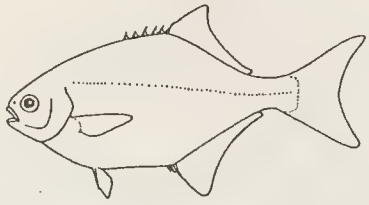
No. 188: PARASCORPIDIDAE. D XI-XII,15-17; A III,13-15; maxilla exposed, scaly, without supramaxilla; jaws with narrow band of minute teeth; GR long and numerous, projecting into mouth; preopercle finely serrate; opercle with a bluntly rounded point posteriorly; no V axillary scale.



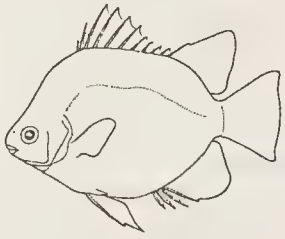
No. 189: KYPHOSIDAE. D X-XI,11-15; A III,11-14; head, body and median fins covered with small, weakly ctenoid scales; maxilla scaly; jaws with an outer row of fixed incisors with long curved roots; microscopic teeth on inner part of jaws and roof of mouth; preopercle weakly serrate; gill membranes separate.



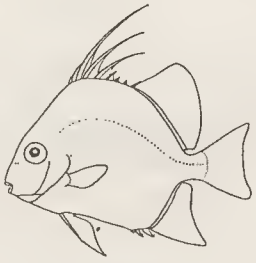
No. I90: SCORPIDIDAE. D VI-VIII,20-22; A III,23-26; head, body and median fins covered with small ctenoid scales; maxilla naked; band of small pointed teeth in jaws, outer teeth enlarged; similar teeth on vomer; preopercle smooth; gill membranes separate.

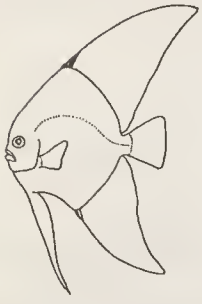


No. I91: SCATOPHAGIDAE. D X/I,15-18; A IV,14-15; scales minute, ctenoid, covering head and body, extending onto median fins, jaws with bands of minute, slender, tricuspid, movable teeth; vomer and palatines edentate; gill membranes united.

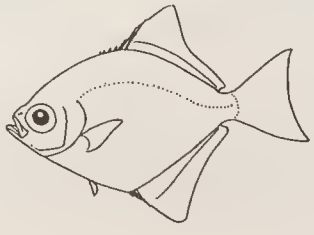


No. I92: EPHIPPIDAE. D V-IX,19-37; A III,15-28; scales small to moderate, ctenoid; operculum and cheek scaly; median fins scaly; jaws with bands of flattened, tricuspid teeth; gill membranes joined to isthmus; preopercle smooth.

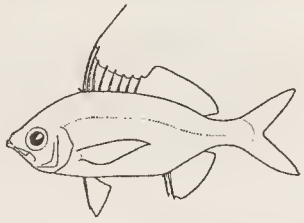




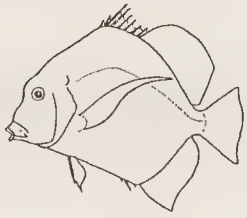
No. I93: MONODACTYLIDAE. D VIII,25-30; A III,25-30; scales small, weakly ctenoid, extending onto median fins and head; maxilla exposed, scaly; jaws with bands of minute teeth; gill membranes separate, not joined to isthmus; V rudimentary or absent in adults.



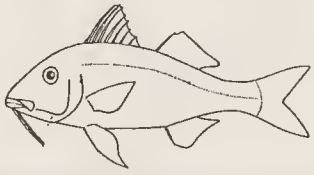
No. I94: GERREIDAE. D IX-X,9-11; A III,7; scales large, cycloid; mouth greatly protrusile, arching downward when protracted; cheeks and operculum scaly; gill membranes separate, free of isthmus.



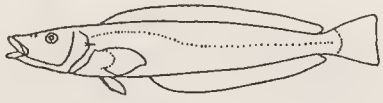
No. I95: DREPANIDAE. D VIII-IX,19-22; A III,17-19; body strongly compressed; scales cycloid; mouth very protrusile, with bands of setiform teeth; gill membranes joined to isthmus.

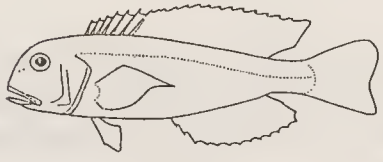


No. I96: MULLIDAE. D VII-VIII+I,8; A I,6-7; a pair of long barbels on chin; mouth protrusile.

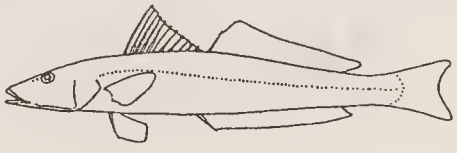


No. I97: MALACANTHIDAE. D VI-X,13-16 or D I-IV,43-60; A II,11-12 or A I,37-53; body oblong, somewhat compressed or elongated and subcylindrical; scales on body mostly ctenoid; opercle with a spine posteriorly.

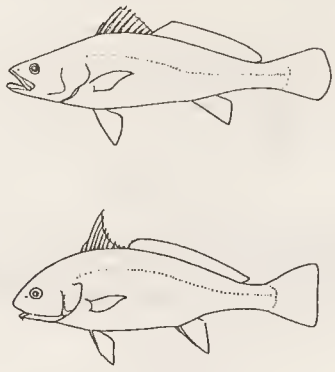




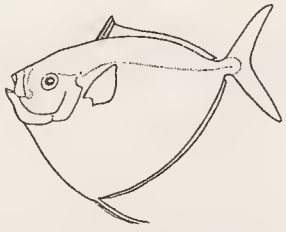
No. I98: SILLAGINIDAE. D X-XII+I,18-23; A II,17-28; scales ctenoid, rather deciduous; maxilla covered by preorbital; fine teeth in bands on jaws and vomer; opercle with a small sharp spine.



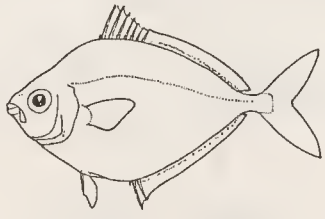
No. 199: SCIAENIDAE. D IX-XI/I,23-31; A II,6-9; scales cycloid or ctenoid, covering head and body and extending onto median fins; LL extends to end of C; no teeth on vomer or palatines.



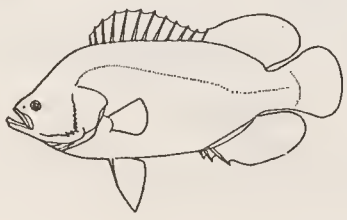
No. 200: MENIDAE. D III-IV,40-45; (spines lost with age); A 30-33; body extremely compressed, disc-like, breast sharp; scales minute, deciduous, barely visible; mouth protrusile; first 2 V rays elongated.



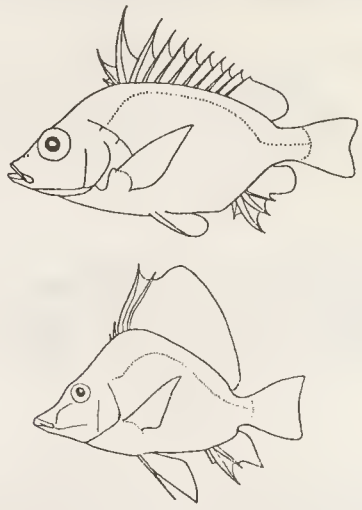
No. 201: LEIOGNATHIDAE. D VII-IX,15-17; A III,13-15; body compressed, slimy; scales inconspicuous; mouth greatly protrusile; gill membranes united with isthmus.



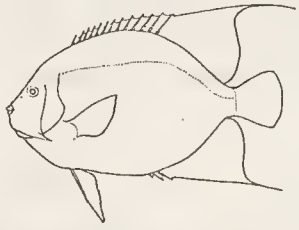
No. 202: LOBOTIDAE. D XI-XII,15-16; A III,11-12; scales moderate, ctenoid, covering head except preorbital region and jaws; jaws with bands of small slender teeth; vomer, palatines and tongue toothless; preopercle coarsely serrate; gill membranes narrowly united, free from isthmus.



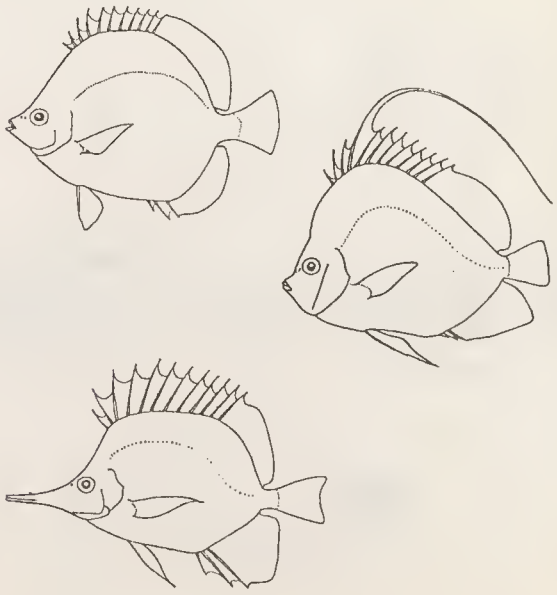
No. 203: PENTACEROTIDAE. D IV,25-27 or XII-XV,8-13; A III-VI,7-10; head bones mostly exposed, rugose, covered with small spines and knobs in young; scales ctenoid, small to moderate.



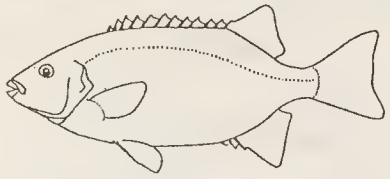
No. 204: POMACANTHIDAE. D XI-XV,15-25; A III-IV,16-23; scales with ridges ending in sharp points; preopercle serrate, with a strong spine at the angle; mouth with bristle-like, generally tricuspid teeth; gill membranes joined to isthmus.



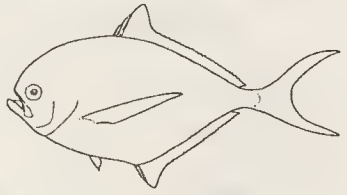
No. 205: CHAETODONTIDAE. D XI-XVII,14-28; A III-IV,14-23; scales finely ctenoid (smooth); preopercle smooth or finely serrate, but no large spine at the angle; mouth with band of bristle-like teeth; gill membranes free from or joined to isthmus.

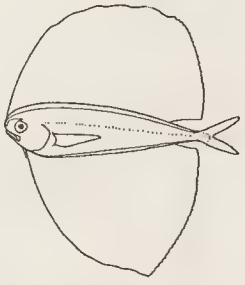


No. 206: OPLEGNATHIDAE. D XI-XII,11-24; A III,11-17; body somewhat compressed, covered with minute ctenoid scales; teeth fused to form a strong parrot-like beak.

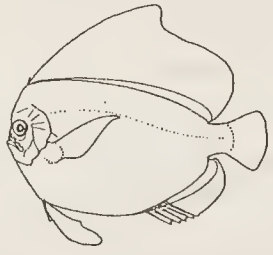


No. 207: BRAMIDAE. D spines + rays 31-57; A spines + rays 22-50; D and A spines not clearly differentiated from the soft-rays; scales moderate to large; cheeks, operculum and maxilla scaly; preopercle coarsely serrate in young, smooth in adults.

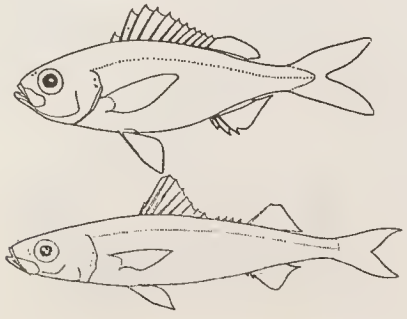




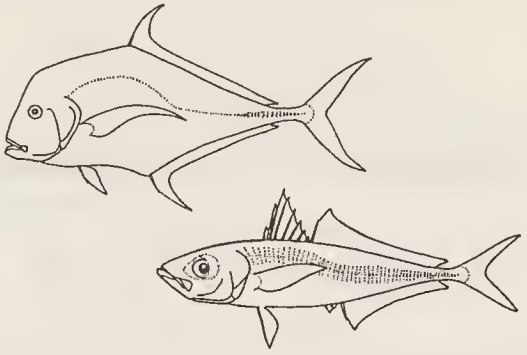
No. 208: CARISTIIDAE. D 28-36; A 17-22; D and A spines not clearly differentiated from the soft-rays; body strongly compressed; scales thin, deciduous; bases of D and A covered by a wide, thin skin flap; V fold into a groove along ventral edge of body.

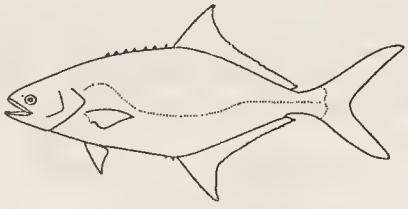


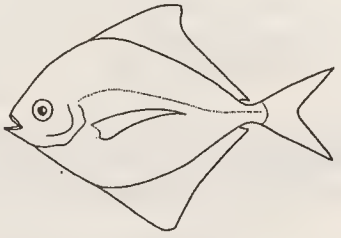
No. 209: EMMELICHTHYIDAE. D XII or X/I,10-12 or X+I+I+I, 9-11; A III,9-10; upper jaw greatly protrusile; maxilla wide, scaly, not covered by preorbital when mouth is closed; teeth rudimentary or absent; GR long and numerous.

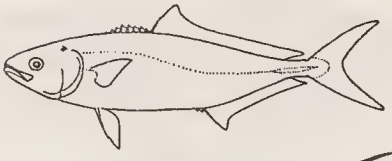


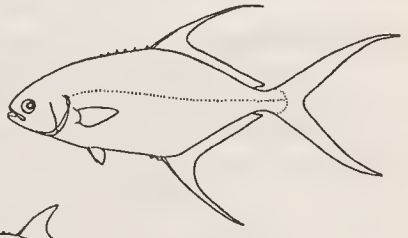
No. 210: CARANGIDAE. D IV-VIII+I,18-44; A I-II+I,15-39; body elongate, fusiform to deep and strongly compressed; scales small, sometimes difficult to see, cycloid; gill membranes separate, not joined to isthmus; opercular bones smooth.

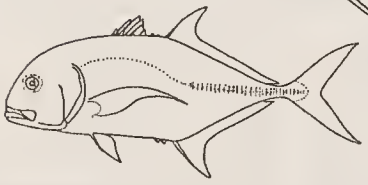




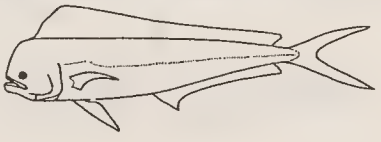






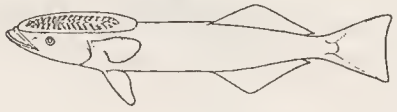


No. 211: CORYPHAENIDAE. D 52-67; A 23-30; body compressed; scales small, cycloid; band of small teeth on jaws, vomer, palatines and tongue.

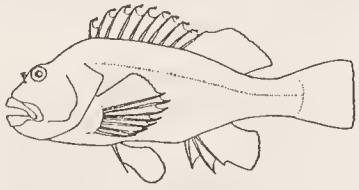


No. 212: RACHYCENTRIDAE. D VII-IX+I,33-36; A II-III,22-28; body sub-cyclindrical; head broad, depressed; scales minute, embedded in thick skin; band of minute teeth on jaws, roof of mouth and tongue.

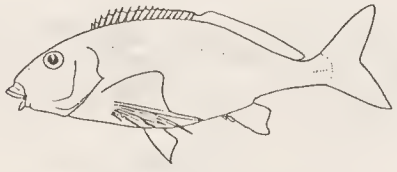
No. 213: ECHENEIDAE. D 22-42; A 21-38; a laminated sucking disc on top of head.



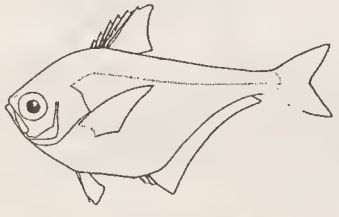
No. 214: CIRRHITIDAE. D X,11-17; A III,5-7; lower 5-7 P rays unbranched, usually enlarged, with membranes deeply incised; fringe of cirri on front nostrils; scales cycloid; no swimbladder; 1 or more cirri at tips of D spines; preopercle smooth, no spines on head.



No. 215: CHEILODACTYLIDAE. D XVI-XX,19-31; A III,7-10; lower 4-7 P rays, simple, thickened; V origin well behind P base; scales cycloid; preopercle smooth; no spines on head.

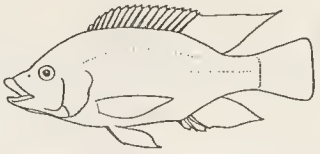


No. 216: PEMPHERIDAE. D V-VI,8-10; A III,20-23 or III,36-45; body compressed; snout naked, rest of head, maxilla and lower jaw scaly; small conical teeth on jaws, vomer and palatines; gill membranes separate, free of isthmus.

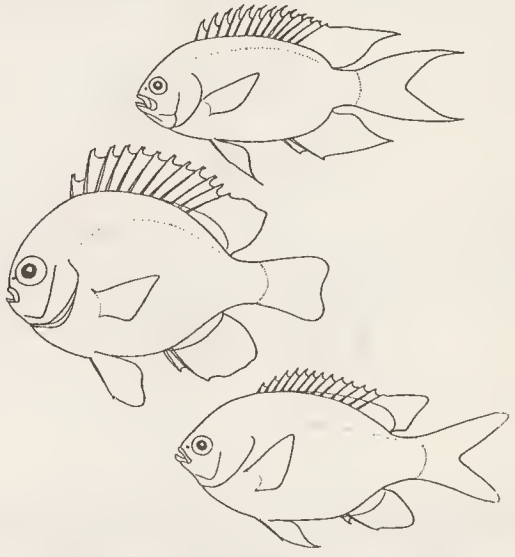


No. 217: BATHYCLUPEIDAE. D 10; A I,27; V minute, in advance of P, with 1 weak spine and 5 rays; scales cycloid, deciduous; villiform teeth on jaws, vomer and palatines; gill membranes separate, free of isthmus.

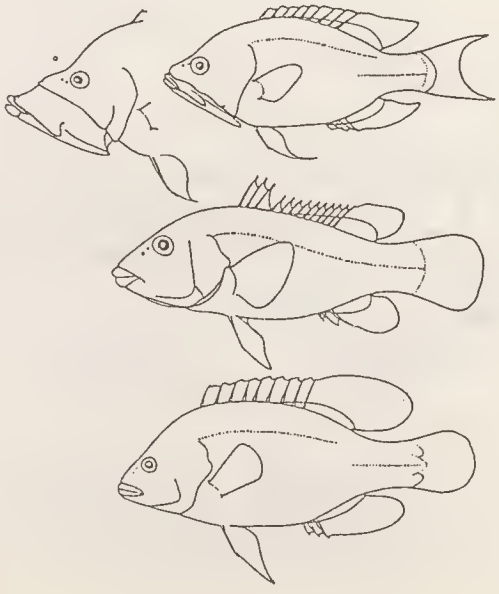
No. 218: CICHLIDAE. D XV-XVII,10-13; A III,7-10; body with moderate cycloid scales; only 1 nostril on each side of snout; LL interrupted; lower pharyngeal bones (5th ceratobranchials) fused into a single unit.



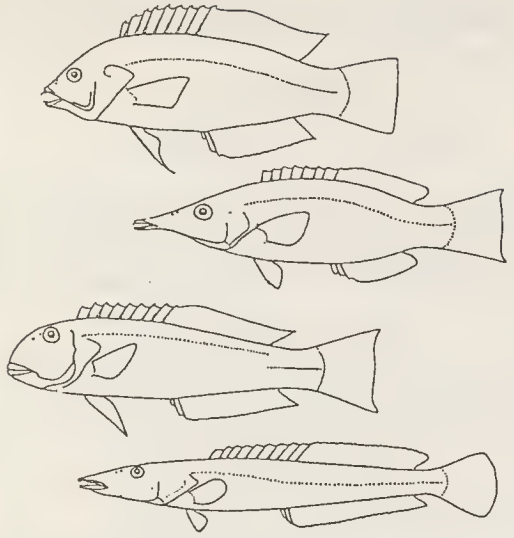
No. 219: POMACENTRIDAE. D VIII-XIV,9-20; A II,9-17; body with moderate ctenoid scales; only 1 nostril on each side of snout; LL interrupted; lower pharyngeal bones (5th ceratobranchials) fused into a single unit.



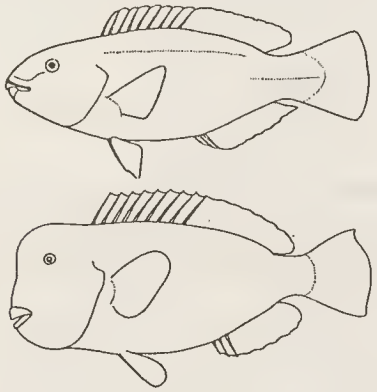
No. 220: LABRIDAE. D VIII-XIII,7-14; A II-III,8-14; body oblong to elongate, with small to large cycloid scales; lower pharyngeal bones (5th ceratobranchials) fused into a single unit, with conical, nodular or molariform teeth; nostrils small, paired; mouth slightly to greatly protrusile.



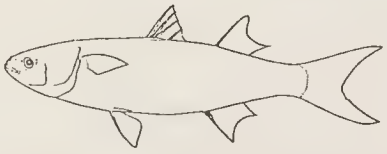
No. 220: LABRIDAE (cont.)



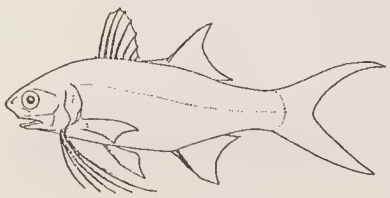
No. 221: SCARIDAE. **D** IX,10; **A** III,9; **D** and **A** spines slender, often flexible; scales large, cycloid; teeth of most species fused to form beak-like dental plates separated by a median suture (*Calatomus*, with 2 species in our area, have a bony ridge in the jaws covered with flattened imbricate teeth); nostrils small, paired; lower pharyngeal bones (5th ceratobranchials) fused into a single unit with a pavement of molariform teeth.



No. 222: MUGILIDAE. **D** IV+I,7-9; **A** III,8-9; scales cycloid or feebly ctenoid; no LL; teeth villiform or absent.

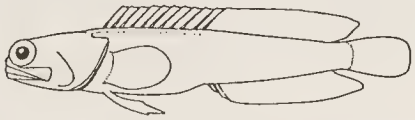


No. 223: POLYNEMIDAE. **D** VIII+I,12-14; **A** II-III,11-13; lower 5-8 **P** rays free, filamentous; snout projecting in front of mouth; adipose eyelid well developed; scales weakly ctenoid; LL extending onto **C**; villiform teeth on jaws and palatines.

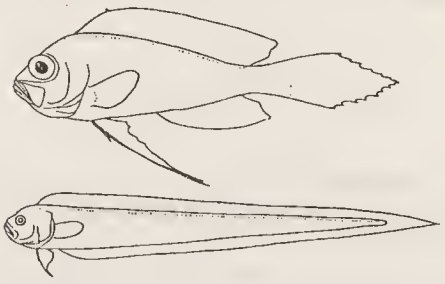


No. 224: SPHYRAENIDAE. **D** V+I,8-9; **A** II,8-10; scales small, cycloid; teeth large, sharp, flattened or conical, of unequal size on jaws and palatines; LL well developed; **V** well behind **P**; **P** much shorter than head.

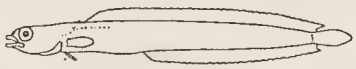
No. 225: OPISTOGNATHIDAE. **D** XI,13-16; **A** III,13-15; **D** and **A** spines weak; **V** origin anterior to **P** base; scales cycloid; LL high on body, ending below middle of **D**; LL tubes embedded in skin, not on scales.



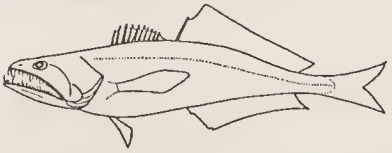
No. 226: CEPOLIDAE. **D** 82-89 or **D** III,21-22; **A** 91-102 or **A** I,13-14; median fins separate or continuous; scales cycloid; LL high on body, incomplete.



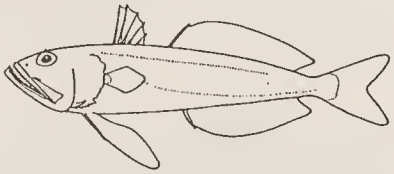
No. 227: CONGROGADIDAE. **D** I-II,42-63; **A** 32-43; **V** rudimentary (I,2 or I,3) or absent; branched **C** rays 10; scales cycloid, small.



No. 228: CHIASMODONTIDAE. **D** IX-XIII+18-29; **A** I,17-29; body naked or with numerous, small, projecting spinules, or with 2 or more rows of larger, stout, projecting prickles; long teeth on jaws and palatines.

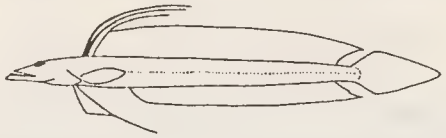


No. 229: CHAMPSODONTIDAE. **D** IV-V,19-21; **A** 17-19; **V** large, inserted in front of the small **P**; scales very small and rough; long, dagger-like spine at angle of preopercle.

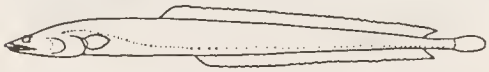


No. 230: URANOSCOPIDAE. **D** III-V+13 or **D** 9-10; **A** 10-14; body thick anteriorly, compressed posteriorly; head massive, flattened dorsally with bones exposed; **V** on isthmus, with 1 short spine and 5 rays.

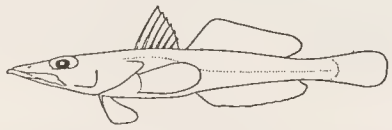
No. 231: TRICHONOTIDAE. **D** 45-47; **A** 37-39; branched **C** rays 11 or 12; scales cycloid; LL continuous; small sharp teeth on jaws, vomer and palatines; gill membranes separate, not joined to isthmus.



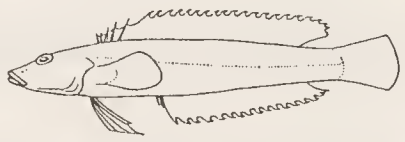
No. 232: CREEDIIDAE. **D** 22-25 or **D** 36-40; **A** 26-28 or **A** 33-40; **V** absent or **V** I,4-5; row of cirri along lower lip; principal **C** rays 11-12, branched rays 8; minute villiform teeth on jaws.



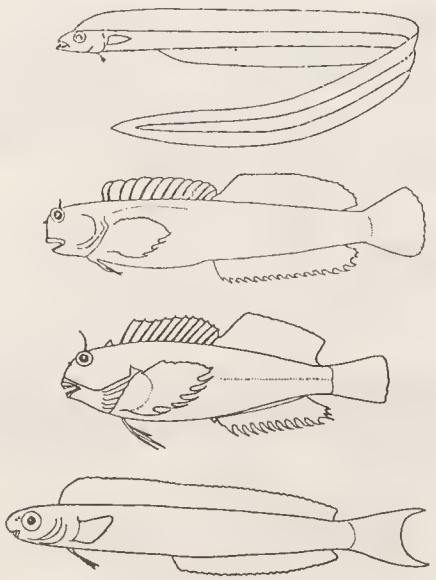
No. 233: PERCOPHIDAE. **D** VI+14-15 or IV-VI,19-22; **A** 15-16 or 23-25; **V** with 1 weak spine and 5 branched rays, their bases well separated; 7-13 branched **C** rays.



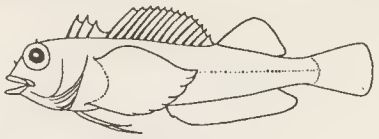
No. 234: MUGILOIDIDAE. **D** IV-V,19-24; **A** I,16-19; branched **C** rays 15; scales small to moderate, ctenoid; maxilla mostly covered by preorbital; opercle with a stout spine posteriorly.



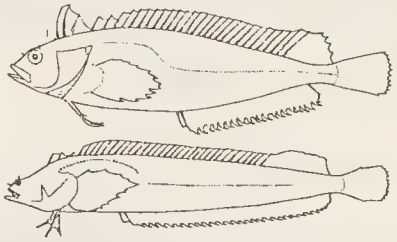
No. 235: BLENNIIDAE. **D** VII-XVII,11-37 (*Xiphasia* with 97-119 segmented **D** & **A** rays); **A** I-II,12-33, **D** & **A** spines weak, flexible; **V** with hidden spine and 1-4 segmented rays; fin rays unbranched, except some **C** rays in certain species; scales absent; segmented **C** rays 10-15.



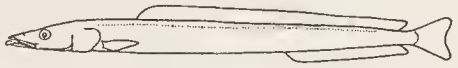
No. 236: TRIPTERYGIIDAE. **D** III-IV/XI-XV+8-12; **A** I-II,16-22; **V** with a hidden spine and 2 segmented rays; body with ctenoid scales; head and belly scaly in some species; branched **C** rays 11, segmented **C** rays 13.



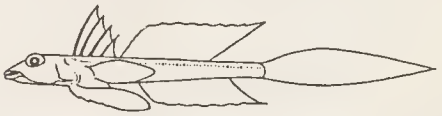
No. 237: CLINIDAE. **D** XXIV-L,0-14; **A** II,14-43; **V** I,2-3; **C** 11-13; all fin rays simple (unbranched); viviparous, males with a fleshy penis; scales cycloid, embedded, usually inconspicuous, rarely absent.



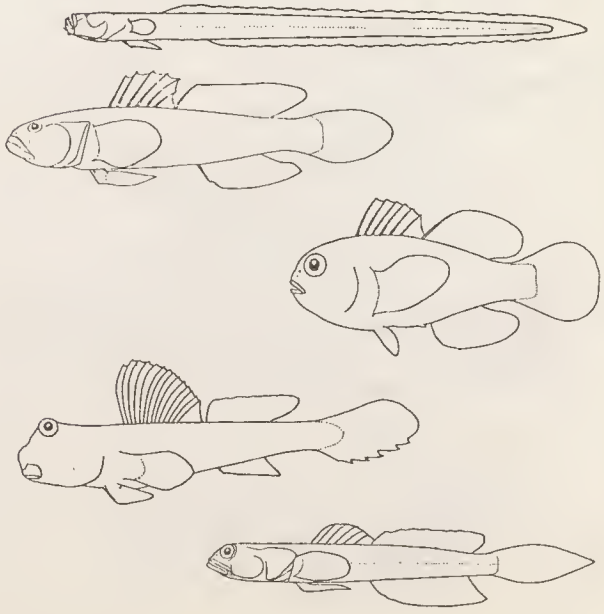
No. 238: AMMODYTIDAE. **D** 49-54; **A** 23-27; **V** absent; branched **C** rays 13; body completely covered with small cycloid scales or mostly naked; teeth absent.



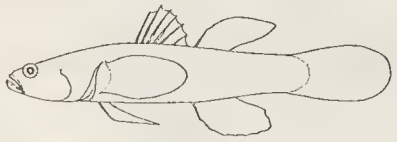
No. 239: CALLIONYMIDAE. **D** IV,7-10 or **D** I+11; **A** 6-12; scales absent; upper jaw greatly protrusile; preopercle with stout spine; opercle and subopercle spineless; gill opening a small pore.



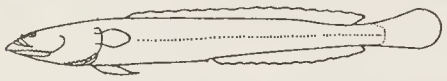
No. 240: GOBIIDAE. **D** VI+I,5-37 or VI+6-7 or VI+14-15 or V-VI, 27-51 or VII-XV+I,10-11 or XIV-XVII+1I; **A** 0-I,5-19 or I, 27-30 or **A** 30-51; **V** I,4-5 separate or united to form a disc; branchiostegal rays 5; scales cycloid, ctenoid, or absent; **D** & **A** spines weak, flexible.



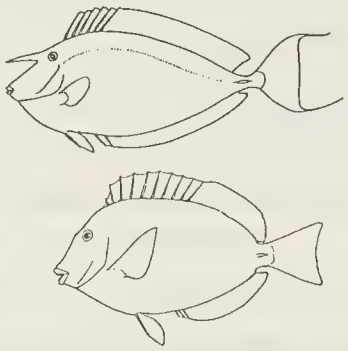
No. 241: ELEOTRIDAE. D VI-X+I,6-15; A I,6-I2; V I,5 widely separated, not connected by membranes; branchiostegal rays 6; scales cycloid or ctenoid; D & A spines weak, flexible.



No. 242: KRAEMERIIDAE. D IV-V,13-17; A I,11-14; V separate or connected, but not forming disc; C segmented rays I1; no scales.

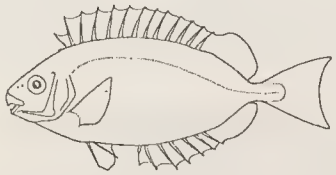


No. 243: ACANTHURIDAE. D IV-IX,19-33; A III,18-31; V I,3-5; body compressed; each side of C peduncle with a sharp spine folding into a groove or 1 or 2 bony plates (which bear sharp keels in adults); scales minute, ctenoid.

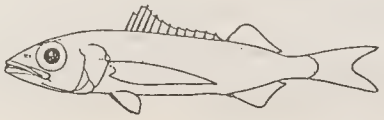


No. 244: ZANCLIDAE. D VI-VII,39-42; A III,3I-37; body strongly compressed; scales minute, rough

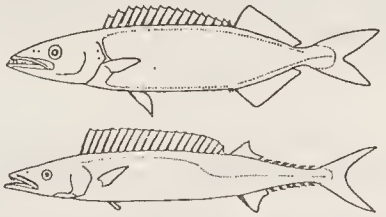
No. 245: SIGANIDAE. D XIII,I0; A VII,9; V I,3,I, with an inner and outer spine separated by 3 soft-rays.



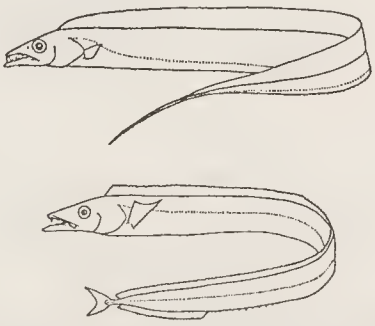
No. 246: SCOMBROLABRACIDAE. D XII/15-16; A II-III,I6-18; V I,5, well developed; body compressed; LL single.



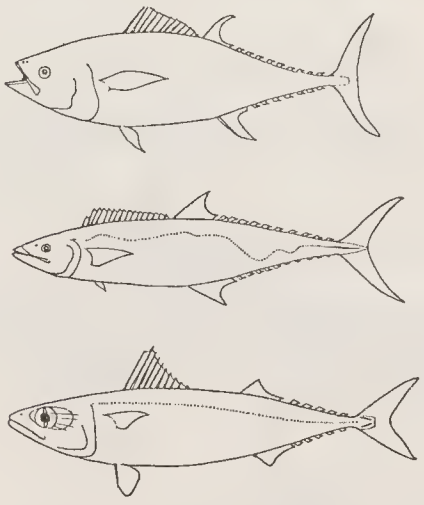
No. 247: GEMPYLIDAE. D VIII-XXXIX/0-II,10-42; total D spines + rays 30-72; A 0-III,8-34; V I,0-5 or absent; C well developed; 2 nostrils on each side of snout; LL single or double.



No. 248: TRICHIURIDAE. Total D spines +rays 97-153; total A spines +rays 45-110; V reduced to a scale-like spine or completely absent; A low, or reduced to embedded short spinules; C small or absent; single nostril on each side of snout; LL single; scales absent.

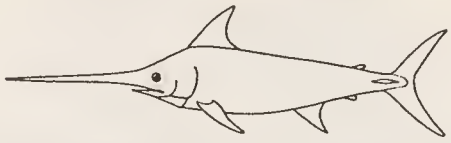


No. 249: SCOMBRIDAE. D IX-XXVII+9-21+5-10 finlets; A 0-I+11-22 +5-10 finlets; C lunate, the rays completely covering hypural plate; 2 or 3 keels on each side of C peduncle.

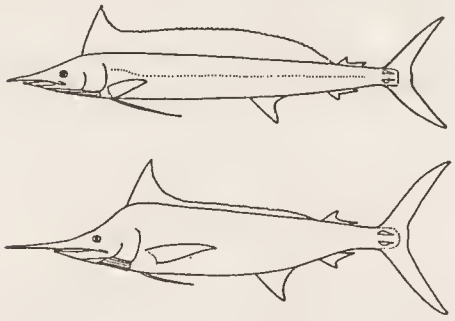


No. 250: LUVARIDAE. D 11-23; A 14-18; fewer D & A rays with growth; V rudimentary or absent; body compressed, covered with minute granular scales; nostrils single; anus below P base, covered by scale-like V remnants in adults.

No. 251: XIPHIIDAE. Upper jaw elongated, forming a flat, bony sword; juveniles with continuous long-based **D**; adults with short, high first **D** well separate from tiny second **D**; **V** absent; **C** peduncle (of adults) with a single keel on each side; teeth and scales absent in adults.

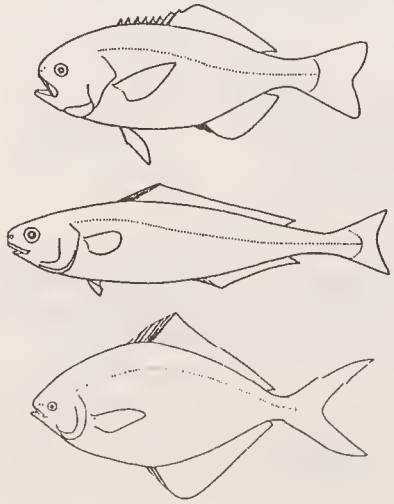


No. 252: ISTIOPHORIDAE. Upper jaw elongated, forming a rounded, bony, spear-like bill; first **D** base longer than height of fin; **V** slender filaments, folding into a groove on belly; 2 keels on each side at base of **C**; body with small elongated scales.

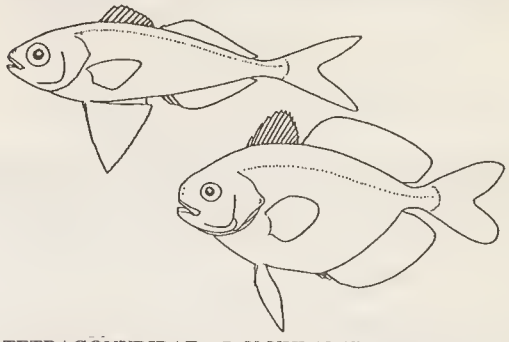


No. 253: AMARSIPIDAE. **D** X-XII/22-27; **A** I,27-32; **V** on isthmus, with 1 short spine and 5 weak rays; body soft, compressed, translucent; **D** & **A** spines weak; maxilla mostly exposed; one row of strong teeth in jaws and a few similar teeth on vomer; scales tiny, deciduous.

No. 254: STROMATEIDAE. Total **D** spines +rays 27-65; **A** II-III,15-38; **D** & **A** spines distinct in some species, weak and similar to the soft-rays in other species; body deep to elongate; **V** absent in some species; one row of small conical or flattened teeth on jaws; no teeth on roof of mouth or tongue; scales moderate to small, deciduous, extending onto median fins.



No. 255: NOMEIDAE. **D** IX-XII/I,13-31; **A** I-III,13-31; first **D** folds into a groove; **D** & **A** spines weak; body deep and compressed to elongate and cylindrical; **V** well developed.



No. 256: TETRAGONURIDAE. **D** X-XXI,10-17; **A** I,9-15; **C** peduncle square in cross-section; mouth box-like; maxilla covered by preorbital; teeth small, slender, curved in upper jaw, large, flattened and knife-like in lower jaw; scales moderate, with heavy keels, adherent.

Family No. 162: CAPROIDAE

by P.C. Heemstra

Boarfishes **Beervisse**

Body strongly compressed, discoid, with small ctenoid scales. Mouth small; upper jaw protrusile; bands of small teeth on jaws, none on vomer or palatines. Single dorsal fin with 8 or 9 spines and 25-30 soft-rays; anal fin with 3 spines and 25-27 soft-rays; dorsal and anal fin rays branched. Pelvic fins with 1 strong spine and 5 soft-rays. Caudal fin truncate, with 10 branched rays. Pectoral fins longer than pelvics, slightly shorter than head, with 13 rays. Cheeks and operculum with distinct scales. Gill membranes free from isthmus; branchiostegal rays 6. Vertebrae 9+12.

Moderate-sized fishes (to about 22 cm total length) in tropical and temperate waters of all oceans. Boarfishes live near the bottom in depths of 50 - 600 m; the larvae are pelagic. Two genera; *Capros* Lacepède, 1802 is monotypic; *C. aper* (Linnaeus, 1758) is common in the North Atlantic and Mediterranean. *Antigonia* Lowe, 1843 comprises about 5 valid species (Berry, 1959); 1 species occurs in our area.

162.1 *Antigonia rubescens*

(Günther, 1860)

PLATE 31

Boarfish Beervis

Hypsinotus rubescens Günther, 1860: 63 (Japan). *Antigonia rubescens:* Smith, **SFSA No. 579***.

D IX,26-30; A III,25-27; P 13; LL difficult to count; GR 4+13. Body depth 1.0-1.2 in SL, more than twice head length. Mouth horizontal; eye diameter about twice snout length.

Body pale orange, with 2 oblique pale reddish bars. Attains 15 cm. Indo-West Pacific from Natal to Japan in 50 - 600 m.

Family No. 163: AMBASSIDAE

by P.C. Heemstra & T.J. Martin

Glassies **Glasvisse**

Body oblong, compressed. Dorsal fin deeply divided before last spine, with 7 or 8 spines and 8-11 soft-rays; anal fin with 3 spines and 8-11 soft-rays; last dorsal and anal rays split to their base. Dorsal and anal fins naked, but with low scaly sheath. Caudal fin forked, with 15 branched rays. Scales thin, cycloid, deciduous. Lateral line complete or interrupted. Head bones variously serrate or not; opercle ending in a membranous flap. Maxilla naked; no supramaxilla. Gill membranes separate; branchiostegals 6. Small teeth on jaws, vomer and palatines. Gill-rakers well developed. Vertebrae 10+14. Swimbladder present.

Small, translucent, silvery fishes of shallow tropical waters throughout the Indo-West Pacific region; common in estuaries. Not of commercial importance, but useful as bait. Several genera, 1 in our area.

Genus ***Ambassis*** Cuvier, 1828

Scales in longitudinal series 25-30; 1 or 2 rows of cheek scales. Several species; 3 (possibly 4) in our area.

KEY TO SPECIES

1a LL interrupted; predorsal scales 13-16; preorbital bone with exposed, posteriorly directed rostral spine below anterior nostril ..... *A. gymnocephalus*

1b LL more or less continuous; no exposed rostral spine 2

2a Hind edge of preopercle serrate; 2 or 3 rows of cheek scales 3

2b Hind edge of preopercle entire; 1 row of cheek scales; 1 or 2 supraorbital spines; 8-10 predorsal scales; preopercle ridge serrate ..... *A. commersoni* Cuvier, 1828 (Reported from Seychelles; may occur in our area)

3a Preopercle ridge smooth except for 2-4 spines posteriorly; predorsal scales 9-11; band of villiform teeth on vomer and palatines ..... *A. natalensis*

3b Preopercle ridge completely serrate; predorsal scales 14-18; 1 row of minute teeth on vomer and palatines ..... *A. productus*

163.1 *Ambassis gymnocephalus*

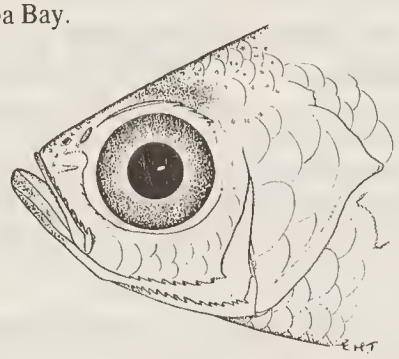
(Lacepède, 1801)

Bald glassy Kaalkop-glasvis

Lutjanus gymnocephalus Lacepède, 1801: Pl. 23, Fig. 3, 1802: pp. 181, 216 (Indo-Pacific). *Ambassis gymnocephalus:* Smith, **SFSA No. 637;** Hill, 1966: 22; Winterbottom, 1976: 62.

D VI-VII/I,8-10; A III,8-10; P 14-15; LL 27-29 interrupted; predorsal scales 13-16; GR (8-10)+(22-25); 2 rows of cheek scales. Depth 2.6-2.9, head 2.7-2.9 in SL; eye 3.1-3.4 in head. Supraorbital spines 1-5 (usually 3 or 4); lower edge and angle of preopercle serrate; dorsal ⅔ of vertical preopercle edge smooth; preopercle ridge completely serrate along lower limb; a large retrorse spine on preorbital just below anterior nostril; preorbital ridge smooth or serrate; interopercle smooth except for 1 or (rarely) 2 small spines. A row of minute teeth on vomer, palatines and tongue.

Attains 10 cm. Tropical waters of Indian Ocean, Indonesia and Philippines; extends south on our coast at least to Algoa Bay.



163.1 *Ambassis gymnocephalus:* head of 3.5 cm SL specimen (Natal).

163.2 *Ambassis natalensis*

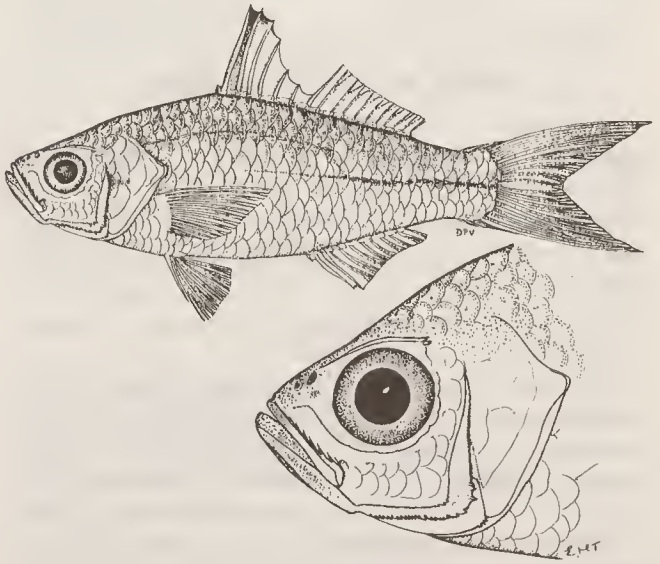
Gilchrist & Thompson, 1908

PLATE 44

Slender glassy Slank glasvis

Ambassis natalensis Gilchrist & Thompson, 1908: 148 (Durban Harbour); Wallace, 1975: 15; Blaber, 1978: 34, 40. *Ambassis safgha:* Smith, **SFSA No. 634;** Hill, 1966: 23; Day, 1974: 95. ?*Ambassis urotaenia:* Smith, **SFSA No. 636.**

D VII/I,9-11; A III,9-11; P 14-15; LL 27-29; predorsal scales 9-11; GR (8-9)+(19-22); 2 rows of cheek scales. Depth 2.5-2.8, head 2.8-3.0 in SL; eye 3.1-3.6 in head. Supraorbital spines 1-4; vertical and lower edge of preopercle serrate; preopercle ridge smooth except for 2 to 4 spines



163.2 *Ambassis natalensis:* 9.5 cm and head of 5.5 cm SL specimen (both Natal).

posteriorly; preorbital ridge entire or serrate; interopercle with 1-4 tiny spines posteriorly. Band of villiform teeth on jaws, vomer and palatines.

Attains 9 cm. Natal south to Umtata River; reported from east Africa.

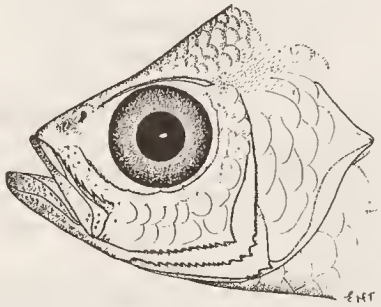
163.3 *Ambassis productus*
Guichenot, 1866

Longspine glassy — Langstekel-glasvis

Ambassis productus Guichenot, 1866: 130 (Madagascar). *Ambassis commersoni* (*non* Cuvier): Smith, **SFSA No. 635***; Hill, 1966: 22; Day, 1974: 95; Blaber, 1978: 34, 40.

D VII/I,9-10; A III,9-11; P 14-15; LL 28-29; predorsal scales 14-18; 2 or 3 rows of cheek scales; GR (8-10)+(20-23). Depth 2.3-2.8, head 2.5-2.6 in SL; eye 3.1-3.7 in head. Supraorbital with 1 spine; vertical and lower edges of preopercle serrate; preopercle ridge serrate; preorbital and suborbital ridges serrate or entire; interopercle with 3-7 serrae. Band of minute teeth in upper jaw, 2 rows in lower jaw, 1 row on palatines, and a discontinuous series on vomer.

Attains 15 cm. Madagascar and east African coast to at least southern Natal.



163.3 *Ambassis productus:* head of 7.5 cm SL specimen (Natal).

Family No. 164: KUHLIIDAE

by M.M. Smith

Flagtails — **Vlagsterte**

Elongate-oval body with moderate ctenoid scales; mouth with fine teeth in jaws in bands, and on vomer; palatines toothed in *Kuhlia,* toothless in *Parakuhlia;* tongue toothless; preopercle serrate; opercle with 2 spines; fin spines strong, a notch before soft dorsal.

Small fishes of shallow tropical waters of the eastern Atlantic, Indian and Pacific oceans, commonly found in freshwater and estuaries. Externally resemble freshwater sunfishes (Centrarchidae) of North America. Previously known as Duleidae. Two genera; *Parakuhlia macrophthalmus* (Osorio, 1894) occurs along the west coast of Africa to southern Angola and may be found in our area; it has D XII,15-16, while our species have D X,9-12.

Genus *Kuhlia* Gill, 1861

Previously known as *Dules* Cuvier, 1829, but this genus is found to refer to a serranid fish; preorbital serrate; contains about 6 species, 2 in our area.

KEY TO SPECIES

1a C with 5 dark oblique stripes; 23-26 GR on lower limb; LL 48-56 ..... *K. mugil*
1b C without 5 dark stripes; 16-19 GR on lower limb; LL 38-44 ..... *K. rupestris*

164.1 *Kuhlia mugil*
(Schneider, 1801)
PLATE 32

Barred flagtail — Bontstertjie

Sciaena mugil Schneider, *in* Bloch & Schneider, 1801: 541 (Tahiti). *Dules taeniurus:* Smith, **SFSA No. 412***; Smith & Smith, 1966: 104*. *Kuhlia mugil:* Smith, 1980: 176. *Kuhlia taeniurus:* van der Elst, 1981: 184*.

D X,9-11; A III 9-11; P 14; GR 12+(23-26); LL 48-56; C covered by small scales, larger basally; interorbital scaleless, about equals eye.

Spawn throughout the year off Natal coast; use tidepools as nursery areas. Flagtails are not at all shy of humans; nocturnal predators on crustaceans and small fishes, but in the daytime shoal in shelter of reefs. A good bait or aquarium fish, reaches 20 cm; abundant throughout Indo-Pacific from Galapagos to Africa, south to Cape Agulhas.

164.1 *Kuhlia mugil:* 12 cm (Transkei).

164.2 *Kuhlia rupestris*
(Lacepède, 1802)
PLATE 44

Rock flagtail — Klip-vlagstert

Centropomus rupestris Lacepède, 1802: 252 (Réunion). *Dules rupestris:* Smith, **SFSA No. 413.** *Kuhlia rupestris:* Smith, 1980: 176.

D X,10-12; A III 9-10; P 13-14; GR (5-6)+(16-19); LL 38- 44.

In sea adults more silvery, in freshwater most scales with a large dusky spot; juveniles often with oblique blackish blotch on each C lobe merging with growth to give broad vertical bar in adults. Reported to reach 2.7 kg; attains 45 cm; Indo-Pacific south to Durban. Good eating.

164.2 *Kuhlia rupestris:* 10 cm (Natal).

Family No. 165: POLYPRIONIDAE

by P.C. Heemstra

Wreckfishes **Wrakvisse**

Body oblong, somewhat compressed, covered with small, strongly ctenoid scales; head, except for snout, also scaly. Dorsal fin with 11 or 12 spines and 11 or 12 soft-rays; anal fin with 3 spines and 9 or 10 soft-rays; pectoral fins shorter than pelvics; caudal fin truncate (rounded in juveniles). Maxilla exposed, scaly, with well-developed supramaxilla; teeth villiform, in bands on jaws, vomer, palatines and tongue. Opercle with distinct horizontal ridge ending in a short spine; preopercle with large spines in juveniles, serrate in adults.

Two or 3 genera; 1 genus represented in our area. The family diagnosis is based solely on *Polyprion*.

Genus ***Polyprion*** Cuvier, 1816

Large fishes of moderately deep water, commonly found on rough, rocky bottom and around wrecks; occasionally taken by trawlers. Excellent eating. Three or 4 species, probably only 1 species in our area.

165.1 *Polyprion americanus*
(Schneider, 1801)
PLATE 32

Wreckfish Wrakvis

Amphiprion americanus Schneider, *in* Bloch & Schneider, 1801: 205, Pl. 47 (labelled *Amphiprion australis*). *Polyprion americanus:* Smith, **SFSA No. 453*;** Penrith, 1967: 532.

D XI-XII,11-12; A III,9-10; P 17-18; LL 69 (78-90 given by Barnard, 1927); GR (7-8)+(8-14) including rudiments, lower-limb developed rakers 6-8. Vertebrae 13+14. Body depth 2.5-3.3 in SL. Interorbital width 3.0-3.6 in head length; orbit diameter 1.5-1.7 in snout length. Anterior nostril subequal to posterior nostril. Head flat above; juveniles with serrated ridges on head, which become reduced with age; median longitudinal bony ridge on occiput. Fin spines with longitudinal ridges, and in young, the spines are also serrated.

Body and head bluish grey above, paler below with a silvery sheen; fins blackish brown; juveniles with numerous dark blotches all over head and body. Attains 2+ m, 300+ kg. North Atlantic (apparently rare on the American side) and Mediterranean; in the eastern Atlantic, the wreckfish is known from Norway to South Africa in depths of 40 - 300 m; also occurs at Tristan da Cunha, Vema Seamount, St. Paul and Amsterdam Ids.

Family No. 166: SERRANIDAE

by P.C. Heemstra & J.E. Randall

Rockcods (groupers) and seabasses **Klipkabeljoue en seebaarse**

Body robust or somewhat compressed, oblong oval to rather elongate. Dorsal fin with 7-13 spines and 10-21 soft-rays; anal fin with 3 spines and 6-10 soft-rays. Pelvic fin insertion under or a little behind pectoral fin base; pelvic fins with 1 spine and 5 branched rays; no scaly process at base of pelvic fins. Mouth large; maxilla exposed, with or without supramaxilla; small, slender teeth on jaws, vomer and palatines (*Luzonichthys* lacks vomerine teeth and *Anyperodon* lacks palatine teeth); small canines usually present at front of jaws; no molars or incisiform teeth. Edge of preopercle serrate; opercle with 3 flat spines or points, the upper and lower spines sometimes indistinct (covered by skin and scales). Gill membranes separate, joined to isthmus far forward, with 7 branchiostegal rays. Scales small to moderate, adherent, usually ctenoid; many species with a mixture of ctenoid and cycloid scales (the cycloid scales generally on head and ventrally on body), some with cycloid scales overall, a few species with embedded scales; head mostly covered with scales; lateral line single, complete (except in some species of *Plectranthias*); soft dorsal, caudal and anal fins usually scaly.

The Family Serranidae, as here defined (excluding the Polyprionidae, Grammistidae and Dinopercidae), comprises 3 subfamilies, about 48 genera and some 320 species; 77 species are known or likely to be found in our area. Western Indian Ocean species revised by Randall & Heemstra (1984, FAO) and Heemstra & Randall (1986). Common in tropical and subtropical waters of all oceans; several species are of commercial importance.

KEY TO SUBFAMILIES

1a Body scales small, more than 80 oblique series from upper end of gill opening to caudal fin base; LL scales inconspicuous, usually smaller than main body scales and mostly covered by them; scaly flap of skin joining upper part of P base to the body ..... EPINEPHELINAE

1b Body scales larger, usually fewer than 80 oblique series from upper end of gill opening to caudal fin base; LL scales distinct, subequal in size and number to those in adjacent rows; no scaly flap of skin at upper end of P base 2

2a Maxilla naked; LL scales 67-77 ..... SERRANINAE
2b Maxilla scaly in most species; LL scales 28-60 (except *Luzonichthys microlepis*, which has 72-75) ... ANTHIINAE

Subfamily ANTHIINAE

Dorsal fin with 10-13 spines and 13-16 soft-rays; anal fin with 6-9 soft-rays; caudal fin branched rays usually 13. Vertebrae 26.

Anthiines are an assemblage of small to moderate-sized (4-40 cm SL) colourful serranids comprising some 20 genera and at least 100 species, many of which are still undescribed. There are 18 species that are known from or are likely to occur in our area.

The generic classification of the Anthiinae is not satisfactory. The genus *Anthias* is an unnatural assemblage, but we continue its use here pending a complete revision of the taxonomy of this subfamily.

Ecologically, there seem to be three kinds of anthiine fishes. The first type are small, schooling, plankton-feeding fishes (e.g. *Anthias squamipinnis*) that are often associated with coral reefs. These species are sexually dichromatic protogynous hermaphrodites. Each little school comprises one to a few large, distinctively coloured adult males plus several smaller, adult females and numerous juveniles coloured like the females. Each male will spawn with several females of his "harem". If a male is taken by a predator, the largest (dominant) female changes sex and colour pattern to take the place of the missing male. The transformation of the ovary to a testis and the simultaneous colour pattern change occurs within two weeks in *A. squamipinnis*.

The second kind of anthiine species is the larger, deep-water, plankton feeder (e.g. *Holanthias natalensis*). These fish seem to be non-schooling, occurring in depths of 50 - 200 m. Sexual dichromatism is rare in this group.

The third kind of anthiine fish is the solitary, benthic species (e.g. *Acanthistius sebastoides* and *Plectranthias* spp.). This type of anthiine may be a large or a small species, and does not exhibit sexual dichromatism. These benthic species have fewer and shorter gill-rakers than their plankton-feeding relatives, and they feed on benthic crustaceans and small fishes.

KEY TO GENERA

1a D with 12 (very rarely 11 or 13) strong spines; anterior nostril with a broad, usually fringed flap; lower edge of preopercle with 2 or 3 large antrorse spines ..... *Acanthistius*
1b D spines 10 or 11 (small juveniles of *Nemanthias* have 12 spines, but the first one is very small and disappears with growth); no broad flap on anterior nostril; no large antrorse spines on preopercle (except in two of the three South African *Plectranthias*) 2

2a Lateral scale series (= LL scales if LL is complete) = 25-31 ..... *Plectranthias*
2b LL 39-75 3

3a D divided to the base between spinous and soft-rayed parts ..... *Luzonichthys*
3b D continuous, not divided into two parts 4

4a Tongue with a patch of minute teeth (tooth patch reduced or absent in specimens of *Holanthias natalensis* larger than 30 cm SL); body depth 2.0-2.9 in SL ..... *Holanthias*
4b No teeth on tongue; body depth 2.5-3.3 in SL 5

5a D spines 11, the first 2 spines elongate in adults ..... *Nemanthias*
5b D spines 10, the first 2 not elongate ..... *Anthias*

Genus *Acanthistius* Gill, 1862

Scales small, 90-160 lateral scale series; LL complete, the tubes with 2-5 branches. Supramaxilla present. Jaws with inner row or rows of small, slender teeth and outer row of larger, curved canines; vomer and palatines with teeth; tongue smooth. Preopercle serrate, with 2 or 3 large, antrorse spines on lower edge. C truncate, with 15 branched rays; D single; P rays mostly branched.

About 8 species; temperate waters of South Africa, Australia, New Zealand and Chile. Two species in our area.

KEY TO SPECIES

1a Maxilla apparently naked; P rays 19-21; head, body and spinous D covered with small orange spots ..... *A. sebastoides*
1b Maxilla with distinct ctenoid scales; P rays 18; no small orange spots as above ..... *A.* sp.

166.1 *Acanthistius sebastoides*
(Castelnau, 1861)
PLATE 32

Koester Koester

Serranus cuvieri (*non* Smith): Castelnau, 1861: 2. *Serranus sebastoides* Castelnau, 1861: 3 (Algoa Bay and Simonstown). *Acanthistius sebastoides:* Boulenger, 1895: 141; Smith, **SFSA No. 431***; Smith & Smith, 1966: 88*. Perciform species 1: Brownell, 1979: 24*.

D XI-XIII,15-17; A III,7-8; P 19-21; LS 90-105; LL 50-55; lower GR 8-9 plus 4-6 rudiments. Rear margin of anterior nostril with a large, usually fringed flap of skin; rear nostril also often fringed. Maxilla with minute, embedded (generally indiscernible) scales.

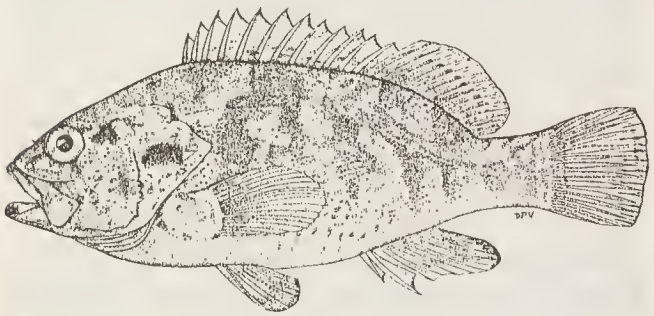
Head and body buff, covered with small orange spots and few scattered dark brown blotches; caudal and anal fins dark grey, pelvics dusky yellow. Attains 35 cm. From Namibia to Maputo, common among rocks in depths of 1 to at least 20 m. A sedentary species often taken by anglers. Flesh excellent.

166.2 *Acanthistius* sp.

Scalyjaw koester — Skubbigebek-koester

D XII,15; A III,7; P 18; LL 49; lower GR 9 plus 5 rudiments. Rear edge of anterior nostril with large fringed flap of skin. Maxilla covered with distinct ctenoid scales.

Colour in life unknown but apparently lacking the orange spots of *A. sebastoides*. Known from a single specimen taken near Port Alfred. Possibly occurs in deeper water than *A. sebastoides*. Apparently rare; more specimens wanted.



166.2 *Acanthistius* sp.: 16 cm (E. Cape).

Genus ***Anthias*** Bloch, 1792

Scales small to moderate; LL complete, with 35-54 tubed scales, the tubes unbranched. Gill-rakers long and numerous. Jaws with inner row or rows of villiform teeth and outer row of larger, slender teeth and some large, curved canines; vomer and palatines with teeth; tongue edentate. Preopercle serrate; no enlarged, antrorse spines on lower edge. Maxilla with distinct, ctenoid scales; supramaxilla absent. C branched rays 13; D single; P rays mostly branched.

Numerous species, several undescribed; tropical and subtropical waters of the Atlantic and Indo-West Pacific Oceans. The genus *Anthias* is used here in a broad sense to include the genera *Franzia* Jordan and Thompson, 1914, *Mirolabrichthys* Herre, 1927 and *Pseudanthias* Bleeker, 1872. Six species are known from or likely to occur in our area.

KEY TO SPECIES

1a LL 46-52; scale rows around caudal peduncle 25-28 2
1b LL 38-45; scale rows around caudal peduncle 22-25 4

2a. Upper lip of males thickened at symphysis, forming a protuberant papilla; A rays 8; colour: head and body mainly cerise, bicoloured, yellow area narrow below D and widening on C peduncle so that whole D and C except margins yellow ..... *A. evansi*
2b Upper lip not thickened at symphysis; A rays usually 6 or 7; colour not as in 2a 3

3a LL 46-47; P 17-18; 3 predorsal bones; 2 parallel violet lines from eye to lower P rays; violet lines also on lower rear part of body and on C ..... *A. bimaculatus*
3b LL 48-52; P 18-20; 2 predorsal bones; no violet lines as above ..... *A. cooperi*

4a 3rd D spine elongate in males and in some females 5
4b 3rd D spine not longer than 4th spine 6

5a D and A mostly covered with scales ..... *A. squamipinnis*
5b D and A apparently naked (with a microscope a few small transparent scales can be seen on these fins) ..... *A. pulcherrimus*

6a Total GR 35-41; C emarginate, the upper and lower rays only slightly longer than the middle rays ..... *A. connelli*
6b Total GR 31-34; C lunate, the upper and lower rays about twice length of middle rays ..... *A. lunulatus*

166.3 *Anthias bimaculatus*

Smith, 1955
PLATE 32

Purple goldie — Pers goudvissie

Anthias bimaculatus Smith, 1955: 339, Fig. 1 (Pinda, Mozambique); 1961: 364*.

D X,16; A III,7-8; P 17-18; LL 46-47; GR (10-11)+(25-26). Body depth 2.6-2.9, head 3.2-3.3 in SL.

Attains 9+ cm SL. Known only from 6 specimens collected in about 20 m in northern Mozambique; likely to be found in our area.

166.4 *Anthias connelli*

Heemstra & Randall, 1986
PLATE 33

Harlequin goldie — Harlekyn-goudvissie

Anthias connelli Heemstra & Randall, 1986: 00, Fig. 00 (off Brighton Beach, Natal).

D X,15-17; A III,6-8; P 16-19; LL 39-45; GR (10-12)+(15-28). Body depth 2.4-3.0, head 2.9-3.3 in SL.

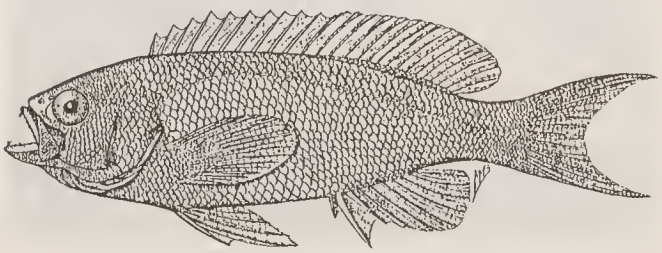
Attains 11+ cm SL. This distinctive species is known only from one small locality south of Durban harbour.

166.5 *Anthias cooperi*

Regan, 1902
PLATE 33

Silver-streak goldie — Silwerstreep-goudvissie

Anthias cooperi Regan, 1902: 273 (Haddumati, Maldives). *Planctanthias preopercularis* Fowler, 1935: 385, Figs. 18 & 19 (Natal coast); Smith,



166.5 *Anthias cooperi:* 11 cm holotype of *A. altus* Smith, 1961 (Kenya).

SFSA No. 455. *Anthias cichlops* (*non* Bleeker): Smith, 1951: 57*; 1953: 518, **No. 459a*;** 1955: 338. *Anthias taeniatus* (*non* Klunzinger): Smith, 1961: 362*.

D X,15-17; A III,7-8; P 18-20; LL 48-52; GR (8-11)+(22-27). Body depth 2.8-3.2, head 3.1-3.4 in SL.

Attains at least 10.5 cm SL. A coral-reef species common in our area and extending across the Indian Ocean to Japan and the east coast of Australia. In Japan, this species has been misidentified as *Pseudanthias taeniatus* (Klunzinger, 1884) or *P. kashiwae* (Tanaka, 1918).

166.6 *Anthias evansi*
Smith, 1954
PLATE 35

Yellowtail goldie — Geelstert-goudvissie

Anthias evansi Smith, 1954: 1, Fig. 1 (Kenya); 1955: 342; 1961: 363*; Randall & Lubbock, 1981: 4*. *Mirolabrichthys evansi:* Heemstra, 1973: 207*.

D XI,16 or X,16-18; A III,8; P 16-18; LL 47-50; GR (8-11)+(22-26). Body depth 3.1-3.4 in SL. D and A heavily scaled at their bases and well out onto fins.

Attains 9.5 cm SL. A common coral-reef species of the tropical Indian Ocean: Kenya, Mozambique, Seychelles, Mauritius, Réunion, Chagos Ids., Maldives and Cocos-Keeling Ids.

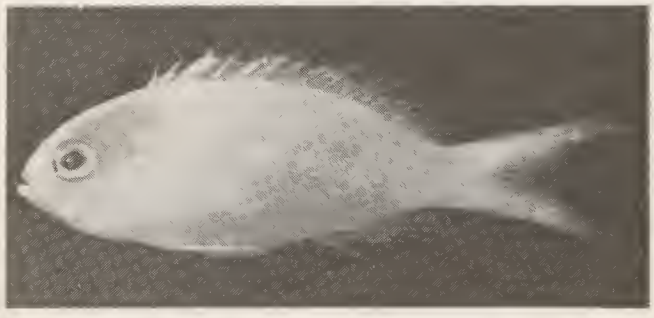
166.7 *Anthias lunulatus*
Kotthaus, 1973

Lunate goldie — Maanstert-goudvissie

Anthias lunulatus Kotthaus, 1973: 20, Fig. 290 (east coast of Somalia).

D X, 15-16; A III,7; P 17-18; LL 38-43; GR (9-10)+(22-25). Body depth 2.8-3.0, head 3.0-3.3 in SL. D and A apparently without scales.

Attains at least 8 cm SL. Previously known from the southern Red Sea and east coast of Somalia; we have examined specimens from Mauritius and Bali.



166.7 *Anthias lunulatus:* 5.5 cm SL holotype (after Kotthaus, 1973).

166.8 *Anthias pulcherrimus*
Heemstra & Randall, 1986
PLATE 33

Resplendent goldie — Mooi goudvissie

Anthias pulcherrimus Heemstra & Randall, 1986: 00, Fig. 00 (Mauritius).

D X,15-16; A III,7; P 17-18; LL 40-45; GR (9-11)+(23-27). Body depth 2.7-3.1, head 3.1-3.4 in SL. A pointed; 3rd D spine elongate, tipped with a fleshy pennant-like filament.

Attains at least 7 cm SL. A deep reef species known from the Maldives, Chagos Arehipelago and Mauritius in depths of 33-35 m, closely related to *A. randalli* Lubbock & Allen, 1978 of the central and western Pacific.

166.9 *Anthias squamipinnis*
Peters, 1855
PLATE 32

Sea goldie — See-goudvissie

Serranus (Anthias) squamipinnis Peters, 1855: 429 (Mozambique). *Anthias squamipinnis:* Smith, **SFSA No. 459*;** 1955: 339; 1961: 362*; Heemstra, 1973: 201; van der Elst, 1981: 283*. *?Anthias huchtii* (non Bleeker): Smith, **SFSA No. 457.** *?Anthias manadensis* (*non* Bleeker): Smith, **SFSA No. 458.**

D X,15-17; A III,6-7; P 16-18; LL 38-43; GR (8-11)+(23-26). Body depth 2.4-3.1, head 2.7-3.2 in SL. Slender filament on rear edge of anterior nostril.

Attains 10 cm SL. Usually the most common and abundant species of *Anthias* on shallow (10 - 20 m) coral reefs. Colour patterns and size of sexual transition vary slightly from one locality to the next. Red Sea and western Indian Ocean from Natal to Japan, Philippines, Australia and Marshall Ids. Juveniles occur south to Algoa Bay.

Genus ***Holanthias*** Günther, 1868

Scales moderate, LL complete, with 29-52 tubed scales, the tubes unbranched. GR long and numerous. Jaws with villiform teeth and an outer series of curved canines; teeth present on vomer and palatines, present or absent on endopterygoids and ectopterygoids; usually a large oval patch of teeth on tongue. Maxilla with distinct, ctenoid scales; no supramaxilla. Preopercle serrate, no large antrorse spines on lower edge. C branched rays 13; D not divided; P rays mostly branched.

The genus is used here to include the genera *Odontanthias* Bleeker, 1873, *Ocyanthias* Jordan & Evermann, 1896, and *Scalantarus* Smith, 1965. About 14 species; 3 known or likely to occur in our area.

KEY TO SPECIES

1a D X,14; body depth 2.6-2.9 in SL ..... *H. caudicinctus*
1b D X,17-19; body depth 2.0-2.3 in SL 2

2a LL 39-43; A III,7; lower GR 27-29; vomerine tooth patch diamond-shaped ..... *H. borbonius*
2b LL 43-53; A III,8-9; lower GR 24-26; vomerine tooth patch chevron-shaped ..... *H. natalensis*

166.10 *Holanthias borbonius*
(Valenciennes, 1828)
PLATES 33 & 35

Checked swallowtail — Geruite swaelstert

Serranus Borbonius Valenciennes, *in* Cuv. & Val., 1828: 263 (Réunion). *Aylopon mauritianus* Guichenot, 1868: 86 (Mauritius). *Anthias ornatus* Fourmanoir, 1954: 213, Fig. 8 (Comoro Ids.). *Holanthias borbonius:* Smith, 1955: 344; 1961: 360*; Smith, 1975: 36; Maugé, 1980: 23* (in part).

D X,17-18; A III,7; P 16-18; LL 39-43; GR (11-13)+(27-29). Body depth 2.0-2.3, head 2.6-2.8 in SL. Vomer and palatines with broad patches of minute teeth, the vomerine patch extending posteriorly past middle of palatine tooth patches; large oval patch of teeth on tongue; endo- and ectopterygoids usually bear tooth patches as well. C lobes acute in specimens less than 10 cm SL, but our 15 cm SL specimen has the C lobes rounded (paddle-shaped).

Attains at least 15 cm SL. Mauritius, Réunion, Comoro Ids., Madagascar and Japan; 1 specimen caught off Durban.

166.11 *Holanthias caudicinctus*
Heemstra & Randall, 1986
PLATE 34

Blackblotch swallowtail — Swartvlek-swaelstert

Holanthias caudicinctus Heemstra & Randall, 1986: 00, Fig. 00 (off Kenya).

D X,14; A III,7-8; P 18-19; LL 45-52; GR (11-12)+(25-28). Body depth 2.6-2.9, head 2.5-2.7 in SL. Broad patches of minute teeth on vomer, palatines and tongue; vomerine patch extends posteriorly past middle of palatine tooth patches.

Attains 10 cm SL. A deep-water species taken in 140 - 300 m off Kenya; probably will be found in our area.

166.12 *Holanthias natalensis*
(Fowler, 1925)
PLATE 35

Gorgeous swallowtail — Pronk-swaelstert

Sacura natalensis Fowler, 1925: 226, Fig. 2 (Natal). *Holanthias furcatus* Pellegrin, 1935: 51 (Réunion). *Glaucosoma peaolopesi* Smith, 1939: 216, Fig. 1 (southern Mozambique). *Holanthias natalensis:* Smith, **SFSA No. 456***; 1961: 360*.

D X,17-19; A III,8-9; P 16-18; LL 43-53; GR (10-12)+(24-26). Body depth 2.0-2.2, head length 2.7-3.1 in SL. Minute teeth on vomer and palatines; vomerine tooth patch chevron-shaped, without a median posterior extension; juveniles with a small patch of teeth on tongue which is absent in adults.

Attains at least 37 cm SL. A beautiful fish known from East London to Madagascar and Réunion.

Genus ***Luzonichthys*** Herre, 1936

D divided to the base between spinous and soft-rayed parts. LL complete. Maxilla scaly; no supramaxilla. Teeth small, uniserial on jaws; palatines with 1 or 2 rows of minute teeth; vomer and tongue edentate. Rear edge of orbit with several papillae. Rear edge of preopercle serrate, lower edge smooth. C lunate, with 13 branched rays.

Small, schooling fishes of the deep reef habitat (40 - 100 m). Six species have been described, but 3 of these may not be valid. Two species likely to occur in our area.

KEY TO SPECIES

1a LL 49-56; body depth 3.2-3.5 in SL; A III,7 ..... *L. addisi*
1b LL 72-74; body depth 4.0-4.4 in SL; A II-III,8-9 ..... *L. microlepis*

166.13 *Luzonichthys addisi*
(Smith, 1955)
PLATE 35

Magenta splitfin — Magenta-spleetvin

Naurua addisi Smith, 1955: 348, Fig. 4 (Aldabra Id.). *Luzonichthys addisi:* Smith, 1961: 367*; Randall, 1981: 13.

D X,15-16; A III,7; P 19-21; GR (7-9)+(20-24). Head length 3.2-3.6 in SL.

Attains 5.5 cm SL. Previously known from Astove and Aldabra Ids.; we have examined specimens from Assumption Id., St. Brandon's Shoals and the Chagos Archipelago. Very similar to *L. waitei* (Fowler, 1931) of the western Pacific, of which *L. robustus* Fourmanoir, 1977 is probably a synonym.

166.14 *Luzonichthys microlepis*
(Smith, 1955)
PLATE 35

Slender splitfin — Slank spleetvin

Naurua microlepis Smith, 1955: 345, Fig. 3 (Aldabra Id.). *Luzonichthys microlepis:* Smith, 1961: 368*; Randall, 1981: 13.

D X,15-16; A II-III,8-9; P 21-24; GR (7-8)+(21-23). Third A element is a spine-like ray with a few segmentations at the tip. Head length 3.4-3.6 in SL.

Attains 6 cm SL. Aldabra; we have seen specimens from St. Brandon's Shoals.

Genus ***Nemanthias*** Smith, 1954

D continuous, with 11 spines; first 2 spines elongate and flexible (in fish longer than 3 cm SL); D and A naked; C forked, branched rays 13. GR long and numerous. Front of upper lip thickened, with a nipple-like papilla at the midline. Narrow band of villiform teeth in upper jaw, with an outer row of larger teeth and 2 pairs of canines on each side

at the front; lower jaw with 1 row of small teeth, a large curved canine on each side, and a pair of outwardly flaring canines at the front; vomer and palatines with teeth; tongue edentate. Maxilla scaly; no supramaxilla.

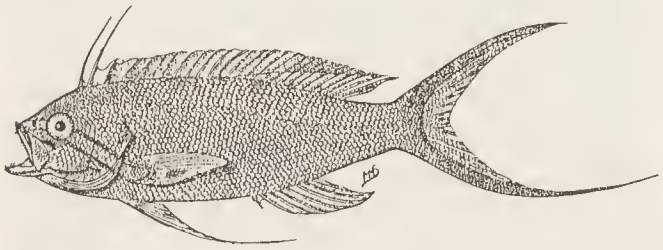
166.15 *Nemanthias carberryi*
Smith, 1954
PLATES 33 & 35

Threadfin goldie — Draadvin-goudvissie

Nemanthias carberryi Smith, 1954: 4, Fig. 2 (Kenya); 1955: 345; 1961: 365*. *Emmelanthias stigmapteron* Smith, 1955: 342, Fig. 2 (east of Port Alfred); 1961: 364*; 1961: 567, **No. 455a;** Winterbottom, 1978: 45.

D XI,16-17 (12 D spines in small juveniles, but first spine is minute and disappears with growth); A 111,7; P 20-21; LL 50-53; GR (9-11)+(24-26). Body depth 3.0-3.2, head length 3.2-3.4 in SL.

Attains 7 cm SL. Common on coral reefs in depths of 10 - 30 m. Widespread in the western Indian Ocean east to the Maldives and south to Natal; adults occur on Aliwal Shoal south of Durban, and juveniles drift to Port Alfred.



166.15 *Nemanthias carberryi:* 10 cm holotype (Kenya).

Genus ***Plectranthias*** Bleeker, 1873

D X,13-18, the fin margin more or less deeply notched between spinous and soft-rayed parts; C truncate or rounded, branched rays 12-15; P rays branched or simple. LL complete or incomplete (with tubed scales ending under rear part of D). Maxilla scaly or naked; supramaxilla rudimentary or absent. Jaws with villiform teeth and a few canines; vomer and palatines with teeth; tongue edentate. Lower edge of preopercle with 1-3 antrorse spines in some species. GR short and few.

Solitary benthic fishes, often seen perched on the substrate like hawkfishes, which some species resemble, not only in general body shape and physiognomy, but also in having some of the lower P rays notably enlarged. Some species occur in deep water, to 360 m. In addition to the 30 species recognised by Randall (1980), 5 more species have been described since his generic revision was published. Three species occur in our area.

KEY TO SPECIES

1a LL complete, with 28-31 tube-bearing scales; lower edge of preopercle smooth ..... *P. morgansi*

1b LL incomplete, ending below middle soft D rays; 2 large antrorse spines on lower edge of preopercle 2

2a D X,13-14; P 12-13 ..... *P. longimanus*
2b D X,16-17; P 16-18 ..... *P. winniensis*

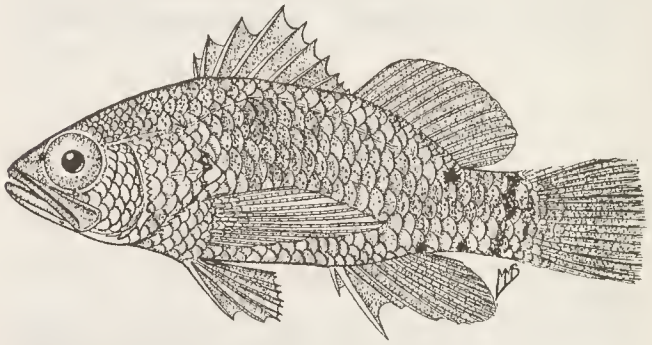
166.16 *Plectranthias longimanus*
(Weber, 1913)
PLATE 34

Silverspots — Silwervlekkies

Pteranthias longimanus Weber, 1913: 208, Fig. 54 (Paternoster Ids., Indonesia); Smith, 1961: 366*. *Plectranthias longimanus:* Randall, 1980: 148*.

D X,13-14, the fin divided to the base between spinous and soft-rayed parts; A 111,6-7; P 12-13, all unbranched; LL 12-16 ending below soft D; LSS 25-26; GR 1+(4-7) not counting 3-6 rudiments. C slightly rounded, with 13 branched rays. Maxilla and lower jaw naked. Body depth 2.6-3.1, head length 2.2-2.3 in SL.

Attains 3 cm SL. A widespread little species extending from Natal to Kenya, Comoro Ids. and the Seychelles east to Fiji and Loyalty Ids. and Japan.

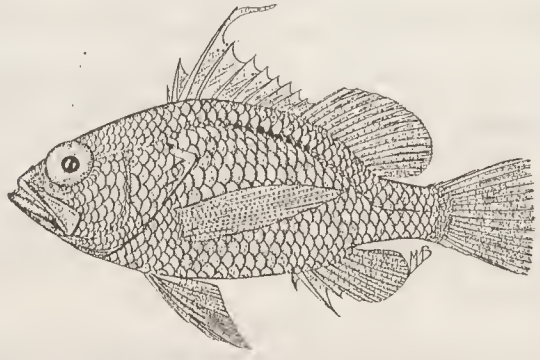


166.16 *Plectranthias longimanus:* 2.5 cm (Kenya).

166.17 *Plectranthias morgansi*
(Smith, 1961)
PLATE 34

Flagfin — Vlagvin

Pelontrus morgansi Smith, 1961: 365, Fig. 3 (40 fms off Lamu, Kenya). *Plectranthias morgansi:* Randall, 1980: 158*.



166.17 *Plectranthias morgansi:* 3.5 cm holotype (Kenya).

D X,13-15; A III,7; P 13-14, a few of the middle rays branched in a specimen of 48 mm SL, all P rays simple in smaller specimens; LL 28-31; GR (5-6)+(11-12) including 4 or 5 rudiments on each limb. Maxilla and lower jaw naked; no supramaxilla. C slightly rounded, with 14 or 15 branched rays; 3rd D spine elongate, with a pennant-like filament at the tip.

Attains 5 cm SL. Five specimens from off Kenya and 3 from off South Africa; depth range 80 - 138 m.

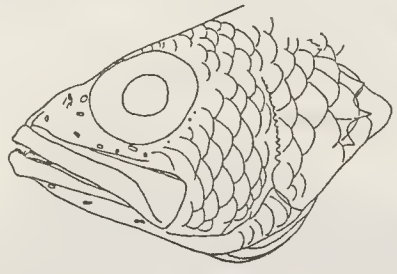
166.18 *Plectranthias winniensis*
(Tyler, 1966)

Redblotch basslet — Rooivlek-baars

Pteranthias winniensis Tyler, 1966: 2, Fig. 1 (Amirante Ids., Seychelles). *Plectranthias winniensis:* Randall, 1980: 182*.

D X,16-17, the fin notched to its base between spinous and soft parts; A III,7; P 16-18, all rays simple; C rounded, branched rays 13; LL 14-20 ending below soft D; LS 25-28; GR (5-6)+(12-13) including 4 or 5 rudiments on each limb. Body depth 3.0-3.4, head 2.2-2.5 in SL. Maxilla naked, with a minute supramaxilla.

Attains 4 cm SL. Red Sea and western Indian Ocean (Natal, Mauritius and the Seychelles) to the central Pacific (e.g. Hawaii, Tuamotus and Pitcairn Id.).



166.18 *Plectranthias winniensis:* head of 3 cm holotype.

Subfamily EPINEPHELINAE

Dorsal fin undivided, with 7-11 spines and 10-21 soft-rays; anal fin with 7-10 soft-rays; caudal fin emarginate to rounded (except lunate in *Variola*) with 15 branched rays. Supramaxilla present; inner teeth on jaws depressible; no teeth on tongue. Scales small, more than 8 rows between lateral line and middle dorsal fin spines, more than 80 oblique series from upper end of gill opening to caudal fin; lateral-line scales inconspicuous, usually smaller than contiguous body scales and mostly covered by them; soft dorsal, caudal and anal fins scaly; upper part of pectoral fin base joined to body by a scaly flap of skin. Vertebrae 24.

The Epinephelinae (rockcods or groupers) are generally demersal fishes of tropical and subtropical seas, ranging from shallow coastal waters to moderate depths, rarely exceeding 200 m. A few species are abundant and commercially important in temperate waters. Some species prefer seagrass beds and mud or sandy bottoms, but most are fishes of coral reefs and rocky bottoms. Juveniles of a few species are common in estuaries. Except for breeding aggregations, most species are solitary. All are predators, feeding mainly on fishes, large crustaceans, and occasionally on cephalopods. Rockcods are excellent food-fishes and of considerable commercial importance, especially to sport fishermen and in local subsistence fisheries. Adults range in size from the diminutive leopard rockcod (20 cm) to the giant brindlebass, *Epinephelus lanceolatus,* which attains over 2 m and 400 kg. Most of the rockcods appear to be protogynous hermaphrodites, beginning life as females and then later changing sex to spawn as males.

About 21 genera with some 170 species, of which several are undescribed. There are 59 species known or likely to occur in our area. Field guide to species of Red Sea and western Indian Ocean by Heemstra and Randall (1984). Gill-raker (GR) counts used here include all countable (evenly spaced) rudiments.

KEY TO GENERA

1a D VII-VIII,10-11; vertical edge of preopercle smooth, lower edge with 3 or 4 large, antrorse spines ..... *Plectropomus*
1b D IX-X1,13-19; vertical edge of preopercle serrate (serrae may be very small in some species), the lower edge without large antrorse spines 2

2a Rear nostril a long vertical slit; head profile of adults markedly concave; D spines 10 ..... *Cromileptes*
2b Rear nostril round or oblong; head profile of adults straight or convex (slightly concave in large *Cephalopholis sonnerati*); D spines 9 or 11 3

3a C lunate, with lobes produced in adults; GR all rudimentary; D IX,13-14 ..... *Variola*
3b C truncate, emarginate or rounded; GR not all rudimentary 4

4a No teeth on palatines; body elongate, compressed, the depth 3.3-3.7 in SL ..... *Anyperodon*
4b Palatines with teeth; body depth 2.1-3.8 in SL 5

5a Body depth 2.1-2.5 in SL; P asymmetric, the 5th or 6th rays longest; C truncate; D IX,17-18 ..... *Aethaloperca*
5b Body depth 2.3-3.8 in SL; P rounded, the middle rays longest; C emarginate to rounded, truncate in a few species; D spines 9 or 11 6

6a D spines 9 7
6b D spines 11 8

7a C truncate or emarginate; head small, its length 2.8-3.2 in SL ..... *Gracila*
7b C rounded; head larger, 2.3-2.8 in SL ..... *Cephalopholis*

8a Head and body strongly compressed; body depth 2.4-2.8 in SL; scales all cycloid (except those just behind P axil); no canine teeth in jaws ..... *Dermatolepis*
8b Head and body not strongly compressed; body depth 2.4-3.8 in SL; scales usually ctenoid (cycloid in a few species); jaws usually with distinct canines ..... *Epinephelus*

Genus ***Aethaloperca*** Fowler, 1904

Body depth greater than head length, 2.1-2.5 in SL; body width 2.25-2.8 in depth. Dorsal profile of head straight, becoming convex on nape. One species.

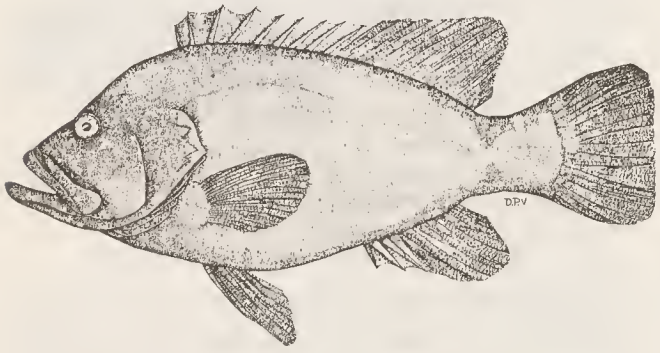
166.19 *Aethaloperca rogaa*
(Forsskål, 1775)
PLATE 34

Redmouth rockcod — Rooibek-kabeljou

Perca rogaa Forsskål, 1775: 38 (Djedda, Red Sea). *Cephalopholis rogaa:* **Smith, SFSA No. 420*.** *Aethloperca rogaa:* Smith, 1955: 310; Morgans, 1982: 6; Heemstra & Randall, 1984: Aethal 1*.

D IX,17-18; A III,8-9; P 17-18; LL 48-55; LSS 90-104; 2-4 rows of teeth at side of lower jaw; lower GR 9 plus some rudiments.

Dark brown, inside of mouth and gill cavity scarlet; juveniles with a white margin on soft D and C; some fish with a white bar on belly at tip of P. Attains 60 cm. Coral reefs in depths of 10 - 40 m; widespread but not common. Red Sea and western Indian Ocean from Delagoa Bay to Persian Gulf, Philippines and Japan.



166.19 *Aethaloperca rogaa:* ca. 45 cm (N. Mozambique).

Genus ***Anyperodon*** Günther, 1859

Body elongate and compressed, the depth 3.3-3.7 in SL; head distinctly longer than body depth. No teeth on palatines; 2 rows of teeth at side of lower jaw. See account of the single species of the genus below.

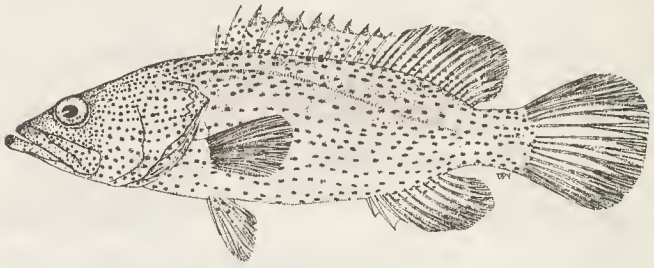
166.20 *Anyperodon leucogrammicus*
(Valenciennes, 1828)
PLATES 34 & 36

Slender rockcod — Slank klipkabeljou

Serranus leucogrammicus Valenciennes, *in* Cuv. & Val., 1828: 347 (Seychelles). *Anyperodon leucogrammicus:* Morgans, 1982: 12; Randall & Ben-Tuvia, 1983: 380*; Heemstra & Randall, 1984: Anyper 1*.

D XI,14-16; A III,8-9; P 15-17; LL 63-71; LSS 110-125; GR (7-9)+(14-17). Head 2.4-2.5 in SL. Scales ctenoid.

Attains 52 cm. Juveniles with alternating blue and red stripes and 1 or 2 black spots at C base. Tropical Indo-West Pacific and Red Sea south to Mozambique. Probably occurs in our area.



166.20 *Anyperodon leucogrammicus:* 29.5 cm SL (Sudan).

Genus ***Cephalopholis*** Schneider, 1801

Body depth 2.3-3.2, head 2.3-2.8 in SL. D spines 9, the membranes distinctly indented between the spines; C rounded; middle P rays longest. Preopercle serrate, without antrorse spines ventrally.

A worldwide genus of at least 28 species, of which 2 are undescribed; 10 species known or likely to occur in our area. *Cephalopholis hemistictus* (*non* Rüppell): Smith, **SFSA No. 424** is unidentifiable.

KEY TO SPECIES

1a A III,7-8; ground colour brown to dark brown 2
1b A III,9-10; ground colour dark brown, red, orange or golden 3

2a Head and body usually dark brown with wavy longitudinal blue lines; P 1.55-1.75 in head ..... *C. formosa*
2b Head and body brown with 8 blackish brown bars; blackish spot between upper and middle opercular spines; P 1.3-1.6 in head ..... *C. boenack*

3a D IX,15-17; lower GR 17-19; body scales with tiny auxiliary scales; head, body and fins dark brown, covered with small, black-edged, blue spots (blue spots present on *C. sexmaculata* and *C. miniata* but ground colour not dark brown); 5 or 6 broad pale bars often visible on rear half of body ..... *C. argus*
3b D IX,14-16; lower GR 14-17; no auxiliary scales; colour not as above 4

4a LL 66-76; LSS 122-140; P 18-20; body depth 2.3-2.7 in SL ..... *C. sonnerati*
4b LL 46-68; LSS 79-121; P 16-19; body depth 2.5-3.2 in SL 5

5a LL 54-68; C and P blackish ..... *C. nigripinnis*
5b LL 46-56; C and P not blackish 6

6a LSS 79-90; a saddle-like, dark brown spot on peduncle separated by a pale area from a smaller dark brown spot at base of upper C rays; an oblique dark streak on upper C rays ..... *C. leopardus*
6b LSS 90-121; colour not as above 7

7a Head, body and fins covered with small, black-edged, blue spots 8
7b No blue spots 9

8a Longest D spine 2.9-3.2 in head; 6 dark brown blotches dorsally on body (4 along D base and 2 on peduncle) ..... *C. sexmaculata*

8b Longest D spine 3.2-3.5 in head; no dark blotches along back ..... *C. miniata*

9a LSS 87-100; subopercle and interopercle smooth (rarely with a few small serrae on interopercle); pale red in life, mottled with brownish red; C with narrow bluish white rear edge, becoming submarginal at corners of fin ..... *C. spiloparaea*

9b LSS 103-177; subopercle and interopercle finely serrate; orange-yellow to pale orange-red with yellow to orange dots on head and anterodorsally on body; C with a black submarginal line posteriorly ..... *C. aurantia*

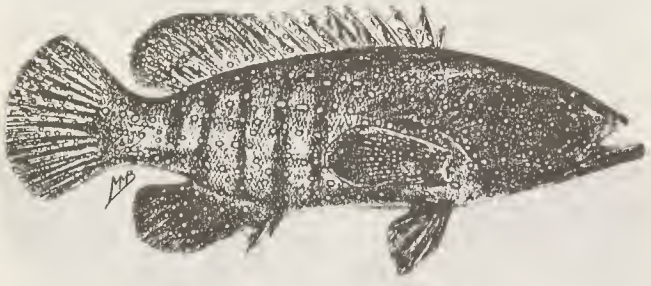
166.21 *Cephalopholis argus*
Schneider, 1801
PLATE 34

Peacock rockcod — Pou-klipkabeljou

Cephalopholis argus Schneider, *in* Bloch & Schneider, 1801: 311, Pl. 61 (East Indies); Smith, **SFSA No. 425*;** Morgans, 1982: 11*; Randall & Ben-Tuvia, 1983: 381*; Heemstra & Randall, 1984: Cephal 9*. *Cephalopholis miniatus* (*non* Forsskål): Smith, **SFSA No. 423*** (Fig. only).

D IX,15-17; A III,9; P 16-18; LL 46-51; LSS 95-110; GR (9-11)+(17-19). Body depth 2.7-3.2, head length 2.3-2.6 in SL.

Attains 50 cm. The most common and widespread species of the genus, extending from the Red Sea south to Durban, and to the central Pacific as far as the Pitcairn Group.



166.21 *Cephalopholis argus:* 30 cm (N. Mozambique).

166.22 *Cephalopholis aurantia*
(Valenciennes, 1828)
PLATE 36

Golden rockcod — Goue klipkabeljou

Serranus aurantius Valenciennes, *in* Cuv. & Val., 1828: 305 (Seychelles). *Cephalopholis aurantius:* Smith, **SFSA No. 422*** (in part); Heemstra & Randall, 1984: Cephal 10*.

D IX,14-15; A III,9; P 17-18; LL 48-53; LSS 103-117; GR (8-9)+(16-17). Body depth 2.7-2.95, head length 2.5-2.7 in SL.

Attains 60 cm. A deep-water species generally found in depths of 50 - 150 m; known from Mauritius, Réunion, Seychelles, east and southern Africa (to Durban). Rare.

166.22 *Cephalopholis aurantia:* 22 cm SL (Mauritius).

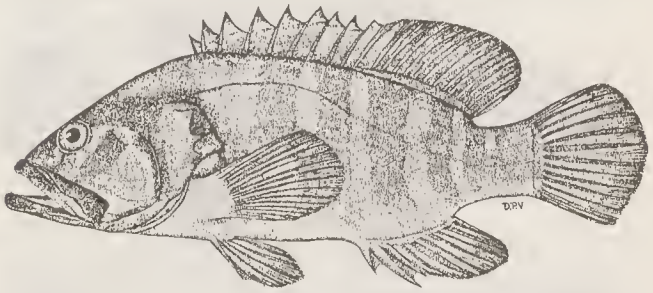
166.23 *Cephalopholis boenack*
(Bloch, 1790)
PLATES 36 & 37

Brownbarred rockcod — Bruinbalk-klipkabeljou

Bodianus boenack Bloch, 1790: 43, Pl. 226 (Japan). *Cephalopholis pachycentron:* Smith, **SFSA No. 425a*;** Morgans, 1982: 11. *Cephalopholis boenack:* Heemstra & Randall, 1984: Cephal 11*.

D IX,15-17; A III,8; P 15-18; LL 47-51; LSS 86-100; GR (7-8)+(14-17). Body depth 2.6-3.0, head length 2.4-2.6 in SL.

Attains 22 cm. Usually found on dead reefs in protected waters. Some fish with dark bands radiating from eye. Western Indian Ocean south to Delagoa Bay and cast to the central Pacific.



166.23 *Cephalopholis boenack:* 20.5 cm SL (Delagoa Bay).

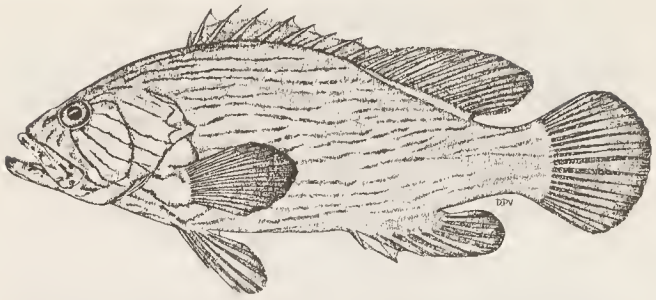
166.24 *Cephalopholis formosa*
(Shaw, 1804)
PLATE 37

Bluelined rockcod — Bloustreep-klipkabeljou

Sciaena formosa Shaw, 1804: 22, Pl. 26 (India). *Cephalopholis formosa:* Heemstra & Randall, 1984: Cephal 12*.

D IX,15-17; A III,7-8; P 16-18; LL 47-52; LSS 96-109; GR (8-10)+(15-18). Body depth 2.5-2.9, head length 2.5-2.6 in SL.

Attains 34 cm. Head and body usually dark brown, with wavy longitudinal dark blue lines; some fish with ground colour yellowish or reddish brown on ventral half of head and body. Often misidentified as *Cephalopholis boenack.* East African coast south to Zanzibar; also India, Sri Lanka and western Pacific (Japan to Qucensland); possibly occurs in our area.



166.24 *Cephalopholis formosa:* 17.5 cm SL (India).

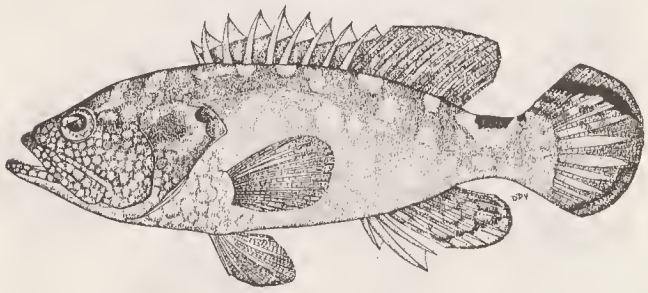
166.25 *Cephalopholis leopardus*
(Lacepède, 1802)
PLATE 36

Leopard rockcod — Luiperd-klipkabeljou

Labrus leopardus Lacepède, 1802: 450, 518, Pl. 30, Fig. 1 (Indian Ocean). *Cephalopholis leopardus:* Morgans, 1982: 7*; Heemstra & Randall, 1984: Cephal 14*.

D IX,14-15; A III,9-10; P 16-18; LL 46-53; LSS 79-90; GR (7-8)+(14-16). Body depth 2.5-2.9, head length 2.4-2.6 in SL.

Attains 20 cm. A secretive coral-reef species probably occurring in southern Mozambique; widespread in the Indo-West Pacific region.



166.25 *Cephalopholis leopardus:* 15 cm (Kenya).

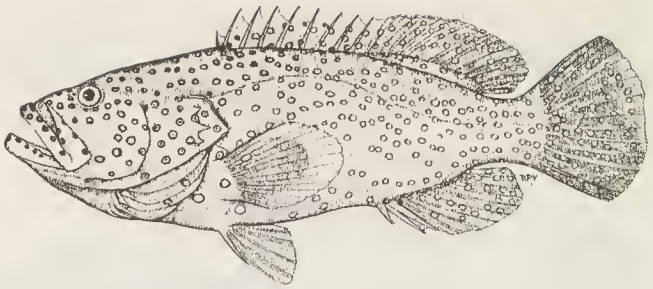
166.26 *Cephalopholis miniata*
(Forsskål, 1775)
PLATE 37

Coral rockcod — Koraal-klipkabeljou

Perca miniata Forsskål, 1775: 41 (Jeddah & Lohaja, Red Sea). *Cephalopholis miniatus:* Smith, **SFSA No. 423** (illustration and part of description is of *C. argus*); Morgans, 1982: 10*. *Cephalopholis miniata:* Randall & Ben-Tuvia, 1983: 385*; Heemstra & Randall, 1984: Cephal 1*.

D IX,14-16; A III,9; P 17-18; LL 47-54; LSS 99-114; GR (7-9)+(14-15). Body depth 2.5-2.9, head 2.4-2.6 in SL.

Attains 40 cm. Head, body and median fins orange-red, covered with small blue spots extending onto maxillae and lips, but not on underside of lower jaw; small juveniles golden, with a few blue spots. A coral-reef species which ranges from the Red Sea south to Natal, and east to the western Pacific.



166.26 *Cephalopholis miniata:* 20 cm (S. Mozambique).

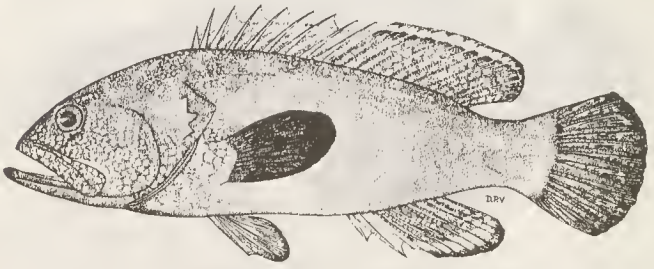
166.27 *Cephalopholis nigripinnis*
(Valenciennes, 1828)
PLATE 37

Duskyfin rockcod — Donkervin-klipkabeljou

Serranus nigripinnis Valenciennes, *in* Cuv. & Val., 1828: 339 (Indian Ocean). *Cephalopholis nigripinnis:* Heemstra & Randall, 1984: Cephal 15*.

D IX,14-16; A III,9; P 17-19; LL 53-70; LSS 88-108; GR (8-9)+(15-17). Body depth 2.6-3.2, head 2.4-2.9 in SL.

Attains 25 cm. Head and body mostly reddish; distal two-thirds of P, most of A, rear part of D and all of C and peduncle dusky black; numerous small orange-red spots on head (where most evident), dorsally on body and on median fins; 2 dark spots at tip of lower jaw; specimens from deeper water have less dark pigment. Widely distributed in Indian Ocean in depths of 5 - 40 m. Coral reefs, south to Natal.



166.27 *Cephalopholis nigripinnis:* 18 cm (S. Mozambique).

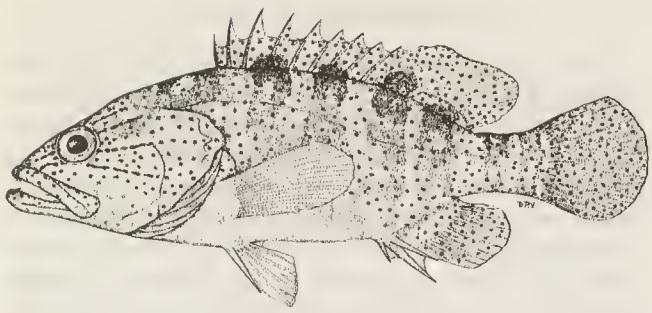
166.28 *Cephalopholis sexmaculata*
(Rüppell, 1830)
PLATE 38

Six-blotch rockcod — Seskol-klipkabeljou

Serranus sexmaculatus Rüppel, 1830: 107 (Red Sea). *Cephalopholis sexmaculatus:* Morgans, 1982: 10*. *Cephalopholis sexmaculata:* Randall & Ben-Tuvia, 1983: 390*; Heemstra & Randall, 1984: Cephal 17*.

D IX,14-16; A III,9; P 16-18; LL 49-56; LSS 99-110; GR (7-8)+(14-16). Body depth 2.6-3.0, head 2.3-2.5 in SL.

Attains 47 cm. A coral-reef species taken in depths of 9 - 150 m. Red Sea, south to Beira, and east to French Polynesia.



166.28 *Cephalopholis sexmaculata:* 6 cm SL (Red Sea).

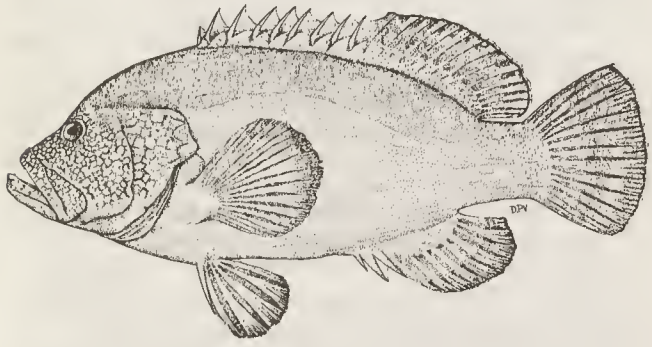
166.29 *Cephalopholis sonnerati*
(Valenciennes, 1828)
PLATE 37

Tomato rockcod — Tamatie-klipkabeljou

Serranus Sonnerati Valenciennes, 1828: 299 (Pondicherry and Ceylon). *Cephalopholis sonnerati:* Smith, **SFSA No. 421*;** Morgans, 1982: 8; Heemstra & Randall, 1984: Cephal 3*.

D IX,14-16; A III,9; P 18-20; LL 66-76; LSS 115-140; GR (7-8)+ (14-16). Body depth 2.3-2.7, head 2.5-2.7 in SL. Nape of adults prominently convex.

Attains 57 cm. Specimens more than 30 cm SL generally darker than smaller fish, especially posteriorly (but some juveniles may be dark brown); at 40 cm SL, the fish is usually entirely dark dusky reddish. Western Indian Ocean (south to Durban) to the central Pacific (Marshall and Gilbert Ids.). Adults usually taken in depths of 30 - 100 m.



166.29 *Cephalopholis sonnerati:* 30 cm SL (N. Mozambique).

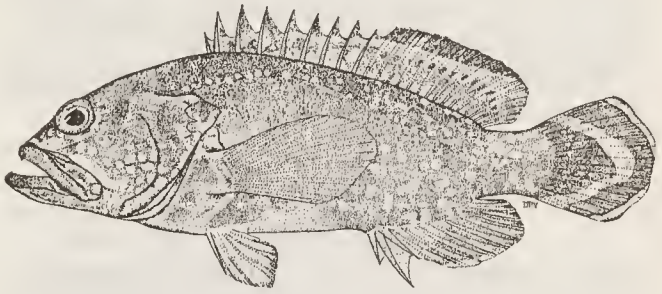
166.30 *Cephalopholis spiloparaea*
(Valenciennes, 1828)
PLATE 38

Strawberry rockcod — Aarbei-klipkabeljou

Serranus spiloparaeus Valenciennes, *in* Cuv. & Val., 1828: 338 (Indian Ocean). *Cephalopholis analis* (*non* Valenciennes): Heemstra & Randall, 1984: Cephal 8*.

D IX,15-16; A III,9-10; P 17-19; LL 48-53; LSS 87-103; GR (7-8)+ (14-16). Body depth 2.7-3.1, head 2.3-2.5 in SL.

Attains 22 cm. C with bluish white rear margin becoming submarginal at the "corners"; margin of soft D and A usually pale bluish (dusky in preservative); small pale blotches usually visible on head, body and median fins (may be pale bluish on head). A common reef species below 30 m; occurs in 15 - 108 m. East Africa to French Polynesia and the Pitcairn Group.



166.30 *Cephalopholis spiloparaea:* 12.5 cm SL (Mauritius).

Genus ***Cromileptes*** Swainson, 1839

Head and body compressed; dorsal head profile distinctly concave; body depth 2.6-3.0 in SL. Scales smooth. Rear nostril a large, vertical slit. C rounded. Jaws with bands of small teeth, no distinct canines; palatine teeth few, indistinct. One species.

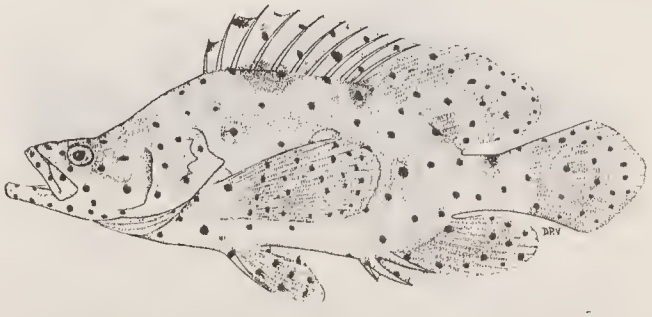
166.31 *Cromileptes altivelis*
(Valenciennes, 1828)
PLATE 38

Humpback rockcod — Boggel-klipkabeljou

Serranus altivelis Valenciennes, *in* Cuv. & Val., 1828: 324, Pl. 55 (type locality unknown). *Cromileptes altivelis:* Heemstra & Randall, 1984: Cromil 1*.

D X,17-19; A III,10; P 17-18; LL 53-56; LSS 121-140; GR short, 8+14, of which 7 on each limb are rudimentary.

Attains 70 cm. Pale greenish grey with round black spots on head, body and fins; juveniles with fewer and larger spots. Kenya, India and Sri Lanka to Japan and Australia; may occur along coast of Mozambique.



166.31 *Cromileptes altivelis:* 30 cm SL (Kenya).

Genus ***Dermatolepis*** Gill, 1861

Body and head deep and strongly compressed: body depth 2.2-2.8 in SL; body width 2.6-3.6 in depth. Body scales smooth, except those covered by P. D XI,17-19; A III,9-10; C rounded to nearly truncate. Preopercle edge finely serrate, mostly covered by skin; opercle with only 2 apparent "spines", the third is covered by skin and scales. Jaws with a band of small teeth; no distinct canines; vomer and palatines with teeth.

Three species: 1 western Indian Ocean, 1 eastern Pacific and 1 western Atlantic.

166.32 *Dermatolepis striolatus*

(Playfair & Günther, 1867)

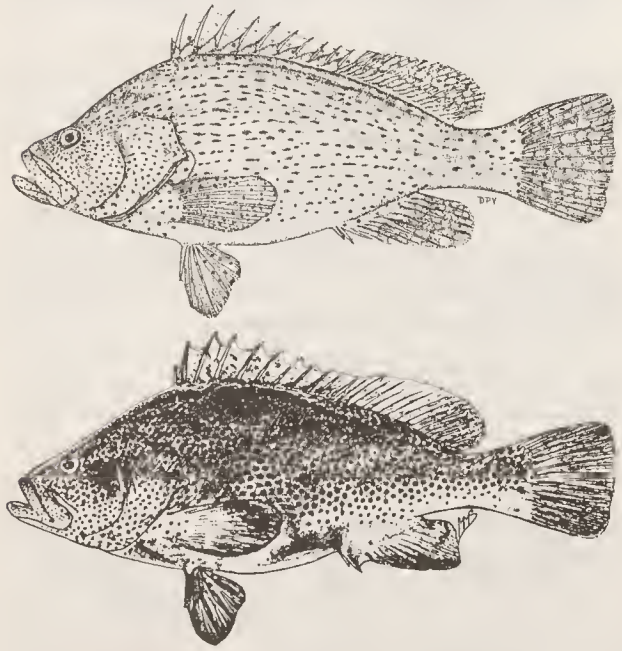
PLATE 36

Smooth rockcod — Gladde klipkabeljou

Serranus striolatus Playfair & Günther, 1867: 11, Pl. 3, Fig. 2 (Zanzibar). *Dermatolepis aldabrensis* Smith, 1955: 311, Pl. 1B (Aldabra). *Dermatolepis striolatus:* Morgans, 1982: 28*; Heemstra & Randall, 1984: Dermat 1*.

D XI,17-19; A I11,9-10; P 18; GR 8 +(13-15). Body scales with many auxiliary scales and mostly covered by skin, hence difficult to count.

Attains 85 cm. Head and body orange-brown, paler ventrally; juveniles covered with brown to black spots, some joining to form short horizontal or oblique streaks; background with more-or-less distinct, irregular, pale blotches of various sizes all over head and body. Adults golden brown or reddish brown, paler ventrally, with small, round, dark spots over all of head, body and fins. Durban to Oman, Aldabra, Comores and Seychelles.



166.32 *Dermatolepis striolatus:* top: 40 cm SL (Natal); bottom: 66 cm holotype of *D. aldabrensis* (Aldabra).

Genus ***Epinephelus*** Bloch, 1793

Body oblong to oval, but not strongly compressed, the depth 2.6-3.8 in SL. C rounded to slightly emarginate; D XI,12-19; A III,7-10. Preopercle distinctly serrate, but no large antrorse spines on ventral edge. Jaws with rows of small depressible teeth and a few small canines at the front; vomer and palatines with distinct teeth; tongue edentate.

A worldwide genus of about 100 species (of which 10 are undescribed). We include the genus *Promicrops* (with 3 species) here. Large fishes of tropical and subtropical seas; a few species are found in temperate waters. Colour pattern is important in distinguishing the various species, but it changes with growth in many species and also is affected by the depth at which the fish is living. There are 35 species known or likely to occur in our area; the record of the tropical Atlantic species *E. adscensionis* (Osbeck) from South Africa (Barnard, 1927: 481; Smith, **SFSA No. 488**) is doubtful. *E. spiniger,* recorded by Fowler (1934) from Natal (Smith, **SFSA No. 432**) is unidentifiable.

KEY TO SPECIES

1a C emarginate to truncate, at least in adults (rear edge of fin may be slightly convex when fully spread) 2
1b C rounded 9

2a D membranes not incised between the spines 3
2b D membranes distinctly incised between the spines 5

3a GR long and numerous, 20-22 on lower limb, no rudimentary rakers; D IX,17-19 ..... *E. undulosus*
3b GR fewer and shorter, 13-18 on lower limb including several rudimentary rakers; D IX,15-17 4

4a Juveniles and small adults (smaller than 30 cm SL) with head and body dark blue, violet or bluish grey, the fins bright yellow (some small juveniles with yellow extending onto C peduncle and rear part of body); large adults (larger than 50 cm SL) dark grey or purplish brown with yellow reduced to small areas of head and margin of spinous D ..... *E. flavocaeruleus*
4b Head and body brown, the ventral part often covered with small, dark reddish brown spots; irregular pale grey or white spots and blotches on head, body and D (these pale markings usually fade after death) ..... *E. multinotatus*

5a LL 48-54; body depth 2.9-3.4 in SL; ground colour pale with numerous close-set dark brown spots on head, body and fins 6
5b LL 58-73; body depth 2.6-3.0 in SL; colour not as above 7

6a D IX,15-17; dark spots on body larger, about 8-14 from last D spine to anus; P 1.6-1.8 in head; lower GR 14-16 ..... *E. areolatus*
6b D XI,16-18; dark spots smaller, about 25-30 from last D spine to anus; P 1.75-2.0 in head; lower GR 15-18 ..... *E. chlorostigma*

7a A III,9; adults with posterior nostrils 3 or 4 times larger than anterior; dark greyish brown with indistinct dark blotches on back ..... *E. chabaudi*
7b A II1,8; posterior nostrils subequal to anteriors; colour not as above 8

8a D XI,14; LL 56-64; head and body greyish or brown with numerous evenly spaced dark brown spots; P and margin of spinous D yellow; A, soft D and C with white edge ..... *E. albomarginatus*
8b D XI,16-17; LL 64-76; no dark spots on body (dark bars may be visible); spinous D margin dark red or black ..... *E. retouti*

9a A III,9-10 (rarely 8) 10
9b A III,7-8 11

10a Midlateral body scales smooth, embedded; nostrils subequal; head and body reddish orange, covered with close-set dark brown spots extending onto soft D and C; spinous D with horizontal dark stripes ..... *E. posteli*
10b Midlateral body scales rough, exposed; posterior nostrils much bigger than anterior; head and body brown with 7 or 8 broad dark bars, the first on nape and the last (broadest and darkest) on C peduncle ..... *E. septemfasciatus*

11a Anterior LL scales with branched tubules; eyes small and interorbital very broad, the orbit diameter 2.0-3.0 times in interorbital width for fishes 30-100 cm SL; maximum total length 270 cm .. *E. lanceolatus*
11b Anterior LL scales with a single tubule (except large specimens of *E. malabaricus* or *E. suillus*); eyes not so small and interorbital less broad, the orbit diameter 0.6-2.0 in interorbital width for fishes 30-70 cm SL; maximum total length usually less than 150 cm 12

12a Discrete dark spots on head and all of body (spots reddish brown to black in life, persisting in preservative) 13
12b No dark spots on head and all of body 27

13a LL 46-53 14
13b LL 55-74 (except *E. fuscoguttatus* with 52-58) 18

14a Midlateral body scales smooth, except those covered by P ..... *E. faveatus*
14b Midlateral body scales distinctly ctenoid (rough) 15

15a Dark spots on body elongate, oblique, and more numerous posteriorly; dark spots on head separated by more than 2 spot diameters ..... *E. longispinis*
15b Dark spots on body not elongate and not more numerous posteriorly; dark spots on head close-set, less than a spot diameter between them 16

16a Longest D spine longer than longest D ray, 2.3-2.5 in head; dark spots on soft D, C and A much bigger than those on body. ..... *E. miliaris*
16b Longest D spine equal to or less than longest D ray, 2.7-3.3 in head; dark spots on soft D, C and A not bigger than those on body 17

17a D XI,15-17; total GR 21-24; no distinct, black, saddle-like blotch on C peduncle; spots on body dark brown, mostly larger than pupil, round to hexagonal and close-set (some often merge to form short bands); P pale, covered with distinct blackish brown spots much smaller than those on body ..... *E. merra*
17b D XI,14-15; total GR 24-27; a black, "saddle" blotch on C peduncle; spots on body very small, blackish, superimposed on a pattern of large brown blotches ..... *E. microdon*

18a Most dark spots on body polygonal and close-set, the interspace forming a pale network 19
18b Most dark spots on body round or oblong and well separated 21

19a Length of 2nd A spine 2.1-2.35 in head; longest D spine 2.5-2.9 in head; dark polygonal spots on head, body and C separated by a pale network with silvery white dots at the corners of the polygons; a yellow-brown blotch behind eye and another horizontally elongate one across opercle ..... *E. hexagonatus*
19b Length of 2nd A spine 2.5-3.6 in head; longest D spine 3.0-3.5 in head; no distinct silvery white dots between dark spots of head and body; no yellow-brown blotch behind eye or on opercle 20

20a Large black blotch on body at base of last 4 D spines extending onto fin at least halfway to the margin; no other black blotches at base of D or on peduncle; C peduncle depth not less than length of 2nd A spine ..... *E. melanostigma*
20b Four black blotches (or groups of spots much darker than others) at base of D; saddle-like black blotch (or merged spots) on C peduncle; C peduncle depth distinctly less than length of 2nd A spine; front of head with small black or dark brown spots (much smaller than half of pupil) ..... *E. spilotoceps*

21a LL 52-65 22
21b LL 65-74 25

22a Total GR 29-31; posterior nostrils subtriangular, larger than anterior nostrils; head and body buff with large, irregular, dark brown blotches and numerous, small, close-set dark brown spots; a black "saddle" spot on C peduncle ..... *E. fuscoguttatus*
22b Total GR 23-29; nostrils subequal; dark spots on head and body not very small and not close-set; no black spot on top of peduncle 23

23a Body depth 2.7-3.1 in SL; no dark spots on A or paired fins and few on C; dorsolateral parts of head and body covered with small, irregularly spaced and shaped, blackish brown spots; D also with dark spots; a dark brown streak from front of snout along upper edge of maxilla to lower rear edge of preopercle; maxilla completely naked ..... *E. magniscuttis*
23b Body depth 3.1-3.8 in SL; fins with dark spots; dark spots on head not in 2 rows from eye towards P base; maxilla with small, embedded scales 24

24a Head and body with small black spots and scattered larger pale spots and blotches; P 18-20 ... *E. malabaricus*
24b Head and body pale, with brownish orange spots but no pale spots or blotches; P 19-20 (usually 20) ..... *E. suillus*

25a LSS 117-135; body pale grey or buff with 5 longitudinal rows of large, widely spaced, oval or round dark brown to black blotches, those in upper 3 or 4 rows larger than eye ..... *E. tukula*
25b LSS 97-110; dark spots on body smaller than eye 26

26a Midlateral body scales distinctly ctenoid; 2 dark streaks running backwards from lower half of eye; midlateral part of lower jaw with 2 rows of teeth ..... *E. andersoni*

26b Midlateral body scales smooth; no dark streaks backwards from eye; midlateral part of lower jaw with 3-5 rows of teeth ..... *E. tauvina*

27a Body with 4-6 subvertical, broad, dark bars (often indistinct); tip of operculum nearer LL than P base 28
27b No subvertical dark bars on body; tip of operculum generally about halfway between LL and P base 29

28a Outer margin of interspinous D membranes black (red on specimens from deep water); orbit with a narrow dark brown edge; scales without a pale dot; dark bars on body vertical with straight edges; D XI,15-17 ..... *E. fasciatus*
28b Margin of interspinous D membranes not black or red; orbit without brown edge; each body scale usually with a bluish white dot; dark bars on body irregular, slightly oblique, often indistinct; D XI,16-18 ..... *E. rivulatus*

29a Whitish spots and/or blotches present on body; D XI,15-16 30
29b No whitish spots or blotches on body; D XI,13-15 32

30a Lower part of head and body usually yellowish; LL 66-73 ..... *E. guaza*
30b No yellow on head or body; LL 47-62 31

31a P 15-17; rear margin of operculum obtuse, the upper edge very convex; pale spots on body of large adults joined to form horizontal pale lines; LL 47-53 ..... *E. ongus*
31b P 17-19; rear margin of operculum acute, the upper edge straight or slightly convex; in large adults (larger than 30 cm SL) the white spots on body have merged to form wavy pale lines and mottlings; LL 52-62 ..... *E. caeruleopunctatus*

32a No dark bands or lines on body; body brownish, with dark brown or black dots, not in regular rows (these dots may be faint or absent on some specimens); faint dark stripe from lower edge of eye to above corner of preopercle ..... *E.* sp. (brown rockcod)
32b Body with curved, dark brown bands or lines (which divide into rows of spots on large specimens); rows of dark spots also sometimes present paralleling the dark bands 33

33a Posterior nostrils of adults about twice as large as anterior nostrils; dark bands (or rows of spots) on head and body with middle of each band lower than the ends 34
33b Posterior nostrils not notably larger than anterior; 5 dark brown bands (with age, only the edges of these bands remain dark) passing downward and anteriorly from upper edge of body: 1st from nape to eye, 2nd from middle D spines to upper edge of opercle, 3rd and 4th from soft D (both branching ventrally) and 5th on C peduncle ..... *E. radiatus*

34a An isolated, dark brown or black blotch (or group of small spots) at base of middle D spines and not joined to an oblique dark band on body; a curved, dark brown band or double row of dark spots from nape to anterior soft D rays paralleling the curve of the dark blotch at base of spinous D .. *E. poecilonotus*
34b Dark blotch at base of middle D spines joined to a dark band from upper edge of operculum; no continuous curved band from nape to anterior D soft-rays ..... *E. morrhua*

166.33 *Epinephelus albomarginatus*

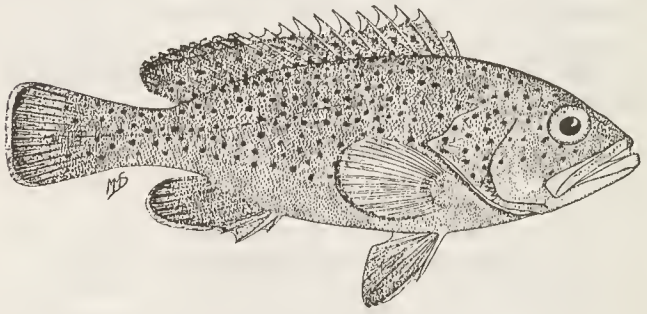
Boulenger, 1903
PLATE 38

White-edged rockcod — Witrand-klipkabeljou

Epinephelus albomarginatus Boulenger, 1903: 65, Pl. 4 (Natal); Smith, **SFSA No. 442*;** van der Elst, 1981: 288*; Heemstra & Randall, 1984: Epin 26*.

D XI,14; A III,8; P 17-18; LL 56-64; LSS 102-116; GR (8-10)+(14-16). Body depth 2.6-3.0, head 2.4-2.5 in SL. Midlateral body scales distinctly ctenoid; 2 rows of teeth at side of lower jaw; maxilla naked; C truncate with rounded corners.

Attains 90 cm. Known only from southern Mozambique to East London; common in 10 - 70 m off Natal.



166.33 *Epinephelus albomarginatus:* 22.5 cm (Delagoa Bay).

166.34 *Epinephelus andersoni*

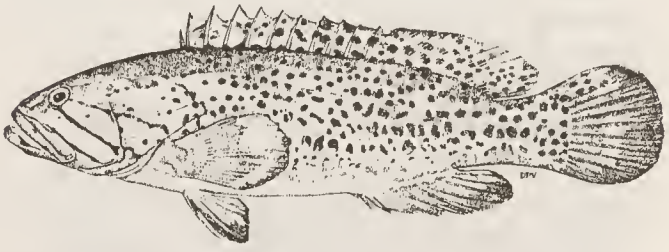
Boulenger, 1903
PLATES 34 & 38

Catface rockcod — Katgesig-klipkabeljou

Epinephelus andersoni Boulenger, 1903: 66, Pl. 5 (Natal); Smith, **SFSA No. 437*;** Smith & Smith, 1966: 69*; van der Elst, 1981: 289*; Heemstra & Randall, 1984: Epin 27*.

D XI,13-15; A III,8; P 17-19; LL 68-72; LSS 100-105; GR (8-11)+(14-16). Body depth 3.2-3.7, head 2.4-2.7 in SL; body width more than half of the depth. Midlateral body scales ctenoid but most embedded, with auxiliary scales; 2 or 3 rows of teeth at side of lower jaw.

Attains 80 cm. Juveniles with a black blotch at base of posterior D spines. Known only from southern Mozambique to Knysna; common on reefs and rocky bottom to depths of at least 50 m.



166.34 *Epinephelus andersoni:* 37 cm SL (Natal).

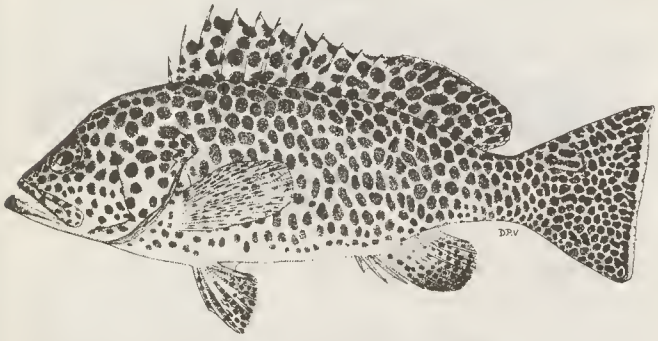
166.35 *Epinephelus areolatus*
(Forsskål, 1775)
PLATE 36

Squaretail rockcod Stompstert-klipkabeljou

Perca areolatus Forsskål, 1775: 42 (Djedda, Red Sea). *Epinephelus areolatus: Smith,* **SFSA No. 446*.** Randall & Ben-Tuvia, 1983: 392*; Heemstra & Randall, 1984: Epin 4*. *Epinephelus chlorostigma* (*non* Valenciennes): van der Elst, 1981: 290*.

D XI,15-17; A III,8; P 17-18; LL 50-56; LSS 97-115; GR (8-9)+(14-16). Body depth 3.0-3.3, head length 2.5-2.7 in SL; orbit 4.1-5.5 in head. Mid-lateral body scales ctenoid; C emarginate; 2 rows of teeth at side of lower jaw; maxilla scaly.

Dark spots become smaller and more numerous with growth; large specimens are easily confused with *E. chlorostigma*. Attains 5 cm. Red Sea, south to Natal, and to the western Pacific. Depth range 6 - 200 m; prefers small coral heads in silty sand areas or seagrass beds.



166.35 *Epinephelus areolatus:* 22 cm SL (Sudan).

166.36 *Epinephelus caeruleopunctatus*
(Bloch, 1790)
PLATE 38

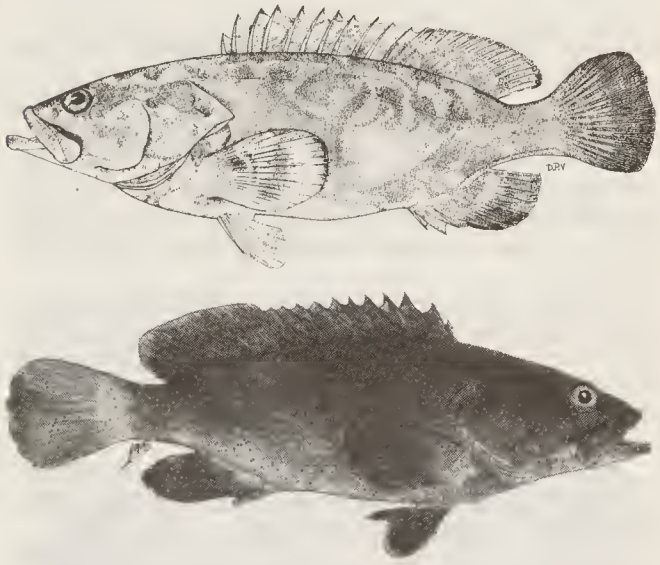
Whitespotted rockcod Witkol-klipkabeljou

Holocentrus caeruleo-punctatus Bloch, 1790: 94, Pl. 241, Fig. 2 (no locality). *Epinephelus caeruleopunctatus:* Smith, **SFSA No. 450*;** Morgans, 1982: 14; Heemstra & Randall, 1984: Epin 28*. *Epinephelus summana* (*non* Forsskål): Smith, **SFSA No. 449*.**

D XI,15-17; A III,8; P 17-19; LL 51-62; LSS 86-106; GR (8-10)+(15-17). Body depth 2.9-3.4, head 2.4-2.7 in SL. Opercular flap acute, the upper edge only slightly convex; body scales mostly ctenoid; 3-5 rows of teeth at side of lower jaw.

166.36 *Epinephelus caeruleopunctatus:* 16.5 cm SL (Natal).

Attains 60 cm. Western Indian Ocean south to East London and east to Japan, Australia, Gilbert and Caroline Ids. Coral reefs and rocky bottom in depths of 2 - 20 m; stays close to the shelter of caves and crevices.



166.36 *Epinephelus caeruleopunctatus:* top: 43.5 cm SL (Natal); bottom: 45 cm (Zanzibar).

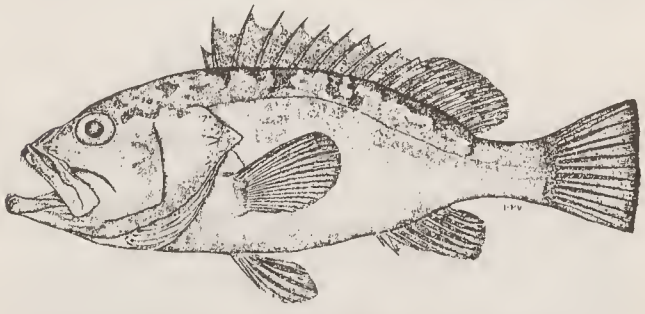
166.37 *Epinephelus chabaudi*
Castelnau, 1861
PLATE 38

Moustache rockcod Snorbaard klipkabeljou

Epinephelus chabaudi Castelnau, 1861: 3 (Algoa Bay). *Epinephelus modestus* Gilchrist & Thompson, 1909: 218 (Durban); Smith, **SFSA No. 441**; Morgans, 1982: 17*; Heemstra & Randall, 1984: Epin 43*. *Epinephelus clarkei* Smith, 1958: 124, Fig. (Xora River mouth, Transkei); 1961 567, **No. 438a*.**

D XI,13-15; A III,9; P 17-18; LL 62-69; LSS 104-114; GR 8+(15-16). Body depth 2.5-2.8, head 2.3-2.5 in SL. Body scales ctenoid; auxiliary scales present or absent. Side of lower jaw with 2 rows of teeth on fish less than 60 cm SL, and 3 or 4 rows on fish 90 cm SL or larger. D membrane deeply incised between the spines. Posterior nostrils 3 or 4 times larger than anteriors.

Greyish brown with vague darker blotches along back above LL; dorsal surface of peduncle blackish brown; a



166.37 *Epinephelus chabaudi:* 24 cm holotype of *E. clarkei* (Transkei).

prominent black streak on maxillary groove; large adults nondescript grey-brown. Attains 137 cm, 41 kg. Known only from Algoa Bay north to Kenya. Usual fishing depths 30 - 180 m.

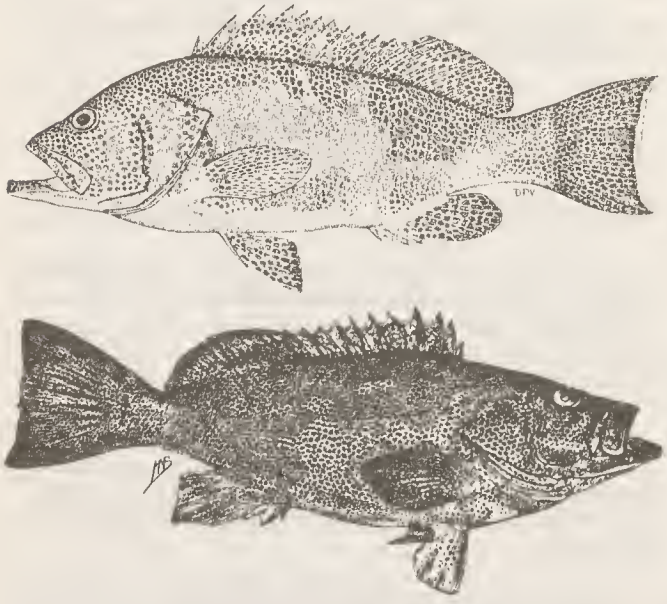
166.38 *Epinephelus chlorostigma*
(Valenciennes, 1828)
PLATE 39

Brownspotted rockcod Bruinspikkel-klipkabeljou

Serranus chlorostigma Valenciennes, *in* Cuv. & Val., 1828: 352 (Seychelles). *Epinephelus chlorostigma:* Morgans, 1982: 23*; Randall & Ben-Tuvia, 1983: 7*; Heemstra & Randall, 1984: Epin 29*; Smith, SFSA **No. 445.**

D XI,16-18; A III,8; P 17-19; LL 49-53; LSS 96-119; GR (8-11)+(14-18). Body compressed, depth 2.6-3.3, head length 2.5-2.7 in SL; eye diameter 5.0-7.3 in head. A of adults angular. Scales on flanks ctenoid with auxiliary scales. Lower jaw strongly projecting, with 2 rows of teeth at the sides.

Rear edge of C usually with a narrow white margin. Attains 75 cm. Red Sea and Indian Ocean (south to Natal) to western Pacific in depths of 4 - 150 m.



166.38 *Epinephelus chlorostigma:* top: 32 cm SL (N. Mozambique); bottom: 75 cm (Kenya).

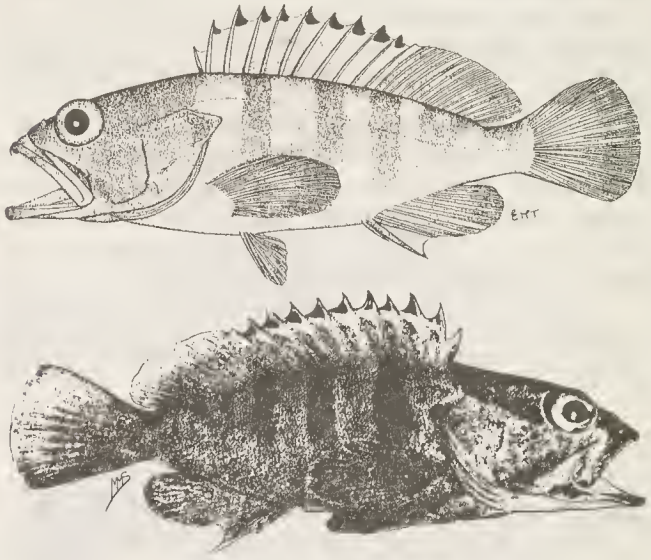
166.39 *Epinephelus fasciatus*
(Forsskål, 1775)
PLATE 39

Redbarred rockcod Rooibalk-klipkabeljou

Perca fasciata Forsskål, 1775: 40 (Red Sea). *Epinephelus fasciatus:* Smith, SFSA **No. 436*;** van der Elst, 1981: 291*; Morgans, 1982: 13; Randall & Ben-Tuvia, 1983: 397*; Heemstra & Randall, 1984: Epin 8*.

D XI,15-17; A III,8; P 18-20; LL 50-58; LSS 92-125; GR (6-9)+(15-18). Body depth 2.9-3.3. head 2.4-2.65 in SL. Scales on flanks mostly ctenoid with auxiliary scales; 2 or 3 rows of teeth at side of lower jaw.

Pale grey to yellowish red with 5 broad, dark, orange-red bars on body (more distinct dorsally, sometimes absent); conspicuous black triangle behind tip of each D spine; dorsal part of head and nape often dark reddish brown; orbit usually with a narrow blackish edge. Attains 35 cm. Red Sea, southwards to Port Alfred and eastwards to the central Pacific. A common species of coral reefs and rocky bottom from the shallows to 160 m.

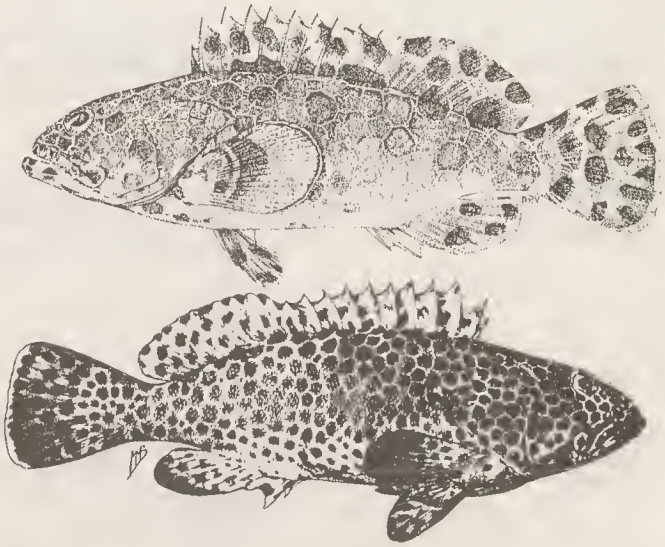


166.39 *Epinephelus fasciatus*: top: 7.5 cm SL; bottom: 22 cm (both N. Mozambique).

166.40 *Epinephelus faveatus*
(Valenciennes, 1828)
PLATES 36 & 39

Bigspot rockcod Grootkol-klipkabeljou

Serranus faveatus Valenciennes, *in* Cuv. & Val., 1828: 329 (India, Mauritius, Sri Lanka). *Epinephelus megachir* (*non* Richardson): Smith,



166.40 *Epinephelus faveatus:* top: 18.5 cm SL (N. Mozambique); bottom: ca. 40 cm (Kenya).

SFSA No. 440*. *Epinephelus gilberti* (*non* Richardson): Morgans, 1982: 27. *Epinephelus macrospilos:* Smith, **SFSA No. 440a*.** *Epinephelus faveatus:* Heemstra & Randall, 1984: Epin 32*.

D X1,15-17; A III,8; P 17-19; LL 47-52; LSS 92-102; GR (6-9)+(14-16). Body depth 3.1-3.6, head 2.4-2.6 in SL. P 1.6-1.9 in head. Flank scales smooth, except those covered by P; 2 rows of teeth at side of lower jaw.

Head and body with close-set brown and black spots of various sizes, the pale interspaces forming a network pattern; dark spots of juveniles appear larger than those of adults. Attains 51 cm. Western Indian Ocean to Natal and east to Indonesia in depths of 1 - 30 m.

166.41 *Epinephelus flavocaeruleus*

(Lacepède, 1802)

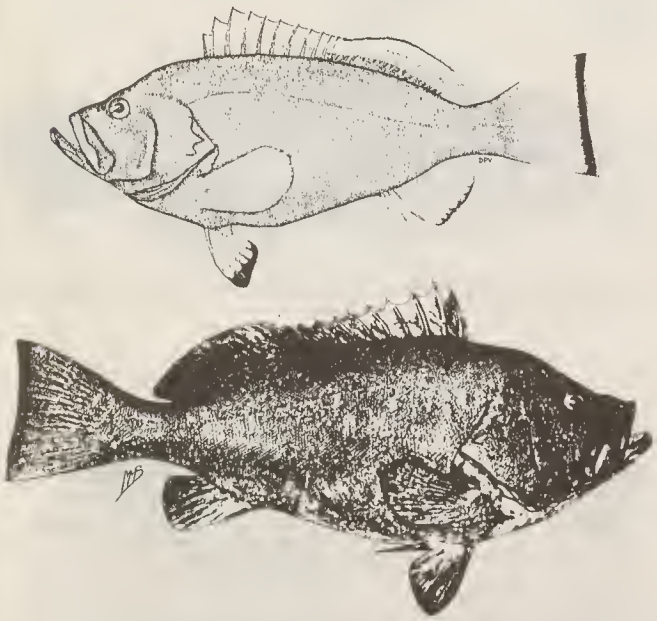
PLATE 39

Yellowtail rockcod — Geelstert-klipkabeljou

Holocentrus flavo-caeruleus Lacepède, 1802: 331, 367 (Mauritius). *Epinephelus flavocaeruleus:* Smith, **SFSA No. 433*;** van der Elst, 1981: 292*; Morgans, 1982: 15; Heemstra & Randall, 1984: Epin 33*; Randall & Whitehead, 1985: 35*.

D XI,15-17; A 1II,8; P 18-19; LL 61-74; LSS 129-148; GR (9-10)+(15-17). Body depth 2.4-2.8, head 2.5-2.7 in SL; body width 2.0-2.8 in depth. D membrane not incised between the spines. Rear nostrils of large adults much larger than front ones.

Yellow colour of juveniles becomes reduced with growth and may be completely gone on large adults. Attains 90 cm, 15 kg. Indian Ocean from Kenya south to Port Alfred and east to India, Persian Gulf, Andaman Ids. and East Burma Sea; also probably at all of the tropical Indian Ocean Ids. (Réunion, Mauritius, Seychelles, etc.). Juveniles in shallow water, adults on deep reefs (to 150 m).



166.41 *Epinephelus flavocaeruleus:* top: 36 cm SL (Natal); bottom: 56 cm (Kenya).

166.42 *Epinephelus fuscoguttatus*

(Forsskål, 1775)

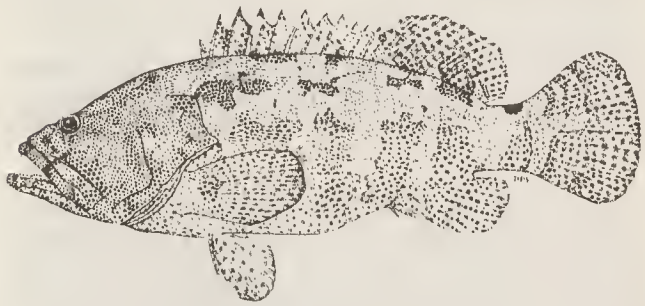
PLATE 39

Blotchy rockcod — Gevlekte klipkabeljou

Perca summana var. *fusco-guttata* Forsskål, 1775: 42 (Red Sea). *Epinephelus fuscoguttatus:* Smith, **SFSA No. 451** (in part, Fig. 451 is of *E. tukula*); Morgans, 1982: 23; Randall & Ben-Tuvia, 1983: 399*; Heemstra & Randall, 1984: Epin 9*.

D XI,14-15; A III,8; P 18-20; LL 49-58; LSS 102-116; GR (10-12)+(18-21). Body depth 2.6-2.9, head 2.3-2.4 in SL. Dorsal head profile with an indentation above rear edge of eye; interorbital area flat. Front nostrils tiny, rear ones much larger. Flank scales smooth, mostly covered by skin on large adults.

Attains at least 90 cm and 10 kg. Red Sea, western Indian Ocean south to Mozambique and east to the western Pacific (Japan to Australia).



166.42 *Epinephelus fuscoguttatus:* 5.5 cm SL (Saudi Arabia).

166.43 *Epinephelus guaza*

(Linnaeus, 1758)

PLATES 36 & 39

Yellowbelly rockcod — Geelpens-klipkabeljou

Labrus Guaza Linnaeus, 1758: 285 (open ocean). *Epinephelus guaza:* Smith, **SFSA No. 435*;** Smith & Smith, 1966: 70*; van der Elst, 1981: 294*; Heemstra & Randall, 1984: Epin 1*.

D XI,15-16; A III,8; P 17-19; LL 66-73; LSS 106-123; GR (8-9)+(14-16). Body depth 2.7-3.0, head 2.4-2.5 in SL. Flank scales ctenoid (small specimens) or smooth (large specimens). Nostrils subequal or posterior ones slightly larger. Lower jaw with 2 or 3 rows of teeth at the side. D membrane deeply incised between the spines.

166.43 *Epinephelus guaza:* 8 cm SL (Tsitsikama).

Head and body greyish or brown dorsally, yellow or whitish ventrally; irregular white blotches usually visible on body and head, sometimes in vertical rows; spinous D margin and basal part of A and paired fins often golden yellow; median fins usually dark brown; rear edge of C with a white line. Attains 150 cm and at least 30 kg. Mediterranean and eastern Atlantic south to the Cape and into the Indian Ocean at least to Quissico, Mozambique (25°S). The most common species of rockcod from Knysna to Natal. Also reported from Brazil (C. L. Smith, 1971).

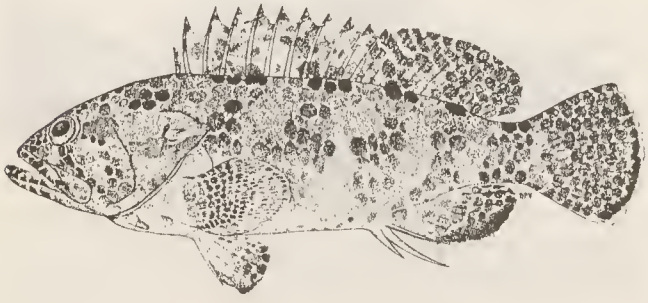
166.44 *Epinephelus hexagonatus*
(Schneider, 1801)
PLATE 39

White specked rockcod — Witspikkel-klipkabeljou

Holocentrus hexagonatus Schneider, *in* Bloch & Schneider, 1801: 323 (Tahiti). *Epinephelus hexagonatus:* Morgans, 1982: 25*; Heemstra & Randall, 1984: Epin 34*.

D XI,15-16; A III,8; P 18-20; LL 61-66; LSS 93-104; GR (7-9)+(16-19). Body depth 3.1-3.5, head 2.4-2.6 in SL; 2nd A spine distinctly longer than 3rd and more than C peduncle depth. Flank scales ctenoid; 3-5 rows of teeth at side of lower jaw.

Silvery white dots at edges of brown polygonal spots are characteristic for this species; 4 black blotches formed by groups of dark polygonal spots are usually present on body at base of D and extending into the fin and 1 dorsally on C peduncle; P pale or dusky with indistinct dark spots. Attains 25 cm. Tropical western Indian Ocean from Mozambique to Sri Lanka and east to the Marshall Ids. and Japan. Coral reefs to depths of 30 m; seems to be rare in our area.



166.44 *Epinephelus hexagonatus:* 15.5 cm SL (Mauritius).

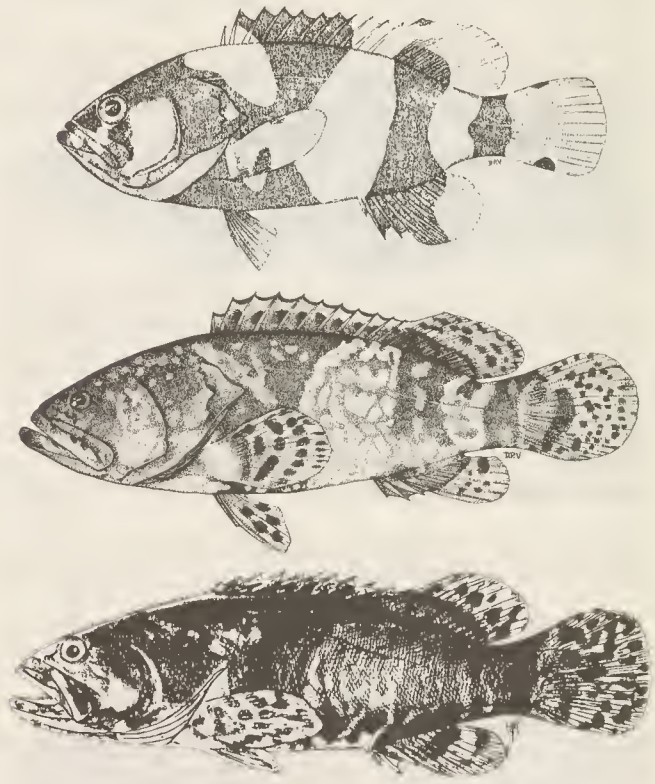
166.45 *Epinephelus lanceolatus*
(Bloch, 1790)
PLATE 36

Brindlebass — Briekwabaars

Holocentrus lanceolatus Bloch, 1790: 92, Pl. 242, Fig. 1 (East Indies). *Promicrops lanceolatus:* Smith, **SFSA No. 452***; van der Elst, 1981: 297*; Morgans, 1982: 13; Heemstra & Randall, 1984: Promic 1*.

D XI,14-16; A III,8; P 18-19; LL 53-67, the anterior scales with branched tubes; LSS 89-110; GR (9-10)+(14-16); side of gill arches with numerous small platelets. Body depth 2.5-3.4, head 2.2-2.5 in SL; body robust, width 1.5-1.75 in depth. Body scales smooth; maxilla reaches well past eye; interorbital area flat; D spines shorter than D rays, 3.2-4.8 in head.

Juveniles and subadults irregularly barred and mottled with dark brown and yellow, the fins yellowish with dark brown spots; adults dark greyish brown, mottled with pale. Attains 270 cm and 400+ kg. Tropical Indo-Pacific south to Algoa Bay. A giant of a fish, large adults, as well as juveniles, are often found in estuaries; on coral reefs they usually reside in large caves. Feeds on a variety of fishes (including small sharks) and crustaceans. The brindlebass is the largest of the rockcods and one of the biggest species of bony fishes in the sea; reputed to attack divers, but such attacks have not been documented.



166.45 *Epinephelus lanceolatus:* top: 8 cm (Transkei); middle: 23.5 cm (Natal); bottom: 25 cm (N. Mozambique).

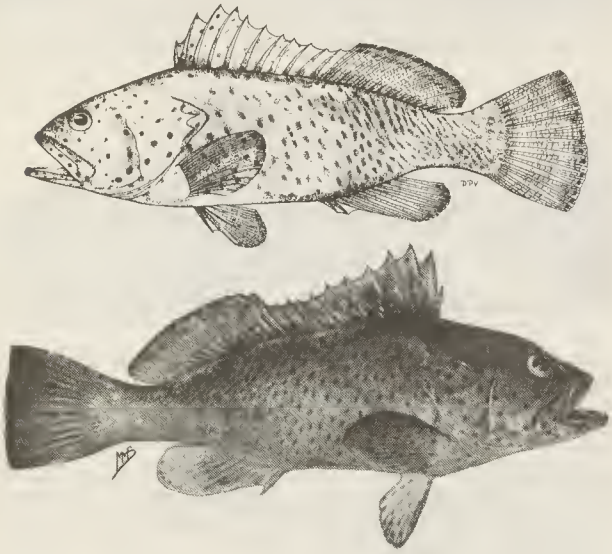
166.46 *Epinephelus longispinis*
(Kner, 1865)
PLATE 39

Streakyspot rockcod — Strepiekol-klipkabeljou

Serranus longispinis Kner, 1865: 275, Pl. 2, Fig. 5 (Madras). *Epinephelus fario* (*non* Thunberg): Smith, **SFSA No. 444***. *Epinephelus longispinis:* Morgans, 1982: 20*; Heemstra & Randall, 1984: Epin. 36*.

D XI,16-17; A III,8; P 17-19; LL 49-53; LSS 106-116; GR (8-11)+(14-16). Body depth 2.5-3.1, head 2.5-2.7 in SL. Longest D spine longer than longest D soft-ray, 2.1-2.5 in head. Body scales distinctly ctenoid.

Head and body pale brown with dark reddish brown spots that are round and well separated on head and front part of body, but become crowded and elongated to form short oblique streaks on rear part of body and peduncle. Attains 55 cm. Indian Ocean from the Transkei to Indonesia in depths of 10 - 70 m. Sometimes misidentified as *E. gaimardi.*



166.46 *Epinephelus longispinis:* top: 38 cm (Natal); bottom: 60 cm (Zanzibar).

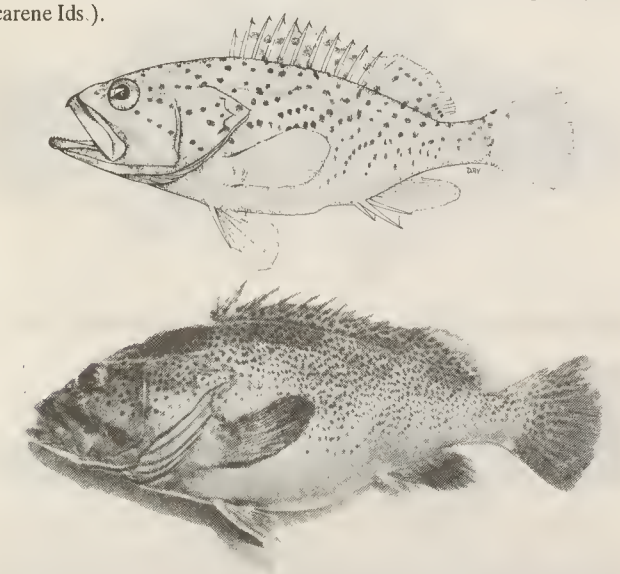
166.47 *Epinephelus magniscuttis*

Postel, Fourmanoir & Guézé, 1964

PLATE 40

Speckled rockcod — Gespikkelde-klipkabeljou

Epinephelus magniscuttis Postel, Fourmanoir & Guézé, 1964: 365, Fig. 9 (Réunion); Heemstra & Randall, 1984: Epin 36*. *Epinephelus pseudomorrhua* Postel, Fourmanoir & Guézé, 1964: 366, Fig. 10 (Mascarene Ids.).



166.47 *Epinephelus magniscuttis:* top: 7.5 cm SL; bottom: 58 cm (N. Mozambique).

D XI,14-15; A III,8; P 17-19; LL 55-62; LSS 103-122; GR 9+(16-17). Body depth 2.7-3.1, head 2.3-2.5 in SL. Flank scales ctenoid; no auxiliary scales.

Attains 70 cm. Known only from Sodwana Bay, Mozambique, Mauritius and Réunion in depths of 50 - 300 m.

166.48 *Epinephelus malabaricus*

(Schneider, 1801)

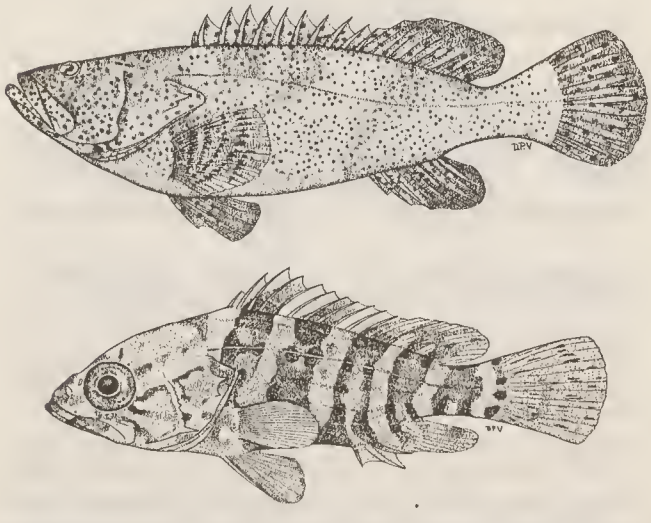
PLATE 40

Malabar rockcod — Malabar-klipkabeljou

Holocentrus malabaricus Schneider, *in* Bloch & Schneider, 1801: 319, Pl. 63 (Tranquebar). *Epinephelus tauvina* (*non* Forsskål): Smith, **SFSA No. 447*** (black and white photograph only; Morgans, 1966: 258. *Epinephelus malabaricus:* van der Elst, 1981: 295*; Heemstra & Randall, 1984: Epin 38* (in part).

D XI,14-16; A III,8; P 18-20; LL 54-64; LSS 102-117; GR (8-11)+(15-18). Body depth 3.0-3.6, head length 2.3-2.5 in SL. Maxilla reaches past eye; 2 rows of teeth at side of lower jaw (3-9 rows in fish larger than 100 cm). Flank scales distinctly ctenoid, with auxiliary scales; anterior LL scales of large adults with branched tubules. Nostrils subequal. Longest D spine shorter than longest ray, 3.1-4.0 in head; D membrane incised between the spines.

Head and body pale grey to yellowish brown covered with small, well-defined and well-separated blackish brown spots and scattered, larger, diffuse pale spots and blotches; body with 5 irregular, slightly oblique, broad dark bars, which tend to bifurcate ventrally and may contain pale areas. Pale spots and dark bars gradually disappear with growth and the small black spots become more numerous. Adults from 50-150 cm TL with eye brilliantly golden. Adults larger than 150 cm with body and head drab dark brown with indistinct paler mottlings and no small blackish spots, but C and soft D usually with small blackish spots. Reported to attain 234 cm, 150 kg (Morgans, 1966). Red



166.48 *Epinephelus malabaricus:* top: 50 cm (N. Mozambique); bottom: 2.5 cm SL (Transkei).

Sea and Indian Ocean south to the Transkei and east to the Pacific (Japan to Australia). An inshore species, often found in estuaries, usually not on well-developed coral reefs. These colour notes are based on the the excellent paper by J. J. C. Morgans (1966), who spent 5 years collecting and studying rockcods off the coast of east Africa.

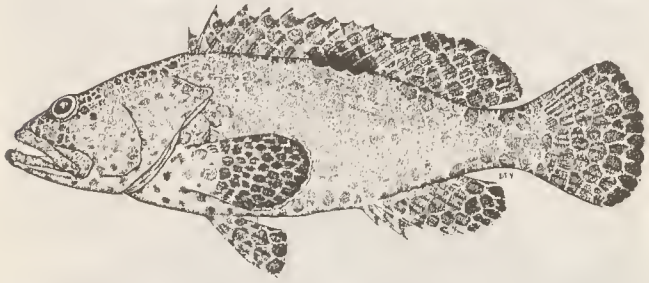
166.49 *Epinephelus melanostigma*
Schultz, 1953
PLATE 40

One-blotch rockcod — Eenkol-klipkabeljou

Epinephelus melanostigma Schultz, 1953: 348, Fig. 54 (Swains Id., Samoan group); Heemstra & Randall, 1984: Epin 39*.

D XI,14-16; A III,8; P 17-19; LL 56-68; LSS 83-98; GR (7-10)+(17-19). Body depth 3.0-3.4, head 2.2-2.4 in SL. Maxilla reaches past eye; 3-5 rows of teeth at side of lower jaw. Flank scales ctenoid, with auxiliary scales. Length of 2nd A spine subequal to 3rd, 2.7-3.6 in head.

Head, body and fins with close-set brown spots, the pale interspaces forming a network; only 1 dark blotch at base of D; outer surface of distal half of P dusky, the entire inner surface of fin with a distinct pale network as on body. Attains 30 cm. Western Indian Ocean south to Durban and east to the western Central Pacific. A shallow-water reef species.



166.49 *Epinephelus melanostigma:* 24.5 cm (Natal).

166.50 *Epinephelus merra*
Bloch, 1793
PLATE 40

Honeycomb rockcod — Heuningkoek-klipkabeljou

Epinephelus merra Bloch, 1793: 17, Pl. 329 (Japan); Smith, **SFSA No. 439*;** Morgans, 1982: 26*; Heemstra & Randall, 1984: Epin 40*.

D XI,15-17; A III,8; P 16-18; LL 48-54; LSS 100-114; GR (6-8)+(14-16). Body depth 2.9-3.2, head 2.3-2.6 in SL. Maxilla reaches past eye; 2-4 rows of teeth at side of lower jaw. Flank scales ctenoid, with auxiliary scales. Length of 2nd A spine greater than 3rd or C peduncle depth.

Distinctive pale P with numerous, small, discrete, black spots. Attains 30 cm. Very common shallow-water reef species. Indo-West Pacific south to the Transkei, east to French Polynesia and north to Japan.

166.50 *Epinephelus merra:* ca. 17 cm SL (S. Mozambique).

166.51 *Epinephelus microdon*
(Bleeker, 1856)
PLATE 40

Camouflage rockcod — Maskering-klipkabeljou

Serranus microdon Bleeker, 1856: 86 (Djakarta). *Epinephelus microdon:* Randall, 1964: 290*; Morgans, 1982: 23; Randall & Ben-Tuvia, 1983: 406*; Heemstra & Randall, 1984: Epin 41*.

D XI,14-15; A III,8; P 16-17; LL 47-53; LSS 95-113; GR (9-10)+(15-17). Body depth 2.7-3.2, head 2.4-2.5 in SL. Dorsal head profile smoothly convex; interorbital area flat. Anterior nostrils subequal to posterior. Flank scales ctenoid, with auxiliary scales. Maxilla reaches well past eye; 2 or 3 rows of teeth at side of lower jaw.

Head, body and fins brownish, covered with small dark spots (smaller than pupil); head and body with more or less distinct, dark blotches, the blotch on top of peduncle usually brownish black and most conspicuous. Attains 90 cm. Red Sea and Indo-Pacific from northern Mozambique (probably in southern Mozambique as well) to the western Pacific (southern Japan to Queensland).

166.51 *Epinephelus microdon:* 37 cm (Bassas da India, Mozambique Channel).

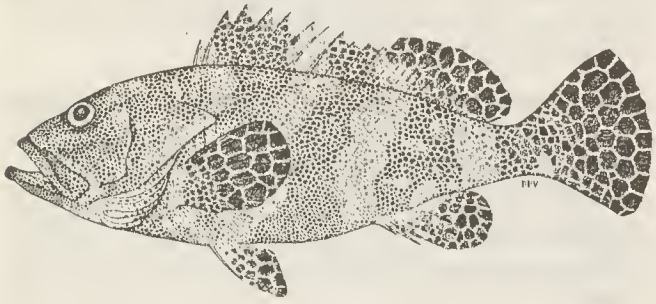
166.52 *Epinephelus miliaris*
(Valenciennes, 1830)
PLATE 40

Netfin rockcod — Netvin-klipkabeljou

Serranus miliaris Valenciennes, *in* Cuv. & Val., 1830: 520 (New Guinea). *Epinephelus fuscus* Fourmanoir, 1961: 92 (Madagascar). *Epinephelus dictiophorus:* Morgans, 1982: 24*. *Epinephelus miliaris:* Heemstra & Randall, 1984: Epin 42*.

D XI,16-18; A III,8; P 17-18; LL 48-51; LSS 94-108; GR (8-9)+(15-16). Body depth 2.9-3.2, head 2.3-2.5 in SL. Maxilla not reaching past eye; 2 rows of teeth at side of lower jaw. Flank scales ctenoid.

Head, body and spinous D covered with small close-set brown spots separated by pale lines; soft D, C, A and paired fins with very large black spots. Attains 45 cm. Zanzibar and northern Mozambique, Madagascar, Comores and Seychelles east to the western Pacific in depths of 1 - 90 m.



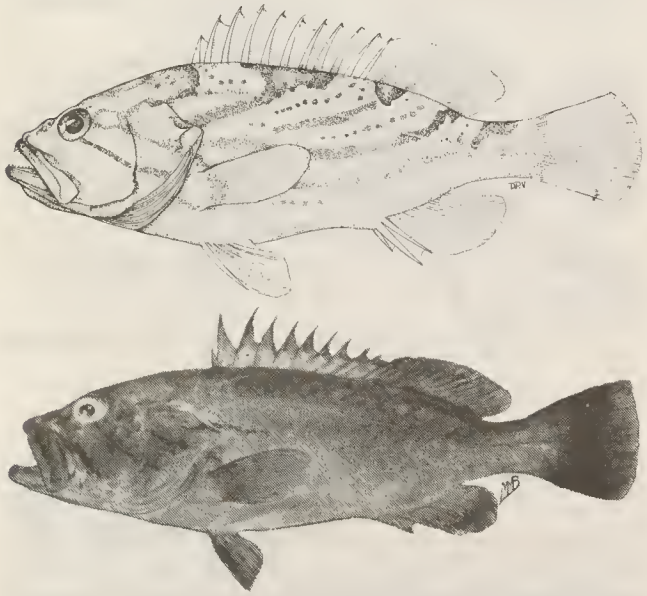
166.52 *Epinephelus miliaris*: ca. 30 cm (N. Mozambique).

166.53 *Epinephelus morrhua*
(Valenciennes, 1833)
PLATE 40

Contour rockcod — Kontoer-klipkabeljou

Serranus morrhua Valenciennes, *in* Cuv. & Val., 1833: 434 (Mauritius). *Epinephelus morrhua*: Smith, **SFSA No. 438*** (in part, not fig. of larger specimen which is *E. poecilonotus*); Randall & Ben-Tuvia, 1983: 408*; Heemstra & Randall, 1984: Epin 44*. *Epinephelus cometae*: Morgans, 1982: 18*.

D XI,14-15; A III,7-8; P 17-18; LL 57-64; LSS 108-123; GR (8-10)+(15-17). Body depth 2.8-3.1, head 2.2-2.5 in SL. Maxilla not reaching past eye; 2 rows of teeth at side of lower jaw. Flank scales strongly ctenoid, without auxiliary scales. Nostrils close together, posterior distinctly larger than anterior.



166.53 *Epinephelus morrhua*: top: 9.5 cm SL (Mauritius); bottom: 55 cm (N. Mozambique)

See illustration for distinctive colour pattern. Attains 90 cm. A deep-water species taken in depths of 120 - 370 m. Red Sea south to Durban and east to Japan and New Caledonia.

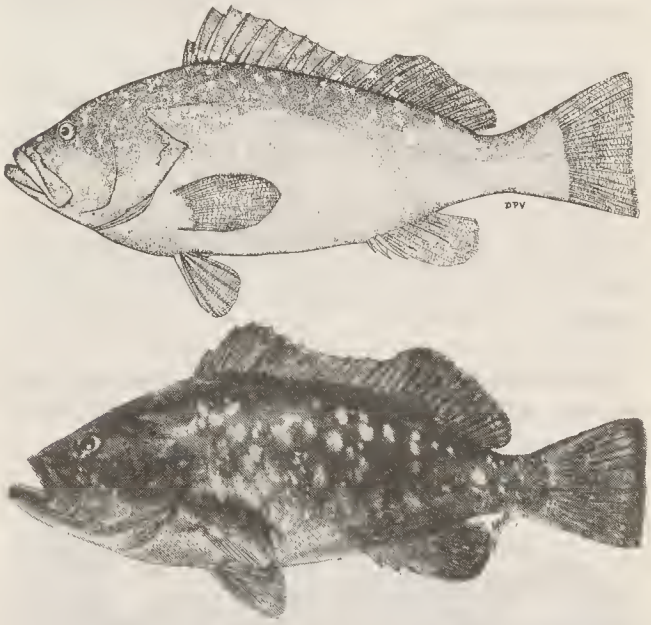
166.54 *Epinephelus multinotatus*
(Peters, 1876)
PLATE 41

White-blotched rockcod — Witvlek-klipkabeljou

Serranus multinotatus Peters, 1876: 435 (Mauritius). *Epinephelus leprosus* Smith, 1955: 310, Pl. 3a (Aldabra Id.); Morgans, 1982: 16. *Epinephelus areolatus* (*non* Forsskål): Morgans, 1982: 21* (in part, photo of 210 mm SL fish). *Epinephelus multinotatus*: Heemstra & Randall, 1984: Epin 45*.

D XI,15-17; A III,8; P 18-19; LL 64-80; LSS 134-162; GR (9-11)+(15-18). Body depth 2.6-3.0, head 2.4-2.8 in SL. D membranes not incised between the spines, longest D spine (3rd or 4th) 2.3-2.9 in head. Flank scales ctenoid, with auxiliary scales. Interorbital area convex; rear nostrils larger than front ones; 2 rows of teeth at side of lower jaw.

Attains 100 cm. Indian Ocean from southern Mozambique to Pakistan and the Persian Gulf, including Aldabra, Seychelles, Comores, Madagascar, Mauritius and Réunion.



166.54 *Epinephelus multinotatus*: top: 61 cm (S. Mozambique); bottom: 51 cm holotype of *E. leprosus* (Aldabra).

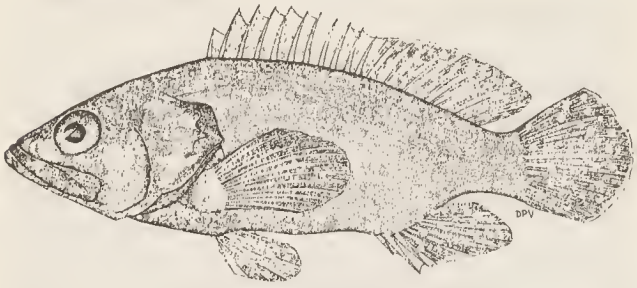
166.55 *Epinephelus ongus*
(Bloch, 1790)
PLATE 41

White-streaked rockcod — Witstrepie-klipkabeljou

Holocentrus ongus Bloch, 1790: 69, Pl. 234 (Japan). *Epinephelus summana* (*non* Forsskål): Morgans, 1982: 15. *Epinephelus ongus*: Heemstra & Randall, 1984: Epin 46*.

D XI,15-16; A III,8; P 15-17; LL 47-53; LSS 90-109; GR (8-10)+(15-17). Body depth 2.7-3.2, head 2.3-2.5 in SL. Opercular flap obtuse, the upper edge strongly convex; interorbital area flat. Flank scales ctenoid, with auxiliary scales.

Head and body dark grey or brown, covered with small greyish white or pale bluish grey spots; in adults, the spots have coalesced to form irregular, wavy, longitudinal lines on the body. Attains 30+ cm. Western Indian Ocean from Mozambique to Somalia, Seychelles, India and east to the Marshall Ids. and Japan.



166.55 *Epinephelus ongus:* 11 cm (Kenya).

166.56 *Epinephelus poecilonotus*

(Temminck & Schlegel, 1842)

PLATE 41

Dot-dash rockcod — Kolstreep-klipkabeljou

Serranus poecilonotus Temminck & Schlegel, 1842: 6, Pl. 4, Fig. 1 (Nagasaki). *Epinephelus morrhua* (*non* Valenciennes): Smith, **SFSA No. 438*** (in part, Fig. of 18 in. specimen). *Epinephelus praeopercularis* (*non* Boulenger): Morgans, 1982: 17*. *Epinephelus poecilonotus:* Heemstra & Randall, 1984: Epin 47*.

D XI,14-15; A III,8; P 17-19; LL 56-65; LSS 110-136; GR (8-9)+(15-18). Body depth 2.5-3.1, head 2.3-2.5 in SL. Maxilla not reaching past eye; 2 rows of teeth at side of lower jaw. Flank scales ctenoid. Preopercle serrate with 2-4 enlarged serrae at the angle; rear nostrils larger than front nostrils.

Body of large adults uniformly brownish. Attains 65 cm. Western Indian Ocean from Port Alfred (juvenile) to Somalia and east to Japan in depths of 60 - 200 m.

166.56 *Epinephelus poecilonotus:* top: 29.5 cm (Kenya); bottom: 11 cm (after Heemstra & Randall, 1984).

166.57 *Epinephelus posteli*

Fourmanoir & Crosnier, 1964

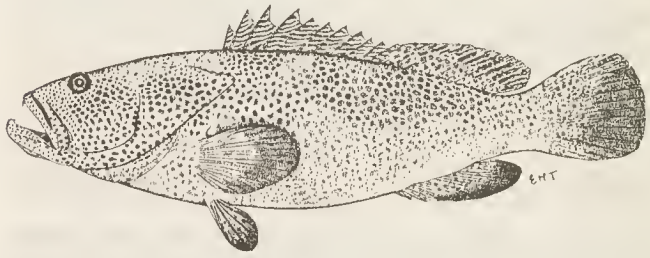
PLATE 45

Tiger rockcod — Tier-klipkabeljou

Epinephelus posteli Fourmanoir & Crosnier, 1964: 18, Pl. 16, Fig. C (Fort Dauphin, Madagascar); Heemstra & Randall, 1984: Epin 48*.

D XI,16; A III,9; P 18; LL 64; LSS 95-98; GR 8+(9-10). Body depth 3.1-3.6, head 2.3-2.4 in SL. Body scales smooth, mostly embedded and covered with auxiliary scales. C peduncle depth about twice length of 2nd A spine. Maxilla not reaching past eye; a pair of large canines at front of both jaws; an outer row of canines in upper jaw and 2 rows of canines at side of lower jaw. Interorbital area concave.

Head and body with small, close-set dark reddish brown spots; spinous D with subhorizontal dark stripes; soft D with a row of dark spots along each inter-radial membrane. Attains at least 100 cm, 10+ kg. Natal, Mozambique and Madagascar; probably more widely distributed, but only recently recognised as a distinct species. Coral reef areas in 20 -50 m.



166.57 *Epinephelus posteli:* 67 cm SL (Natal).

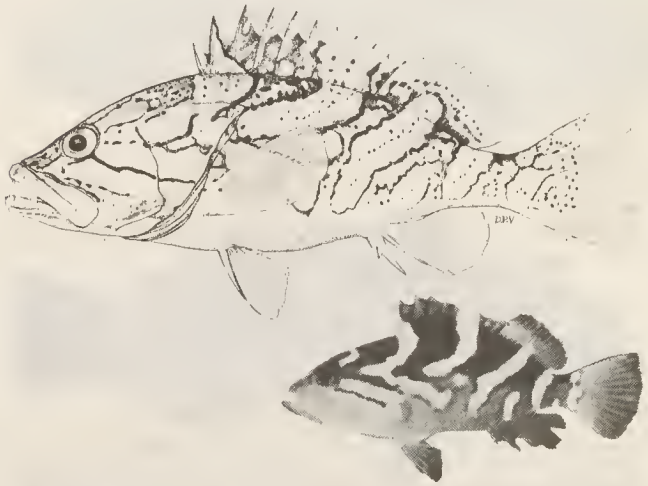
166.58 *Epinephelus radiatus*

(Day, 1867)

PLATE 41

Oblique-banded rockcod — Skeweband-klipkabeljou

Serranus radiatus Day, 1867: 699 (Madras). *Epinephelus radiatus:* Heemstra & Randall, 1984: Epin 50*.



166.58 *Epinephelus radiatus:* top: 29.5 cm SL (Japan); bottom: 4 cm SL (Mauritius; photo by J.E. Randall).

D XI,13-15; A III,8; P 17-18; LL 51-66; LSS 100-120; GR (8-9)+(16-18). Body depth 2.5-3.1, head 2.1-2.4 in SL. Flank scales distinctly ctenoid; preopercle serrate, with 2-5 enlarged serrae at the angle; 2 rows of teeth at side of lower jaw.

Attains 70 cm. Natal, Mauritius, Réunion, south India, Chagos Archipelago east to southern Japan. Adults generally in 80 - 160 m depth range; juveniles have been collected in 18 m.

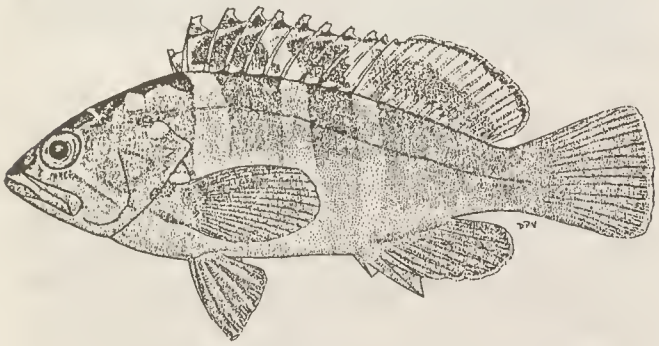
166.59 *Epinephelus retouti*
Bleeker, 1868
PLATE 45

Red-tipped rockcod — Rooipunt-klipkabeljou

Epinephelus retouti Bleeker, 1868: 339 (Réunion); Postel et al., 1964: 360*; Heemstra & Randall, 1984: Epin 51*; Randall & Heemstra, MS. *Epinephelus mauritianus* Baissac, 1962: 188 (Mauritius).

D XI,16-17; A III,8; P 19-20; LL 64-76; LSS 121-141; GR (6-8)+(15-16). Body depth 2.5-3.1, head 2.4-2.6 in SL. Flank scales ctenoid, with auxiliary scales; no scales on maxilla; 2-4 rows of teeth at side of lower jaw; nostrils subequal.

Adults generally dull yellowish orange to brownish red (scales red with greenish grey centres); 5 faint dark bars on body, the 1st on nape and below D origin, last on C peduncle; pale blue line adjacent to red rim of orbit and completely surrounding eye; D olivaceous to brown, the soft-rayed part darker, the outer triangular part of each interspinous membrane dark red with a submarginal yellow band; other fins pale orange-red except upper fourth of C which is dusky brown. Attains 50 cm. Indian Ocean (Bassas da India between Mozambique and Madagascar, Réunion, Mauritius, Chagos) to the central Pacific in depths of 25 - 220 m.



166.59 *Epinephelus retouti:* 10 cm SL (Mauritius).

166.60 *Epinephelus rivulatus*
(Valenciennes, 1830)
PLATES 41 & 45

Halfmoon rockcod — Halfmaan-klipkabeljou

Serranus rivulatus: Valenciennes, *in* Cuv. & Val., 1830: 515 (Réunion). *Epinephelus grammatophorus* Boulenger, 1903: 64, Pl. 3 (Natal); Smith, **SFSA No. 434*;** Smith & Smith, 1966: 69*; Morgans, 1982: 13. *?Epinephelus diacanthus* (*non* Valenciennes): Smith, **SFSA No. 443*.**

D XI,16-18; A III,8; P 17-19; LL 49-53; LSS 86-102; GR (7-8)+(13-16). Body depth 2.6-3.3, head 2.4-2.7 in SL. Flank scales ctenoid; nape and front of body above LL covered with small, embedded cycloid scales.

Head and body generally brownish; each body scale with a bluish white spot; usually 4 irregular dark bars from base of D to ventral part of body and a 5th dark bar at C base; usually 3 or 4 wavy violet lines radiating from eye and a few short segments of the same colour on cheek and opercle; P dark grey, usually with a dark red halfmoon-shaped blotch at the base; dark brown pigment in crease along base of spinous D. Attains 35 cm. Widely distributed in western Indian Ocean, from Algoa Bay to India and east to China and Japan. Commonly caught by shore anglers, also extends to depths of 120 m.

166.60 *Epinephelus rivulatus:* 22 cm SL (Natal).

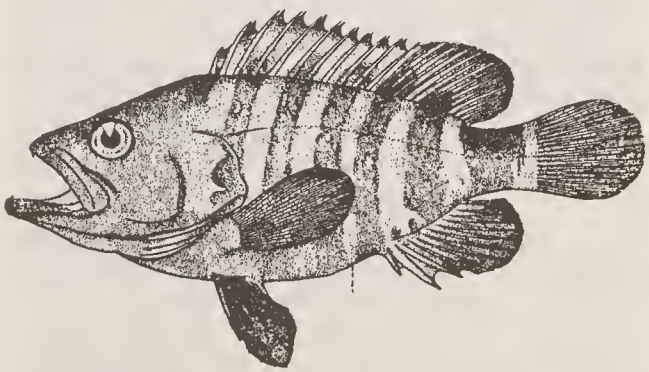
166.61 *Epinephelus septemfasciatus*
(Thunberg, 1793)
PLATE 42

Convict rockcod — Bandiet-klipkabeljou

Perca septemfasciatus Thunberg, 1793: 56, Pl. 1 (Nagasaki). *Epinephelus compressus* Postel, Fourmanoir & Guézé, 1964: 364, Fig. 8 (Réunion). *Epinephelus septemfasciatus:* Heemstra & Randall, 1984: Epin 53*.

D XI,13-15; A III,9-10; P 17-18; LL 63-71; LSS 107-116; GR (8-10)+(13-18). Body depth 2.5-3.1, head 2.2-2.5 in SL. Maxilla not reaching past orbit; 2 rows of teeth at side of lower jaw; rear nostrils of adults much larger than front ones; preopercle serrate, the lower edge with 1 or 2 spines well separated from the enlarged serrae at the angle.

Head and body pale brownish grey, with 7 or 8 dark bars, the first on nape and the last (broadest and darkest) on



166.61 *Epinephelus septemfasciatus:* 23 cm (after Katayama, 1975).

peduncle; fins dark brown. Attains 100 cm. Known in western Indian Ocean only from Mauritius, Réunion and Chagos Ids.; also occurs in Japan.

166.62 *Epinephelus* sp.

PLATE 42

Brown rockcod — Bruin klipkabeljou

D XI,14; A III,8; P 17; LL 58; LSS 115; GR 8+15. Body depth 3.05, head length 2.5 in SL; orbit 6.0, interorbital 5.6, P 1.9, longest D spine 3.5 in head. Maxilla not reaching past eye; 2 rows of teeth on lower jaw; diameter of rear nostrils about twice that of front ones; preopercle finely serrate, the angle produced, with enlarged serrae; distinct notch above preopercle angle. Flank scales ctenoid, with a few auxiliary scales.

Head and body brownish grey; dorsolateral part of body with black dots (very faint or absent on some specimens); median fins darker than body; margin of soft D, A and corners of C pale; dark streak on cheek along upper edge of maxillary groove; faint dark stripe from lower edge of eye to just above preopercle notch. Attains at least 60 cm, 5 kg. Diagnosis above taken from a 50 cm SL specimen caught off Umdloti, Natal by Mr Dave Williams. Mr A. R. Thorpe has supplied excellent photographs of 5 other specimens from Natal. This "brown rockcod" may represent a new species; it is very similar to *E. epistictus* (Temminck & Schlegel) of Japan, which differs slightly in scale counts and colour pattern; another similar species, *E. poecilonotus,* differs from the brown rockcod only in colour pattern.

166.63 *Epinephelus spilotoceps*

Schultz, 1953

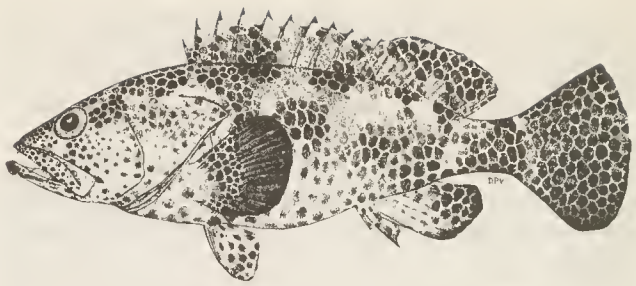
PLATE 42

Foursaddle rockcod — Viersaal-klipkabeljou

Epinephelus spilotoceps Schultz, 1953: 357, Figs. 56 & 57 (Bikini Atoll, Marshall Ids.); Morgans, 1982: 26*; Heemstra & Randall, 1984: Epin 54*. *Epinephelus salonotus* Smith & Smith, 1963: 15, Pl. 14, Fig. 1 (Cape Delgado, Mozambique).

D XI,15; A III,8; P 17-19; LL 60-69; LSS 91-94; GR (7-8)+(15-18). Body depth 3.1-3.5, head length 2.2-2.4 in SL. Maxilla reaches past eye; 3 or 4 rows of teeth at side of lower jaw; nostrils subequal. Flank scales ctenoid, with auxiliary scales.

Head, body and fins covered with close-set, dark polygonal spots, the pale interspaces forming a network; a black blotch on body at base of last 4 D spines and extending into fin (this blotch formed by the fusion of several dark polygonal spots); 2 similar but smaller blotches at base of soft D and another black saddle blotch on peduncle; dark spots on head progressively smaller and darker anteriorly, those on snout about the size of the nostrils; median fins with dark spots as on body; paired fins with small, faint dark spots. Attains 35 cm. Western Indian Ocean from Natal to Kenya; also Madagascar, Comores, Seychelles, Mauritius and Réunion; in the western Pacific from the Marshall Ids. to the Line Ids.



166.63 *Epinephelus spilotoceps:* 37 cm (Seychelles).

166.64 *Epinephelus suillus*

(Valenciennes, 1828)

PLATES 42 & 45

Orangespotted rockcod — Oranjekol-klipkabeljou

Serranus suillus Valenciennes, *in* Cuv. & Val., 1828: 335 (India). *Epinephelus tauvina* (*non* Forsskål: Smith, SFSA No. 447* (in part, Fig. 447 on Pl. 19). *Epinephelus malabaricus* (*non* Schneider): Morgans, 1966: 264*; Heemstra & Randall, 1984: Epin 38* (in part).

D XI,14-16; A III,8; P 19-20; LL 58-65; LSS 100-118; GR (8-10)+(15-17). Body depth 3.2-3.8, head 2.3-2.6 in SL. Maxilla reaches past eye; 2 rows of teeth at side of lower jaw. Flank scales ctenoid, with auxiliary scales; anterior LL scales of large adults with branched tubules. Nostrils subequal. Longest D spine shorter than longest ray, 3.0-3.9 in head; D membrane incised between the spines.

Body off-white, with 5 oblique brown bars, some of which are forked and broken ventrally; brownish orange spots all over head and body, spots clearly defined in small fishes but become diffuse and duller with growth; spots on head often coalesce and become elongated to form irregular rows radiating from eye. The orange spots turn brown after death. Attains at least 100 cm, 15 kg. Indian Ocean (Natal to Persian Gulf) to the western Pacific. Juveniles common in estuaries, adults occur on coral reefs and rocky bottom to depths of 100 m.

166.65 *Epinephelus tauvina*

(Forsskål, 1775)

PLATE 42

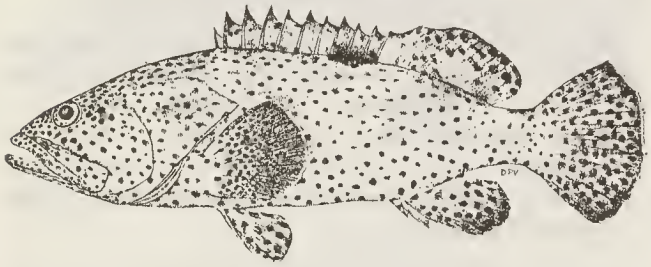
Greasy rockcod — Slym-klipkabeljou

Perca tauvina Forsskål, 1775: 39 (Jeddah). *Epinephelus chewa* Morgans, 1966: 267, Pl. 9, Fig. D (Mafia Id., Tanzania). *Epinephelus tauvina:* Randall & Ben-Tuvia, 1983: 413*; Heemstra & Randall, 1984: Epin 12*.

D XI,14-16; A III,8; P 18-19; LL 65-74; LSS 95-113; GR (8-10)+18-20). Body depth 3.0-3.8, head 2.1-2.4 in SL. Maxilla reaches well past eye; width of distal expansion of maxilla subequal to orbit diameter; 3-5 rows of teeth at side of lower jaw. Body scales smooth, except for those covered by P. Preopercle rounded, the lower edge fleshy; no small platelets on side of 1st gill arch; rear nostrils larger than front ones for fish larger than 30 cm SL. Longest D spine 3.1-4.6 in head.

Head, body and fins pale greyish, covered with dull orange-red to dark red-brown spots, the spots smaller and more numerous on larger fish, not sharply outlined (centres

darker than the edges); 5 faint, oblique dark bars may be visible on body; blackish blotch usually present at base of last 4 D spines and extending into fin; dark spots on soft D, C and A separated by a pale network in small specimens. Attains 70 cm. Red Sea to Natal, thence to India across the central Pacific to the Pitcairn Group. Primarily a coral-reef species occurring in depths of 1 to at least 50 m.



166.65 *Epinephelus tauvina:* 40.5 cm SL (Sudan).

166.66 *Epinephelus tukula*
Morgans, 1959
PLATE 43

Potato bass — Aartappel-baars

Epinephelus fuscoguttatus (*non* Forsskål): Smith, **SFSA No. 451*** (in part). *Epinephelus tukula* Morgans, 1959: 651, Pl. 17 (Mafia Id., Tanzania); van der Elst, 1981: 296*; Morgans, 1982: 22; Heemstra & Randall, 1984: Epin 56*.

D XI,14-15; A III,7-9; P 18-20; LL 66-70; LSS 113-135; GR (7-10)+(16-19). Body depth 2.9-3.3, head 2.5 in SL. Maxilla reaches past eye; 3.6 rows of teeth at side of lower jaw; nostrils subequal. Flank scales strongly ctenoid, with many auxiliary scales. Longest D spine 3.3-4.0 in head.

Body greyish brown, with large, widely spaced, round to oval black blotches of regular outline, arranged in 5 longitudinal rows; head with small dark spots and short dark bands radiating from posterior part of orbit; fins with dark spots which become smaller toward the margin. Large adults may be nearly uniform black. Attains 200 cm, 100 kg. Indo-West Pacific from Natal to Japan and Australia.

166.66 *Epinephelus tukula:* 32 cm SL (Natal).

166.67 *Epinephelus undulosus*
(Quoy & Gaimard, 1824)
PLATE 43

Midwater rockcod — Middelwater-klipkabeljou

Bodianus undulosus Quoy & Gaimard, 1824: 310 (Waigiu & Rawak Ids.). *Epinephelus undulosus:* Morgans, 1982: 19*; Heemstra & Randall, 1984: Epin 57*.

D XI,17-19; A III,8; P 18-19; LL 63-75; LSS 125-155; GR long, no rudiments (13-15)+(20-22). Body depth 2.6-3.2, head 2.4-2.8 in SL. Maxilla usually not reaching past eye; 2 rows of teeth at side of lower jaw; nostrils subequal or posterior slightly larger. Flank scales strongly ctenoid. Preopercle finely serrate, with a few enlarged serrae at the angle; interorbital area distinctly convex. D membranes not incised between the spines.

Purplish to brownish grey with yellowish brown dots on upper half of head and slightly wavy, longitudinal, yellowish brown lines on body (lines usually absent on large adults). Attains 75 cm, 6 kg. Indo-West Pacific from Kenya to China and the Philippines. A fish of the banks, not of the reefs, usually in depths of 20 - 90 m; feeds on pelagic as well as benthic fishes, small crustaceans and pelagic tunicates (thaliaceans).

166.67 *Epinephelus undulosus:* 30 cm SL (drawn after Day, 1875).

Genus ***Gracila*** Randall, 1964

Body depth 2.6-3.0, head 2.8-3.2 in SL. D IX, 14-15, the membranes only slightly incised between the spines; A III,9; C truncate; P 17-19, the middle rays longest; paired fins short, subequal. Preopercle broadly rounded, finely serrate, without antrorse spines ventrally. Maxilla reaches past eye; 2 rows of teeth at side of lower jaw. Flank scales mostly ctenoid. Two species of rare coral-reef fishes, both known from the western Indian Ocean; either (or both) may be found in our area.

KEY TO SPECIES

1a Head and body yellow, with longitudinal, dark-edged pale bluish stripes ..... *G. polleni*

1b Head and body dark greenish or reddish brown or violet; adults with numerous, dark, curved, subvertical bars on side of body and a dark spot at base of middle C rays; juveniles with an orange stripe in median fins ..... *G. albomarginata*

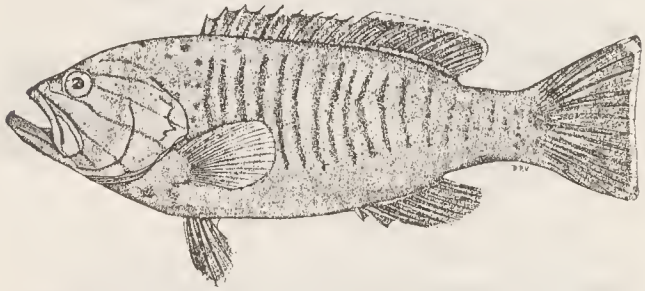
166.68 *Gracila albomarginata*
(Fowler & Bean, 1930)
PLATE 43

Red-edged rockcod Rooirand-klipkabeljou

Cephalopholis albomarginatus Fowler & Bean, 1930: 235, Fig. 11 (Danawan Id., Borneo). *Aethaloperca albomarginata:* Smith, 1954: 925*. *Gracila albomarginata:* Randall, 1964: 282*; Heemstra & Randall, 1984: Gracil 1*.

D IX,14-15; A III,9; P 17-19; LL 67-73; LSS 101-117; GR (8-9)+(15-17).

Adults dark greenish to brownish grey or reddish brown, with 16-20 faint, curved dark bars on midlateral part of body and peduncle; a diffuse dark spot midlaterally at C base; 4 or 5 oblique, dark blue lines on head; margin of soft D and A reddish orange with a submarginal mauve band; corners and rear margin of C reddish or mauve. Juveniles brown or violet, with a broad red-orange stripe in D and A and in C lobe, extending forward onto dorsal and ventral edges of C peduncle. Attains 40 cm. Northern Mozambique to Zanzibar and islands of western Indian Ocean; also East Indies, southern Japan and New Caledonia. Usually in outer reef areas deeper than 15 m; an active grouper not inclined to stay near the bottom.

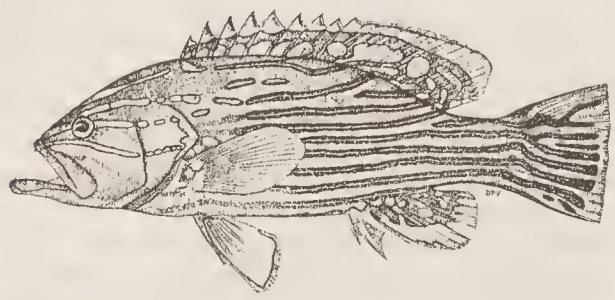


166.68 *Gracila albomarginata:* 31 cm SL (Seychelles).

166.69 *Gracila polleni*
(Bleeker, 1868)
PLATE 43

Harlequin rockcod Harlekyn-klipkabeljou

Epinephelus polleni Bleeker, 1868: 336 (Réunion). *Cephalopholis virgatus* Fourmanoir, 1954: 214 (Anjouan Id., Comores). *Cephalopholis polleni:* Morgans, 1982: 8. *Gracila polleni:* Heemstra & Randall, 1984: Gracil 2*



166.69 *Gracila polleni:* 20 cm SL (Mauritius).

D IX,14; A III,9; P 17-19; LL 65-75; LSS 111-120; GR (7-8)+(14-16).

Mainly yellow with dark-edged blue stripes as shown in the colour plate. Attains 35 cm. Comores, Madagascar, Mauritius, Réunion, Rodrigues and Chagos Archipelago; also eastern Indian Ocean and western Pacific to southern Japan.

Genus ***Plectropomus*** Oken, 1817

Body elongate, the depth 2.9-3.8 in SL; D VII-VIII,10-11; A III,8 (the spines small and inconspicuous); C emarginate to truncate; paired fins short; middle P rays longest; a pair of large canines at front of jaws and 1-4 fixed canines on rear half of lower jaw; preopercle rounded, the lower edge with 3 or 4 large antrorse spines (usually covered by skin); opercular spines poorly developed.

Large, active, piscivorous reef fishes. About 7 species, distinguished primarily by colour patterns; species distinction is complicated by intraspecies variation in colour patterns and two different colour phases of *P. laevis;* 4 species known or likely to occur in our area.

KEY TO SPECIES

1a C truncate; interorbital area and top of snout with small embedded scales; P 15-16; head and body covered with round dark-edged blue spots ..... *P. areolatus*
1b C slightly emarginate; interorbital and top of snout naked; P 15-18; dark-edged blue spots present or absent (if present, smaller than those of *areolatus*, not always round, and may or may not extend ventrally on head and body) 2

2a Adults greyish brown, mottled with dark and light, without any spots on dark bars; juveniles with numerous pale dashes on body ..... *P. punctatus*
2b Body with numerous, dark-edged, round or elongate blue spots (spots sparse on the pale black-saddled colour phase of *P. laevis*) 3

3a P rays 16-18 (rarely 16); 4 broad, dark brown "saddle" blotches on body (1 on nape and 3 under D); 1 colour phase is white with yellow fins, the dark saddle blotches very prominent, the blue spots few; the other colour phase is dark brownish red with numerous small, dark-edged blue spots, the dark saddle blotches less evident ..... *P. laevis*
3b P rays 16-17 (rarely 17); no dark saddle blotches on body ..... *P. pessuliferus*

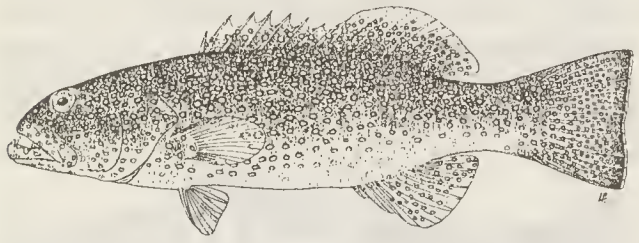
166.70 *Plectropomus areolatus*
Rüppell, 1828
PLATE 43

Squaretail leopardgrouper Stompstert-luiperdkabeljou

Plectropomus (maculatum) areolatum Rüppell, 1828: 143 (Red Sea). *Plectropomus truncatus:* Heemstra & Randall, 1984: Plect 2*.

D VIII,11; A III,8; P 15-16; LL 88-105; GR poorly developed, raker at angle of 1st arch about ½ length of gill filaments. Body depth 3.1-3.7 in SL. Middle C rays not much shorter than upper and lower rays. Nostrils subequal.

Body, head and median fins orange-brown, with numerous black-edged blue spots; spots close-set and extending onto ventral part of belly. Attains at least 53 cm. Red Sea and Indian Ocean (Maldives and Cocos-Keeling Ids.) to Samoa. May occur in our area.



166.70 *Plectropomus areolatus:* ca. 60 cm (after Heemstra & Randall, 1984).

166.71 *Plectropomus laevis*
(Lacepède, 1801)
PLATE 45

Black-saddled leopardgrouper — Swartsaal-luiperdkabeljou

Labrus laevis Lacepède, 1801: 431 & 477, Pl. 23, Fig. 2 (Mauritius). *Bodianus melanoleucus* Lacepède, 1802: 283 & 296 (Mauritius). *Plectropomus maculatus* (*non* Bloch): Smith, **SFSA No. 417*** (in part, not fig. on Pl. 93, not middle fig. of 3 fish on Pl. 106). *Plectropomus laevis:* Heemstra & Randall, 1984: Plect 3*.

D VIII,11; A III,8; P 16-18; LL 96-115. Body depth 2.9-3.7 in SL. Middle C rays distinctly shorter than upper and lower rays; posterior nostrils larger than anterior ones.

Attains at least 100 cm, 20 kg. Zanzibar, Kenya and islands of the western Indian Ocean; also from southern Japan to Australia.

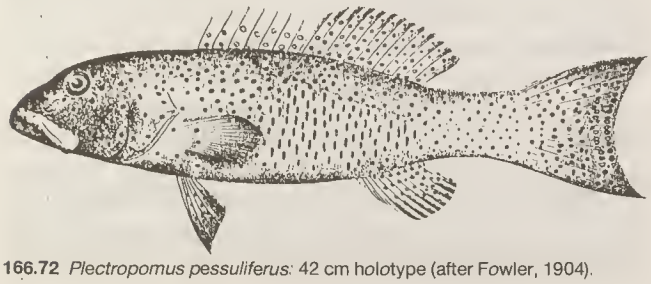
166.72 *Plectropomus pessuliferus*
Fowler, 1904
PLATE 43

Leopardgrouper — Luiperdkabeljou

Plectropoma pessuliferum Fowler, 1904: 520, Pl. 17 upper fig. (Sumatra). *Plectropomus maculatus* (*non* Bloch): Smith, **SFSA No. 417*** (in part, not figs. on Pl. 106); Heemstra & Randall, 1984: Plect 4*.

D VIII,11; A III,8; P 15-17; LL 88-101. Body depth 3.1-3.7 in SL. Middle C rays distinctly shorter than upper and lower rays. Nostrils subequal.

Brownish orange-red with dark-edged blue spots, those on head and front part of body larger and more elongate than the small round spots on rear part of body and median fins. Attains at least 53 cm. Indian Ocean and western Pacific; probably occurs in our area.



166.72 *Plectropomus pessuliferus:* 42 cm holotype (after Fowler, 1904).

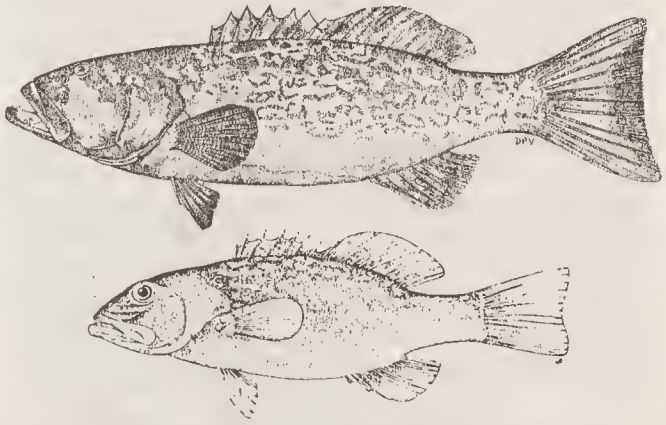
166.73 *Plectropomus punctatus*
Quoy & Gaimard, 1824
PLATES 34 & 45

Marbled leopardgrouper — Marmer-luiperdkabeljou

Plectropomus punctatum Quoy & Gaimard, 1824: 318, Pl. 45, Fig. 1 (Mauritius). *Plectropomus maculatus* (*non* Bloch): Smith, **SFSA No. 417*** (in part, only middle fig. of 3 fish on Pl. 106). *Plectropomus marmoratus* Talbot, 1958: 751, Pl. 21 (Zanzibar); Morgans, 1982: 4. *Plectropomus punctatus:* Heemstra & Randall, 1984: Plect 5*.

D VIII,10-11; A III,8; P 16-18; LL 88-92; interorbital space and top of snout naked. Body depth 3.1-3.7 in SL. Middle C rays distinctly shorter than upper and lower rays. Nostrils subequal.

Juveniles with horizontally elongate pale blue spots all over body; adults (?) generally purplish brown, the body and D with irregular pale mottling. Attains 90 cm, 10 kg. Western Indian Ocean: Zanzibar to Kenya and various islands. A common coral-reef species in depths of 5 - 15 m.



166.73 *Plectropomus punctatus:* top: 90 cm SL; bottom: juvenile (after Heemstra & Randall, 1984).

Genus ***Variola*** Swainson, 1839

Body depth 2.8-3.2 in SL. C lunate, the upper and lower rays markedly elongate; D IX,13-15; A III,8; rear end of D and A pointed; A spines distinct; preopercle rounded, finely serrate, without spines on ventral edge; body scales mostly ctenoid, no auxiliary scales; side of lower jaw with 1 or 2 fixed canines.

Active, piscivorous, coral-reef fishes; 2 beautiful species; 1 known from our area and the other probably occurs here as well.

KEY TO SPECIES

1a Rear margin of C narrowly white with a dusky submarginal band; fins without distinct, yellow, posterior margins ..... *V. albimarginata*

1b Rear margin of P and median fins broadly yellow ..... *V. louti*

166.74 *Variola albimarginata*
Baissac, 1953
PLATE 43

White-edged lyretail — Witrand-maantstert

Variola albimarginata Baissac, 1953: 214 (Mauritius); Morgans, 1982: 5*; Heemstra & Randall, 1984: Vari 2*.

D IX,14; A III,8; P 18-19; LL 68-75; LSS 110-130; GR (7-9)+(13-16).

Pale red to brownish orange with numerous, small, irregular spots or streaks of pale blue, lavender, pink or yellow; paired fins yellowish. Attains 60 cm (fork length). Zanzibar, Mafia Id., Madagascar, Mascarenes, Chagos and western Pacific. A coral-reef species much less common than *V. louti;* occurs in depths of 40 - 100 m.

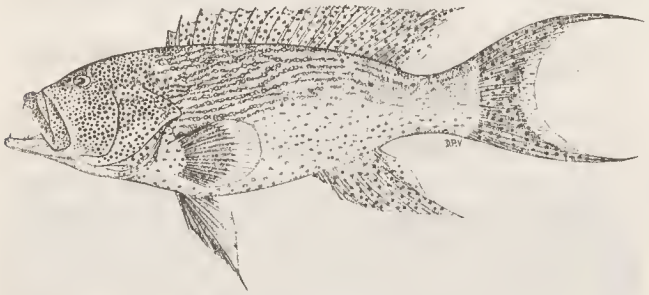
166.75 *Variola louti*
(Forsskål, 1775)
PLATE 44

Yellow-edge lyretail — Geelrand-maanstert

Perca louti Forsskål, 1775: 40 (Jeddah and Lohaja, Red Sea). *Variola louti:* Smith, **SFSA No. 426*;** van der Elst, 1981: 298*; Morgans, 1982: 5*; Randall & Ben-Tuvia, 1983: 419*; Heemstra & Randall, 1984: Vari 1*.

D IX,13-15; A III,8; P 16-19; LL 64-78; LSS 113-135; GR (7-10)+(15-19).

Brownish red to orange-red with numerous small, irregular spots or streaks of pale blue, lavender, violet or pink on head, body and median fins; P and median fins with a broad yellow margin. Juveniles with an irregular, dark brown band from eye to rear end of D base, the body dull yellow to reddish above and whitish below the stripe. Attains 80 cm (fork length). From the Red Sea south to Durban and east to the Pitcairn Group in depths of 5 - 100 m.



166.75 *Variola louti:* 40 cm SL (S. Mozambique).

Subfamily SERRANINAE

Body elongate, not much compressed. Dorsal fin undivided, with 10 spines and 10-16 soft-rays; anal fin with 3 spines and 6-8 soft-rays; caudal fin truncate to emarginate, with 15 branched rays. Supramaxilla absent; depressible teeth few or none; vomer and palatines with teeth; no teeth on tongue. Scales ctenoid; lateral line complete, the scales distinct; maxilla naked. Vertebrae 10+14.

About 10 genera with about 50 species. One genus known from our area.

Genus ***Serranus*** Cuvier, 1816

D X,13-15; A III,7-8; P 15-18. This genus is not clearly differentiated from others of this subfamily. About 20 species, most in the western North Atlantic; 2 species in our area.

KEY TO SPECIES

1a Lower GR 21-23 (including rudiments) ..... *S. novemcinctus*
1b Lower GR 13-15 (including rudiments) ..... *S. cabrilla*

166.76 *Serranus cabrilla*
(Linnaeus, 1758)
PLATE 45

Comber — Kammer

Perca cabrilla Linnaeus, 1758: 294 (no locality). *Serranus knysnaensis* Gilchrist, 1904: 2, Pl. 19 (Knysna); Smith, **SFSA No. 427*.** *Serranus cabrilla:* Smith, **SFSA No. 429*;** Smith & Smith, 1966: 88*; Heemstra & Randall, 1984: Serran 1*. *Serranus scriba* (*non* Linnaeus): Smith, **SFSA No. 430.**

D X,13-15; A III,7-8; P 15-17; LL 70-77; 36-38 scales round C peduncle; GR (6-7)+(13-15) of which 2-4 on each limb are rudiments. Body depth 2.9-3.4, head 2.6-2.9 in SL.

Head and body brownish dorsally, ventral half pale pinkish; usually 2 irregular, brownish longitudinal bands from head to C and several short dark brown bars on body; C and soft D with small, pale blue spots. Attains 30 cm. Mediterranean and eastern Atlantic from the English Channel to South Africa and round our coast to Natal. Occurs from the shore out to 200 m.

166.76 *Serranus cabrilla:* 15 cm SL (Knysna).

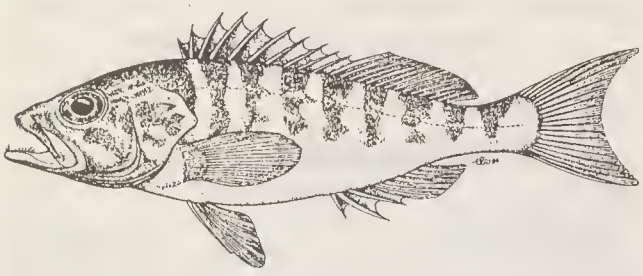
166.77 *Serranus novemcinctus*
Kner, 1865

Barred rockcod — Balk-klipkabeljou

Serranus novemcinctus Kner, 1865: 17, Pl. 2, Fig. 1 (St. Paul Id. and Cape of Good Hope); Smith, **SFSA No. 428.**

D XI,14-15; A III,7; P 16-18; LL 67-74; 34-37 scales round C peduncle; GR (9-11)+(21-23) of which 1 or 2 may be rudiments. Body depth 3.1-3.5, head 2.5-2.9 in SL.

Generally brownish with 9 dark bars dorsally on body, the 1st on nape, the last at base of C. Attains 32 cm. Known with certainty from Amsterdam and St. Paul Ids.; reported from the Cape, but this record appears to be erroneous. French ichthyologists have also taken this species at Walters Shoal south of Madagascar.



166.77 *Serranus novemcinctus:* 24 cm (after Heemstra & Randall, 1984).

Family No. 167: GRAMMISTIDAE

by J.E. Randall

Soapfishes **Seepvisse**

Dorsal fin divided, or continuous but deeply notched, with 2-9 spines and 12-27 soft-rays; anal fin with 2 or 3 spines (the 11 species of *Rypticus*, of the Atlantic and eastern Pacific oceans, have no anal fin spines, 16 or 17 branched caudal rays, and 2 or 3 opercular spines) and 8-17 soft-rays; pectoral rays 13-18; pelvic rays I,5, the last ray broadly joined to abdomen by a membrane; caudal fin rounded to truncate with 15 branched rays. Vertebrae 24 or 25. Opercular spines 3; upper border of opercle attached to body; preopercle strongly serrate or with 1-5 spines. Mouth large, the lower jaw projecting; maxilla reaching to or beyond a vertical through centre of eye; bands of villiform teeth in jaws and on vomer and palatines.

Skin with a thick coat of viscid mucus containing the toxin grammistin, which imparts a bitter taste. The amount of toxin produced increases when the fish is frightened. Other fishes, confined in a small volume of water with a soapfish under stress, will soon die. Grammistid fishes are carnivorous, feeding mainly on benthic crustaceans and small fishes. Revised by Randall et al. (1971); *Belonoperca chabanaudi* added to the family by Randall, Smith and Aida (1980). Some authors (notably Johnson, 1983) prefer to classify the soapfishes as a subfamily of the Serranidae. Seven genera with 18 species; 3, possibly 5, genera in our area. *Diploprion* Kuhl & van Hasselt, 1828, with 2 species (*D. drachi* Estève, 1955 of the Red Sea and *D. bifasciatum* Kuhl & van Hasselt, 1828 of the northern Indian Ocean and western Pacific) have D VIII,13-16; A II,12-13.

KEY TO GENERA

1a Scales mainly ctenoid, not embedded; preopercle strongly serrate; subopercle and interopercle partially serrate; nasal organ with lamellae arranged in a nearly complete circle 2
1b Scales cycloid, often embedded; preopercle smooth except for 1 to 5 spines; nasal organ vertically elongate, the lamellae horizontal 3

2a D IX,12; A III,9; P 14-16; C rounded ..... *Aulacocephalus*
2b D VIII+I,10; A II,8; P rays 13-15; C truncate ..... *Belonoperca*

3a No fleshy flap on chin; P 14 or 15; D soft-rays 12 or 13; 1st D spine 1.2-1.5 in 2nd D spine ..... *Grammistops*
3b A fleshy flap on tip of chin; P rays 16-18; D soft-rays 13 or 14; 1st D spine about 1.7 in 2nd D spine 4

4a Fleshy flap on chin large, about as long as eye diameter; A III,8 ..... *Pogonoperca*
(One species, *P. punctata* (Valenciennes, 1830) ranges from central Pacific to Mauritius and Seychelles; *P. ocellata* Günther, 1859 and *P. reticulatus* Bliss, 1883 appear to be synonyms).
4b Fleshy flap on chin very small; A II,9 ..... *Grammistes*

Genus ***Aulacocephalus*** Temminck & Schlegel, 1842

Monotypic.

167.1 *Aulacocephalus temmincki* Bleeker, 1857

Goldribbon soapfish Gouelint-seepvis

Aulacocephalus temmincki Bleeker, 1857: 15, Pl. 5, Fig. 2 (Nagasaki, Japan); Smith, **SFSA No. 419*;** Randall et al., 1971: 173*.

D IX,12; A III,9; P 14-16; GR (7-8)+(18-20); LL 75-82; scales ctenoid; body depth 2.9-3.0, head length 2.4-3.0 in SL; preopercle coarsely serrate; subopercle and interopercle serrate; nasal organ a rosette.

Body deep blue with a bright yellow band from snout through eye and along back to C. Attains 35 cm. Though widespread in the Indo-Pacific, there are relatively few records: Natal (south to Durban), Japan, Korea, northeastern China, Taiwan, Mauritius, Réunion, Thailand, Kermadec Ids. and New Zealand. The Bishop Museum has a specimen from Rapa. With the exception of Thailand, all these records lie within the range 20° to 36° latitudes.

Genus ***Belonoperca*** Fowler & Bean, 1930

Monotypic.

167.2 *Belonoperca chabanaudi* Fowler & Bean, 1930

PLATE 31

Arrowhead soapfish Pylkop-seepvis

Belonoperca chabanaudi Fowler & Bean, 1930: 182, Fig. 4 (Celebes); Randall, Smith & Aida, 1980: 2*.

D VIII+I,10; A II,8; P 13-15; GR (6-8)+(13-15); LL 69- 76; scales ctenoid; body depth 3.5-3.7, head length 2.5-2.7 in SL; preopercle coarsely serrate; subopercle and interopercle serrate; nasal organ a rosette.

Body brown with a saddle-like bright yellow spot on C peduncle and a large ocellated black spot in spinous D. Largest specimen, 145 mm. Central Pacific to east Africa, ranging south to Natal. A reef species generally seen in caves; becomes active and moves out of shelter at dusk.

167.2 *Belonoperca chabanaudi*: 13.5 cm (N. Mozambique).

Genus ***Grammistes*** Bloch & Schneider, 1801

Monotypic.

167.3 *Grammistes sexlineatus*
(Thunberg, 1792)
PLATE 45

Sixstripe soapfish — Sesstreep-seepvis

Perca sexlineata Thunberg, 1792: 142, Pl. 5 (East Indies). *Grammistes sexlineatus*: Smith, **SFSA No. 418*;** Randall et al., 1971: 183*.

D VII,13-14; A II,9; P 16-18; GR (1-3)+(7-9) excluding rudiments; LL 60-72; scales cycloid, embedded; body depth 2.3-2.8, head length 2.3-2.7 in SL; preopercle with 2 to 4 short broad-based spines; subopercle and interopercle smooth; nasal organ vertically elongate, the lamellae horizontal.

Body dark brown with yellow stripes (very small juveniles with spots, those up to 5 cm SL with 3 stripes; 8 cm specimens and larger with 6 stripes; in large adults the stripes increase in number and break into series of dashes). Largest specimen, 27 cm. Indo-West Pacific and Red Sea; on our coast south to East London. A shallow-reef species generally seen hiding beneath ledges and small caves during daylight hours. The toxin-producing glands of this species (and of *Pogonoperca punctata* and *Rypticus* spp.) are in the dermis and multicellular (in contrast to allegedly more primitive genera such as *Aulacocephalus* and *Diploprion* which have individual mucous cells in the epidermis).

167.3 *Grammistes sexlineatus*: 11 cm (N. Mozambique).

Genus ***Grammistops*** Schultz, 1953

Monotypic.

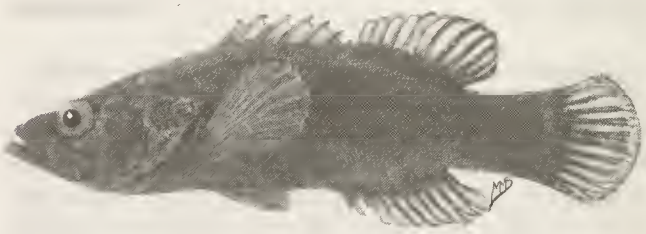
167.4 *Grammistops ocellatus*
Schultz, 1953

Ocellated soapfish — Ogie-seepvis

Grammistops ocellatus Schultz, 1953: 386, Fig. 62 (Bikini Atoll); Randall et al., 1971: 176*. *Tulelepis canis* Smith, 1954: 869, Pl. 27, Fig. A (Pemba, Mozambique).

D VII,12-13; A III,9; P 14-15; GR (1-2)+(6-9) excluding rudiments; LL 58-67. Scales cycloid, embedded. Body depth 3.1-3.7, head length 2.5-2.7 in SL. Preopercle smooth or with 1 or 2 short spines on upper margin; subopercle and interopercle smooth.

Body and fins dull yellowish brown; a prominent dark ocellus on opercle; dark brown spots on each side of chin. Attains 10 cm. Northern Mozambique and western Pacific; rare, probably occurs in our area.



167.4 *Grammistops ocellatus*: 8.5 cm holotype of *Tuelepis canis* (off Pemba Id.).

Family No. 168: CALLANTHIIDAE

by P.C. Heemstra & W.D. Anderson, Jr.

Goldies — **Goudvisse**

Body oblong, somewhat compressed, with moderate ctenoid scales. Single dorsal fin with 11 spines and 9-11 soft-rays. Anal fin with 3 spines and 9-11 soft-rays. Jaws with caniniform, conical and villiform teeth; vomer usually with teeth; palatines with or without teeth; no teeth on tongue. No supramaxilla; opercle with 1 or 2 spines; preopercle smooth. Branchiostegal rays 6. Vertebrae 10+14. Lateral line running near base of dorsal fin, ending below or somewhat behind last rays.

Goldies occur in depths of 5 - 400 m over rocky bottoms. Two genera, with about 10 species. *Callanthias* Lowe, 1839, with about 6 species, is represented in our area by 1 species.

168.1 *Callanthias legras*
Smith, 1947
PLATE 46

Goldie — Goudvis

Callanthias legras Smith, 1947: 335, Fig. 1 (off Algoa Bay, 30 fms); **SFSA No. 460*.**

D XI,10-11; A III,10; P 19-20; LSS 36-41; LL 28-33; GR (9-11)+(22-27). Bony interorbital width 1.1-1.4 in bony orbit diameter; bony orbit diameter 2.6-3.1 in head. C lunate.

Attains 25 cm. Known only from Dassen Id. (off western Cape Province) to Natal. Rare.

Family No. 169: PSEUDOCHROMIDAE

by M.M. Smith

Dottybacks — **Spikkelrûe**

Fairly elongate body with moderate to small scales; posterior body scales ctenoid, rest cycloid. Lateral line in 1 or 2 parts: upper from shoulder to below middle of spinous dorsal then parallel to base of dorsal fin ending below soft-rays; 2nd part, if present, along rear midlateral part of body to base of caudal fin. Dorsal fin with 1-3 weak spines and 21-37 soft-rays. Pelvic fin of a spine and 3-5 rays, 1 of which is generally produced. Six branchiostegals. Jaws and vomer with small, sharp conical teeth; dentition of male often stronger than that of female.

Small, drab to brightly coloured tropical Indo-Pacific coral reef fishes; bodies soften rapidly after death, and fins and scales easily damaged. Males of some species guard their ball of eggs aggressively. Five genera, 3 in our area; *Labracinus* Bleeker, 1876 with 4 species and the monotypic *Pseudoplesiops* Bleeker, 1858 have been recorded from the Pacific and Western Australia. *Pseudocrenilabrus natalensis* Fowler (1934) was originally described as a pseudochromid fish from Durban, but this species is a synonym of the cichlid *Pseudocrenilabrus philander* Weber, 1897, which is known only from freshwater. Species easily distinguished by colour when alive, but some preserved specimens are difficult to identify.

KEY TO GENERA

1a Head naked; most of lower gill arch smooth; palatines edentate; vertebrae (10-11)+(22-25); P 13-15 (generally 14); D and A each with 1 small spine ..... *Anisochromis*
1b Scales on head; most of lower gill arch with rakers and knobs; palatines toothed; vertebrae (10-11)+(16-17); P 15-18; D and A with 2-3 small spines 2

2a Top LL reduced to single tubular scale at shoulder and a few rudimentary pits; V I,4 ..... *Chlidichthys*
2b Top LL with 25 or more tubular scales; V I,5 ..... *Pseudochromis*

Genus *Anisochromis* Smith, 1954

Gill membranes form a broad fold across isthmus. Two species, both known only from western Indian Ocean; *A. straussi* Springer, Smith & Fraser, 1977 from St. Brandon's Shoals differs in the terminal phase having no ocellus on front of D, and higher mean numbers of D and A rays, total vertebrae and tubed LL scales.

169.1 *Anisochromis kenyae*
Smith, 1954
PLATE 46

Annie — Anna

Anisochromis kenyae Smith, 1954: 300, Fig. 1 (Malindi, Kenya); Smith, 1977: 22*; Springer, Smith & Fraser, 1977: 5.

D I,24-26; A I,16-18 (D & A spines difficult to see); P 13-15; V I,4; GR 4+2; LS 41-43; LL 32-35 ends below rear D rays; fins naked; longest V ray 10-12% SL. One row of small conical teeth on side of jaws; front teeth enlarged, antrorse and slightly recurved in smaller (female) specimens; larger and more regular in larger (male) specimens; similar smaller teeth in 1-3 series behind front teeth.

This species is a protogynous hermaphrodite, the smaller ocellated form being generally females and the larger terminal phase generally males, although there is some overlapping. Attains about 31 mm; occurs on reefs and in pools exposed at low tide from 3°S in Kenya to Pinda (14°14′S). Females distended with about 100 eggs during October and November. Although not yet found south of 20°S, it is likely to occur here, as its small size makes it difficult to collect.

Genus *Chlidichthys* Smith, 1957

A few posterior rays of D and A branched; pupil pear-shaped; C with basal scales, the rays (5-6)+17+(5-6); vertebrae 11+16. Vomer and palatines dentate, tongue smooth. Upper jaw posteriorly with 1-2 series of irregular teeth; about 6 series at symphysis, the 4 posterior series setiform, and 2 front series caniniform with 3-8 large canines in outer series. Lower jaw similar, but only 1 series of teeth posteriorly and 2-8 large canines in front series. About 11 species known, 6 from western Indian Ocean, 2 reach southern Africa.

KEY TO SPECIES

1a Anterior D rays elevated; snout, interorbital and chin vermillion, prominent dark bands on green body; LS 46-48; lower LL pitted scales 15-16 ..... *C. bibulus*
1b D not elevated anteriorly; almost uniform cerise; D and A dark green near body; LS 50-52; lower LL pitted scales 5-6 ..... *C. johnvoelckeri*

169.2 *Chlidichthys bibulus*
(Smith, 1954)
PLATE 46

Nosey — Neusie

Wamizichthys bibulus Smith, 1954: 205, Fig. 3 (Wamizi Id., Mozambique, 12°S). *Chlidichthys bibulus:* Lubbock, 1977: 14*.

D II,23-25; A III (1st minute),14-15; P 18; V I,4; GR (4-5)+(10-12); LS 46-48; LL 1+(19-21)+(15-16); longest V ray 15-24% SL, C feebly convex.

Attains 61 mm. Lives in and round coral; from 3°S in Kenya to Mozambique Id. and probably further south.

169.3 *Chlidichthys johnvoelckeri*
Smith, 1953
PLATE 46

Cerise dottyback — Kersrooi spikkelrug

Chlidichthys johnvoelckeri Smith, 1953: 518, **No. 408a*** (Pinda); 1954, 203*; Lubbock, 1977: 13*.

D II,22-23; A III (1st minute),13-14; P 17; V I,4; GR (5-6)+(10-12) = 16-17; LS 50-52; LL 1+(18-23)+(5-6); predorsal scales 19-23; C rounded; longest V ray 20-21% SL.

Only 3 specimens known, 1 from Bazaruto Id. and 2 from the mouths of the rock-cod *Aethaloperca rogaa* at Pinda and Pemba (5°S); coral reefs to about 55 - 75 m.

Genus ***Pseudochromis*** Rüppell, 1835

Pupil pear-shaped. Upper jaw with 2 series of sharp, slightly recurved conical teeth at side, outer series larger, and 6-8 series of setiform teeth at symphysis with 2-7 large curved canines in front; lower jaw similar, except only 1 series laterally and 2-5 large canines in front; vomer and palatines dentate, tongue smooth. Most soft-rays branched; P 18-20, top ray minute and adnate to 2nd; C (6-9)+17+(6-9). Vertebrae (10-11)+(16-17). Numerous species, many undescribed; 5 species in our area.

KEY TO SPECIES

1a Longest V ray 12-16% SL; in life, 2 oblique blue bands across corners of truncate C; another along D base to snout, and from tip of lower jaw under eye to opercle edge ..... *P. dutoiti*
1b Longest V ray 16-37% SL; no bands on C or along body 2

2a Dark blue (black when preserved), yellow-edged ocellus on upper edge of opercle 3
2b No ocellus on opercle (small dark spot at upper margin of preopercle sometimes present in adult *P. natalensis*) 4

3a Whole body black; LL (34-35)+(8-10) = 42-45 ..... *P. melas*
3b Upper part of head and back to end of D black, remainder pale; LL (29-32)+(4-8) = 34-38 ..... *P. pesi*

4a D III,25-27; GR 15-16; 16-30 sensory pores in postorbital and suborbital series ..... *P. natalensis*
4b D III,28-30; GR 16-18 (rarely 16); 23-42 sensory pores in postorbital and suborbital series; in adults head generally paler (yellow to orange in life) than body ..... *P. tauberae*

169.4 *Pseudochromis dutoiti*
Smith, 1955
PLATE 44

Dutoiti — Dutoiti

Pseudochromis dutoiti Smith, 1955: 145, Fig. 1 (Bazaruto Id.); 1961: 567, **No. 407b;** Lubbock, 1977: 4*.

D III,28-33; A III,16-19; GR (4-5)+(11-12) = 15-17; LS 41-49; LL (25-34)+(3-7) = 32-41; predorsal scales 20-27.

A beautiful and fearless aquarium fish that lays and then actively guards its eggs in empty shells or similar objects. Attains 88 mm. Indian Ocean from Pakistan and Persian Gulf to Durban, common and easily seen by snorkling from the shore near rocks and coral at Sodwana Bay; the most widely distributed of all the pseudochromids.

169.5 *Pseudochromis melas*
Lubbock, 1977
PLATE 44

Dark dottyback — Donker spikkelrug

Pseudochromis melas Lubbock, 1977: 8, Pls. 1D and 3A (Wasin Id., Shimoni, Kenya); Smith, 1980: 176.

D III,26; A III,15; GR 6+13; LS 47-48; LL (34-35)+(8-10) = 42-45; predorsal 18-22; C rounded to truncate; longest V ray 27-28% SL.

Attains 90 mm. Two specimens from Kenya and 1 from Sodwana Bay in 15 - 20 m.

169.6 *Pseudochromis natalensis*
Regan, 1916
PLATE 46

Natal dottyback — Natalse spikkelrug

Pseudochromis natalensis Regan, 1916: 167 (Durban); Smith, SFSA **No. 408*;** Lubbock, 1977: 10*.

D III,25-27; A III,13-18; GR (4-6)+(10-12) = 15-16; LS 41-49; LL (30-35)+(0-11) = 33-44; predorsal scales 17-26; C truncate, emarginate in large specimens; longest V ray 16-25% SL.

Juveniles (< 4 cm SL) are drab uniform olive; adults with a blue spot on each body scale and a dark spot on upper opercle margin. Attains 88 mm; common under and round large boulders; lies still against greenish weed; from Durban to Patta Id., Kenya (2°S) and Madagascar, down to 25 m.

169.7 *Pseudochromis pesi*
Lubbock, 1975
PLATE 46

Bicoloured dottyback — Tweekleur-spikkelrug

Pseudochromis pesi Lubbock, 1975: 136 Pl. 1d (Gulf of Aqaba); Smith, 1980: 176.

D III,26-28; A III,14-15; GR 6+(11-13); LS 41-48; LL (29-32)+(4-8) = 34-38; predorsal scales 19-22; C truncate; longest V ray 19-37% SL.

Faint, slightly oblique body lines in life disappear with preservation. Attains nearly 100 mm. Occurring singly or in pairs around isolated rocks or coral on sand from 10 - 45 m in Gulf of Aqaba and Sodwana Bay.

169.8 *Pseudochromis tauberae*
Lubbock, 1977
PLATE 46

Lightheaded dottyback — Ligkop-spikkelrug

Pseudochromis tauberae Lubbock, 1977: 9, Pls. 2A, 3C and 3D (Shanzu, Kenya); Smith, 1980: 176.

D III,28-30; A 1II,15-17; GR (4-6)+(11-13) = I6-18; LS 42-47; LL (28-35)+(5-11) = 33-45; predorsal scales 15-26; C truncate; longest V ray 17-21% SL.

Similar to *P. natalensis;* small fishes are olive with rows of orange-red spots. Attains 80 mm. Not uncommon in shallow water down to 6 m, inside fringing reefs where *P. natalensis* is apparently absent; Madagascar and Kenya to Sodwana Bay.

Family No. 170: ACANTHOCLINIDAE

by M.M. Smith

Spiny basslets — **Stekelbaarsies**

Small compact fishes, similar to the Pseudochromidae; subocular shelf absent, and dorsal and anal fins have numerous spines and few rays; pelvic fins with 1 spine and 1 or 2 soft-rays.

About 5 species in 3 genera, 1 in our area. The New Zealand *Acanthoclinus* Jenyns, 1841 with 2 species and the monotypic *Bėlonepterygion* McCulloch, 1915 from the Pacific have 3 lateral lines.

Genus ***Acanthoplesiops*** Regan, 1912

Two species, 1 in our area. The minute *A. hiatti* Schultz, 1953 is from the Pacific.

170.1 *Acanthoplesiops indicus*
(Day, 1888)
PLATE 46

Scottie — Skottie

Acanthoclinus indicus Day, 1888: 264 (Madras, India); 1888: 798, Fig. *Acanthoplesiops indicus:* Barnard, 1948: 370*; Smith, SFSA No. 409*.

D XVIII-XX,3-5; A VIII-X,3-5; P 16-17 ; V I,2, 1st ray branched; GR 1+4; LS about 33; LL single, rudimentary, 8-10 pores; scales all cycloid, those on rear part of body with free lobes behind.

Attains 50 mm. An agile, neat and attractive small fish of the tropical Indian Ocean; found in quiet, weedy water in Delagoa Bay, Mombasa and along the northern Mozambique coast opposite Ibo Island.

Family No. 171: PSEUDOGRAMMIDAE

by M.M. Smith

Podges — **Vetsakke**

Body elongate-oval, slightly compressed; 1 or 2 incomplete lateral lines; cheeks and operculum scaly. Maxilla exposed, reaching past eye. Dorsal fin with 6-8 pungent spines and 19-25 soft-rays; anal fin with 3 pungent spines and 15-24 soft-rays; pelvic fins I,5. Branchiostegals 7; 2 large pyloric caeca.

Small, cryptic fishes, usually on coral reefs. Three genera, with about 6 species. Two genera represented in our area.

KEY TO GENERA

Ia A rays 20-21; 2 LL; LS 80; preopercle spine points upwards, a few minute pores about head ..... *Aporops*

1b A rays 15-18; 1 LL; LS about 50; preopercle spine points downwards; large pores about eye, on postorbital and chin ..... *Pseudogramma*

Genus ***Aporops*** Schultz, 1945

Scales cover vertical fins and most of interorbital. Palatines nearly touch in front and diverge behind. Two species; *A. bilinearis* Schultz, 1943 from Phoenix Island, has GR (5-7)+(9-12) and LS 59-61.

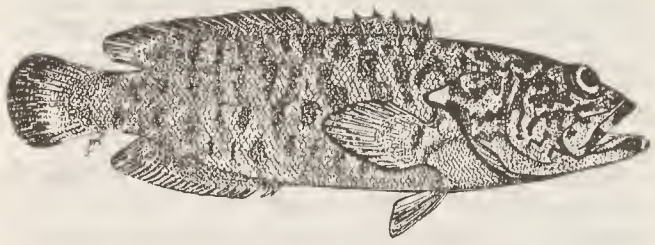
171.1 *Aporops allfreei*
Smith, 1953

Blotched podge — Gevlekte vetsak

Aporops allfreei Smith, 1953: 553, Fig. 2 (Kisiti Id., Kenya); Winterbottom, 1978: 46.

D VI-VII,23-25; A 1II,20-21; P 15; GR 5, knob-like; vertebrae 9+19; LS 80; LL interrupted 38+(27-30) = 65-68; predorsal scales 40, 25 series across cheek.

Dull olive-yellow brown with darker blotches and dusky brown fins. Iris yellow with dusky shading. Attains 10 cm; from Kenya (4°43′S) to Sodwana Bay, around coral.



171.1 *Aporops allfreei:* 9.5 cm female holotype (N. Mozambique).

Genus ***Pseudogramma*** Bleeker, 1875

Anterior nostril a prominent tube; scales cover fins and ½ of interorbital; single incomplete LL; teeth in 3 series at side of jaws, 4 or more series at symphysis all directed inwards; in front the hinder teeth are longer, retrorse and depressible; no anterior canines; oval patch of fine teeth on convergent palatines which almost touch the dentate vomer in front. Two species in the western Atlantic, 1 widespread in the Indo-Pacific.

171.2 *Pseudogramma polyacantha*
(Bleeker, 1856)
PLATE 44

Honeycomb podge — Heuningkoek-vetsak

Pseudochromis polyacanthus Bleeker, 1856: 375 (Ternate). *Pseudogramma polyacanthus:* Bleeker, 1875: 24*; 1877, Pl. 389*. *Pseudogramma polyacantha:* Smith, 1953: 549*; 1961: 567. **No. 408f.**

D VII-VIII,19-22; A III,15-18; P 18; total GR 17-18; LS about 50; LL 23-30 ending below middle of soft D; predorsal scales 30.

Brownish with dusky reticulations. Ripe females have eggs about 0.7 mm diameter. Attains 70 mm. In coral down to about 8 m, Indo-Pacific, from Africa to Polynesia and Hawaii, south to Sodwana Bay.

171.2 *Pseudogramma polyacantha:* 6 cm female (Kenya).

Family No. 172: PLESIOPIDAE

by P.C. Heemstra

Longfins — **Langvinne**

Body ovate to elongate, somewhat compressed. Scales on body mostly ctenoid; cheeks and operculum scaly; snout, maxilla and lower jaw naked. Lateral line interrupted below posterior rays of dorsal fin, continued along mid-lateral part of peduncle. Preopercle edge smooth; no spines on opercle. Branchiostegal rays 6, the membranes mostly separate, free from isthmus. Dorsal fin X-XII,6-10; anal fin III,8-9; pectorals 18-23; pelvics I,4; all fin spines pungent; 17 branched caudal rays. Upper jaw slightly protrusible; supramaxilla present. Bands of small canines on jaws, vomer and palatines. Vertebrae 25 or 26.

Plesiopids frequent coral reefs and rocky areas from the shore out to 45 m. Six genera and about 20 species.

KEY TO GENERA

Ia Spinous D membrane deeply incised behind each spine; C length and body depth less than head length ..... *Plesiops*

1b Spinous D membrane not incised; C length and body depth greater than head length ..... *Calloplesiops*

Genus ***Calloplesiops*** Fowler & Bean, 1930

A single species; probably occurs in our area.

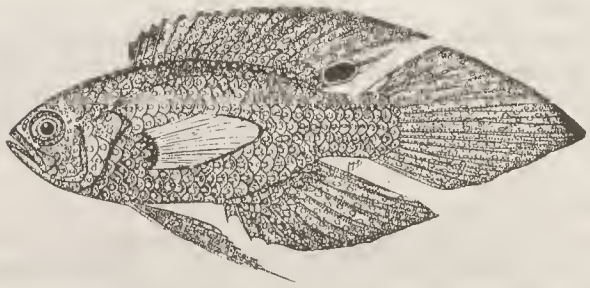
172.1 *Calloplesiops altivelis*
(Steindachner, 1903)
PLATE 47

Comet — Komeet

Plesiops altivelis Steindachner, 1903: 17 (Nias Id., Indonesia); Smith, 1952. *Barrosia barrosi* Smith, 1952: 149, Fig. 2 (Baixo Pinda, Mozambique). *Calloplesiops altivelis:* McCosker, 1978: 708*.

D XI,8-9; A III,9; last D & A rays double; P 18-19; LL 19-20/9-10; GR (2-3)+(9-10). Depth 2.5-2.7, head 2.8-3.0 in SL; eye 3.3-3.5 in head.

Head and body brownish black, covered with small pale blue spots; vertical fins and V dark orange-brown, with many small blue spots like those on body; blue-ringed black



172.1 *Calloplesiops altivelis:* 14 cm holotype of *Barrosia barrosi* (N. Mozambique).

ocellus just above base of last 3 D rays; yellow spot at base of upper C rays; P rays bright yellow, the fin membrane transparent. Attains 16 cm. Widespread in tropical Indo-Pacific; reported from northern Mozambique and the Red Sea.

Genus ***Plesiops*** Cuvier, 1816

Six species, 2 in our area.

KEY TO SPECIES

1a D XI,6-7; upper LL 18-21 ..... *P. coeruleolineatus*
1b D XII,7; upper LL 25-30 ..... *P. multisquamatus*

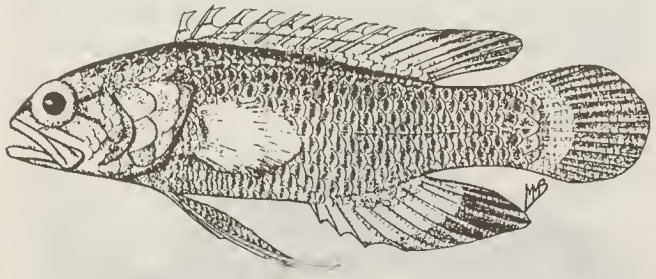
172.2 *Plesiops coeruleolineatus*
Rüppell, 1835

Crimsontip longfin — Rooipunt-langvin

Plesiops coeruleolineatus Rüppell, 1835: 5, Pl. 2, Fig. 5 (Massaua = Mits'iwa, Red Sea); Smith, **SFSA No. 411***; 1952: 143*; Inger, 1955: 270*.

D X-XII,6-8; A III,8; P 19-23; LL 18-21/6-13; GR (2-3)+(7-9) not counting rudiments. Depth 3.3-3.6, head 2.6-3.0 in SL; eye 3.3-3.8, interorbital 7.0-7.5 in head.

Colour variable; body generally black or brown; 2 dark stripes behind eye; D spines orange distally; bluish stripe along basal part of D. Attains 8 cm. Occurs from Red Sea to Japan and Oceania; on our coast south to Delagoa Bay.



172.2 *Plesiops coeruleolineatus*: 5.5 cm (N. Mozambique).

172.3 *Plesiops multisquamatus*
Inger, 1955
PLATE 47

Spotted longfin — Gespikkelde langvin

Plesiops nigricans (*non* Rüppell): Smith, **SFSA No. 410***; 1952: 141, Pl. 9 (Natal). *Plesiops multisquamata* Inger, 1955: 264 (on *P. nigricans* of Smith, 1952).

D XII,7; A III,8; P 21-23; LL 25-30/13-19; GR (4-6)+(11-13). Depth 2.6-2.9, head 2.6-2.9 in SL; eye 5.0-5.6, interorbital 3.9-4.2 in head.

Head, body and fins blackish, covered with small blue spots. Attains 25 cm. Known only from Natal.

172.3 *Plesiops multisquamatus*: 13.5 cm (Natal; photo by R.E. Stobbs).

Family No. 173: TERAPONIDAE

by P.C. Heemstra

Thornfishes — **Doringvisse**

Body oblong, slightly compressed. Dorsal fin continuous, more or less deeply notched in front of soft-rayed part, with 11-13 spines and 9-11 rays; anal fin with 3 spines and 7-10 rays (last dorsal and anal rays usually split to their base but counted as 1); pectoral fins shorter than head, with 13-16 rays; pelvics I,5; caudal fin truncate to shallowly forked, branched rays 15. Scales small or moderate, ctenoid; lateral line complete, continued a short distance on caudal fin; dorsal and anal fins with basal scaly sheath, merging posteriorly with scales on soft-rayed part of fins; cheeks and opercles scaly; interorbital area, snout, preorbitals and lower jaw naked. Maxilla more or less exposed when mouth is closed; no supramaxilla. Preopercle serrate; opercle with 2 spines posteriorly. Jaws with villiform teeth in bands or flattened (incisiform) teeth in 2 rows with outer teeth enlarged; no canines; vomer and palatines usually edentate in adults. Gills 4, a slit behind the last; branchiostegals 6. Gasbladder divided, anterior chamber attached to a muscle arising on rear of skull. Vertebrae 25-27.

Vari (1978), in his excellent revision of this family, recognises 15 genera and 37 species. Several species are restricted to freshwater in Australia, New Guinea, Indonesia and the Philippines. Two genera represented in our area.

KEY TO GENERA

1a Post-temporal bone serrate posteriorly, not covered by scales; D notched before last spine ..... *Terapon*
1b Post-temporal bone not serrate, completely covered by scales; D not notched before last spine ..... *Pelates*

Genus ***Pelates*** Cuvier, 1829

Teeth of adults in 1-3 rows; penultimate D spine subequal to last one. Two species; 1 in our area.

173.1 *Pelates quadrilineatus*
(Bloch, 1790)
PLATE 47

Trumpeter Trompetter

Holocentrus quadrilineatus Bloch, 1790: 82, Pl. 238, Fig. 2 (The Orient). *Pelates quadrilineatus:* Smith, **SFSA No. 402*;** Vari, 1978: 249*.

D XII-XIII,9-11; A III,9-11; P 13-16; LL 60-69; GR (16-18)+(22-27). Depth 2.6-3.2; head 2.3-3.6 in SL.

Generally silver, with 4-6 narrow dark horizontal lines; black humeral blotch present or absent just behind head and below D origin; dark blotch present or absent at front of D; C pale or slightly dusky. Attains 24 cm. Widely distributed in tropical Indo-West Pacific region; extends south to the Transkei. A coastal species often found in brackish water. Croaks when taken from the water.

Genus ***Terapon*** Cuvier, 1816

Terapon is the original incorrect transliteration (of the Greek word for slave) rather than a *lapsus calami* and therefore valid. *Therapon,* the correct transliteration, is not nomenclaturally valid. Jaws with an outer row of strong conic teeth and inner band of smaller teeth. Body pale, with more or less distinct dark stripes extending onto C. Three species, 2 in our area.

KEY TO SPECIES

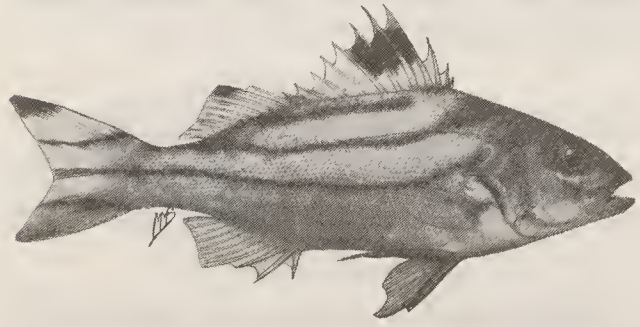
1a LL 69-93; body stripes curved; 2-5 large spines at angle of preopercle ..... *T. jarbua*
1b LL 46-56; dark body stripes straight; serrae at angle of preopercle not much enlarged ..... *T. theraps*

173.2 *Terapon jarbua*
(Forsskål, 1775)
PLATE 47

Thornfish Doringvis

Sciaena jarbua Forsskål, 1775: 50 (Djedda, Red Sea); Klausewitz & Nielsen, 1965: 20, Pls. 17 & 18. *Therapon jarbua:* Smith, **SFSA No. 401*.** *Terapon jarbua:* Smith & Smith, 1966: 122*; Vari, 1978: 254*.

D XI-XII,9-11; A III,7-10; P 13-14; LL 69-93; GR (6-8)+(13-16). Depth 2.5-3.2, head 2.3-3.6 in SL.



173.2 *Terapon jarbua:* 15 cm (Algoa Bay).

Body silvery, with 3 or 4 curved dark brown or blackish stripes. Whitfield & Blaber (1978) have shown that this species often feeds by biting scales from other larger fishes. When captured, *T. jarbua* contracts the muscles on one side of its body so that the fish forms a U shape; at the same time the fin spines are erected and the large opercular spines are held at right angles to the head. The Xhosa vernacular for *T. jarbua* means "thorn-tree" and aptly describes the fish. This defensive posture may deter predators and allow *T. jarbua* to feed on scales of larger fishes with relative immunity from predation. The juveniles and adults are often found in freshwater, but according to Wallace (1975) spawning occurs in the sea. Attains 33 cm. Widely distributed in Indo-West Pacific region; extends to Knysna, but not common south of the Kei River.

173.3 *Terapon theraps*
(Cuvier, 1829)

Straight-lined thornfish Reguitstreep-doringvis

Therapon theraps Cuvier, 1829: 129, Pl. 53 (Java & Mahe (India)); Smith, **SFSA No. 400*.** *Terapon theraps:* Vari, 1978: 259*.

D XI-XII,9-11; A III,7-9; P 14-15; LL 46-56; GR (6-8)+(15-18). Depth 2.4-3.5, head 2.8-3.5 in SL.

Body of adults dusky above, silvery below, with 2-4 horizontal dark stripes. Small juveniles less than 45 mm have dark vertical bars; at 25 mm SL, dark stripes and bars form a chequed pattern. Attains 30 cm SL. Widely distributed in tropical Indo-West Pacific region; rare in our area, but does occur from Durban northwards.

173.3 *Terapon theraps:* 18.6 cm (S. Mozambique).

Family No. 174: PRIACANTHIDAE

by P.C. Heemstra

Bigeyes **Grootoë**

Body somewhat compressed. Dorsal fin single, continuous, with 10 spines and 10-15 rays; anal fin with 3 spines and 11-16 rays; last dorsal and anal rays usually split to their base, but counted as a single ray. Pectoral fins much shorter

than head, with 16-19 rays. Pelvic fins with 1 spine and 5 branched rays. Caudal fin with 14 branched rays; rear margin truncate, convex or concave. Gasbladder present. Scales ctenoid; lateral line single, complete, not continued on caudal fin; head, maxilla and lower jaw scaly. Upper jaw slightly protrusile; supramaxilla absent; 1 row or narrow band of small conical teeth on jaws; no canines; vomer and palatines with minute teeth. Two closely set nostrils. Gills 4, a slit behind last; pseudobranch present; branchiostegals 6, membranes separate, free from isthmus. Vertebrae (9-10)+13.

Bigeyes are found near the bottom in rocky areas or reefs of tropical and temperate regions in depths of 1 - 400 m. Three genera, all in our area; about 12 species.

KEY TO GENERA

1a D spines increase regularly in length from first to last; 10th spinè more than twice length of 2nd ..... *Cookeolus*
1b 10th D spine subequal to 2nd 2

2a Body depth 2.3-2.9 in SL; LL 54-73 ..... *Priacanthus*
2b Body depth 1.9-2.1 in SL; LL 36-38 ..... *Pristigenys*

Genus ***Cookeolus*** Fowler, 1929

V longer than head in fish larger than 15 cm SL; A base shorter than head. One worldwide species.

174.1 *Cookeolus boops*
(Schneider, 1801)
PLATE 47

Bulleye — Buloog

Anthias boops Schneider, *in* Bloch & Schneider, 1801: 308 (Atlantic Ocean near St. Helena). *Priacanthus boops:* Smith, **SFSA No. 404*.**

D X,12-13; A III,12-13 (3rd spine longer than orbit diameter); P 17-19; LL 54-59; GR (5-7)+(15-20) not counting rudiments. Depth 1.8-2.8; head 2.6-3.0.

Head and body reddish silver, paler ventrally; membrane of D & A dark anteriorly; V membrane blackish; the rays pale. Attains 60 cm. Beira to Algoa Bay in depths of 100 - 400 m.

Genus ***Priacanthus*** Oken, 1817

About 6 species; 2 in our area. Previous records of *P. arenatus* Cuvier from southern Africa (Smith, **SFSA No. 405**) are unsubstantiated.

KEY TO SPECIES

1a No scales on rear margin of preopercle; adults with well-developed U-shaped gap under preopercular spine at junction of subopercle and interopercle; C truncate to convex, usually with dark dots; interorbital space 3.3-3.7 in head ..... *P. cruentatus*
1b Preopercle entirely scaled; adults without U-shaped gap under preopercular spine; C truncate to concave, without dark dots; interorbital space 3.6-4.5 in head ..... *P. hamrur*

174.2 *Priacanthus cruentatus*
(Lacepède, 1801)
PLATE 47

Glass bigeye — Glas-grootoog

Labrus cruentatus Lacepède, 1801: 452, 522 (America). *Priacanthus cruentatus:* Fowler, 1936: 66; ?Smith, **SFSA No. 403*** (Fig. 403 on Pl. 104 is of *P. hamrur*).

D X,13-14; A III,13-15; P 18-19; LL 60-69; GR (3-4)+(17-19) not counting rudiments. Depth 2.4-2.7; head 2.8-3.1. Eye 2.3-2.8, V 1.3-1.6 in head; V (20-26% SL) shorter than in *P. hamrur*. Preopercle spine distinct.

Colour silver or reddish or mottled silvery and red; median fins with small dark spots; V uniformly pale or dusky, but without distinct spots. Attains 30 cm. East coast of Africa to Hawaii, south to at least Durban; also in Atlantic.

174.3 *Priacanthus hamrur*
(Forsskål, 1775)
PLATE 44

Crescent-tail bigeye — Sekelstert-grootoog

Sciaena hamrur Forsskål, 1775: 45 (Djedda, Red Sea); Klausewitz & Nielsen, 1965: 18, Pl. 11. *Priacanthus hamrur:* ?Smith, **SFSA No. 406*;** Smith & Smith, 1966: 120*. *Priacanthus cruentatus* Smith, **SFSA No. 403*** (Fig. only).

D X,13-15; A III,13-16; P 17-20; LL 64-75; developed GR (3-5)+(18-20). Depth 2.4-2.7; head 2.9-3.3. Eye 2.4-2.7, V 1.0-1.2 in head; V (28-33% SL) longer than in *P. cruentatus*. With age, the preopercle spine becomes smaller and the C of specimens 25 cm and larger becomes progressively more lunate.

Colour silvery or coppery red; median fins dusky, without distinct dark spots; V dusky, black spot at base of first 3 rays. Attains at least 45 cm. Throughout Indo-Pacific region (Red Sea possibly to Hawaii); in our area from Mozambique to Knysna. Frequently thrown up dead by cold water on our eastern Cape coast.

174.3 *Priacanthus hamrur.* 30 cm (N. Mozambique).

Genus ***Pristigenys*** Agassiz, 1835

Middle D spines longest; V shorter than or subequal to head length; A base shorter than head. Four species, 1 in our area.

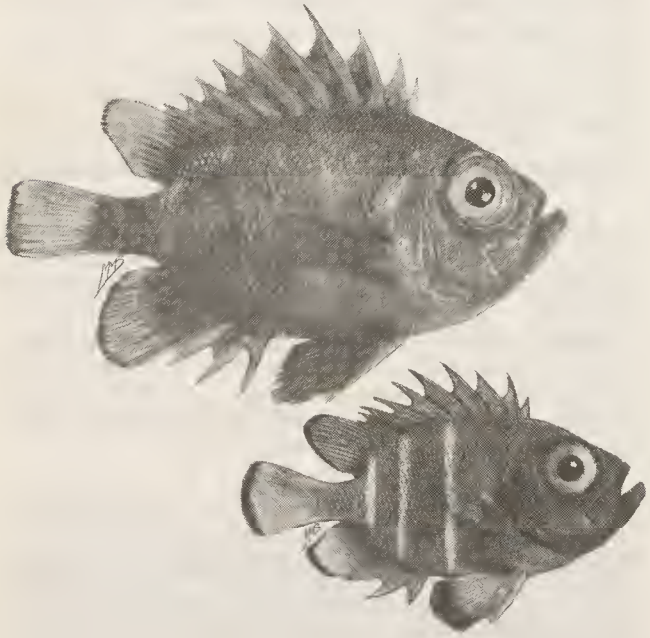
174.4 *Pristigenys niphonia*
(Cuvier, 1829)
PLATE 47

Japanese bigeye — Japanse grootoog

Priacanthus niphonius Cuvier, *in* Cuv. & Val., 1829: 107 (Japan). *Pseudopriacanthus niphonius:* Smith, 1953: 517, **No. 406a.** *Pristigenys niphonia:* Smith, 1966*; Masuda et al., 1975: 208*.

D X,11-12; A II,10-11; P 18-19; LL 36-38; GR (7-8)+(16-20). Depth 1.9-2.1; head 2.4-2.6 in SL. Eye 1.9-2.1 and bony interorbital width 5.9-6.4 in head.

Body bright scarlet, with 3 or 4 narrow pale vertical bars; median fins with narrow black margin; V dark red, blackish distally. Attains 26 cm. Japan, Indonesia and western Indian Ocean south to Algoa Bay in depths of 80 - 100 m.



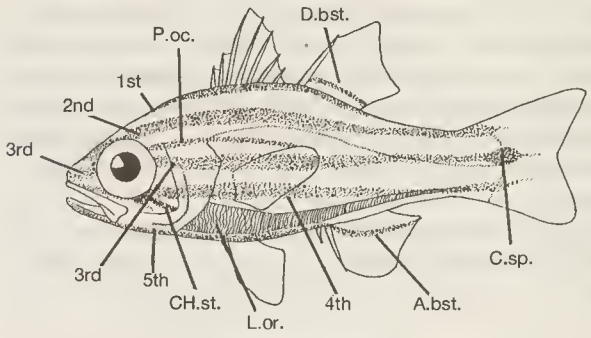
174.4 *Pristigenys niphonia.* top: 25 cm (Algoa Bay); bottom: 15 cm (N. Mozambique).

Family No. 175: APOGONIDAE

by O. Gon

Cardinal fishes — **Kardinaalvisse**

Body oblong and compressed to fusiform. Two separate dorsal fins, VI-VIII+I,7-14; anal fin II,8-18; pectoral fin rays 10-23; principal caudal rays 9+8, upper and lowermost unbranched. Scales present except in *Gymnapogon;* opercular bones scaled; predorsal scales present except in *Astrapogon.* Mouth large and oblique; teeth on jaws, vomer (except in some Epigoninae) and usually on palatines. One opercular spine (more in some Epigoninae). Opercular bones smooth or serrated. Seven branchiostegals; gill membranes separate. Vertebrae 10 or 11+14, or 10+15.



Features of an apogonid fish: 1st-5th – stripe numbers; A.bst. – anal basal stripe; C.sp. – caudal spot; Ch.st. – cheek stripe; D.bst. – dorsal basal stripe; P.oc – postocular stripe; L.or. – light organ.

Small carnivorous fishes, mostly of shallow water, in all tropical and subtropical seas, occupying a variety of habitats such as coral reefs, sandy and weedy bottom, turbid water and mangroves; some species occur in brackish and fresh water. Not of commercial importance in our area although eaten by natives in east Africa. Some species make good aquarium fishes.

The family is divided into 3 subfamilies, 24-26 genera and about 200 species (Fraser, 1972). At least 14 genera and 53 species likely to be found in our area. No comprehensive revision of the whole family has been done, but regional studies were undertaken in the western Indian Ocean (Smith, 1961), Marshall Ids. (Lachner, 1953) and Indo-Australian Archipelago (Weber and de Beaufort, 1929). A comparative generic study of the subfamilies Apogoninae and Pseudaminae was published by Fraser (1972). Several genera (especially *Apogon*) are in need of revision.

Note: In the following accounts, gill-raker (GR) counts include all rudiments unless stated to be of developed GR; a gill-raker is considered developed when its tip is freely movable and its length is at least twice the width of its base. In some species, the numbers of gill-rakers decrease from juvenile to adult. Lateral-line counts are of *all* pored scales (including those extending onto caudal fin).

KEY TO SUBFAMILIES

1a No scales on soft D and A; fewer than 30 pored scales in LL, or LL absent; if more (*A. multitaeniatus*) then canine teeth absent, opercle without long, stout spine and preopercle ridge always smooth 2
1b Soft D and A with scales at least basally; always more than 30 pored scales in LL ..... EPIGONINAE

2a Large canines always present in both jaws; scales cycloid or absent; LL incomplete or absent ..... PSEUDAMINAE
2b Canines absent (except in *Cheilodipterus*); scales ctenoid; LL complete (except *Foa* and *Fowleria*) .. APOGONINAE

Subfamily APOGONINAE

Supramaxilla present or absent; 10+14 vertebrae (10+15 in *Vincentia*); 4 genera with species having light organs; oral brooding has been reported for a number of species. About 10 genera and 42 species in our area. The monotypic genus *Neamia* is not yet known from our area, but it probably occurs here and is thus included.

KEY TO GENERA

1a Silvery (in live fish) dark-striped light organ under P base and along ventral side of body from isthmus to C peduncle; 1st D spines 6-7; A II,7-10; scales cycloid to weakly ctenoid. ..... *Siphamia*
1b No light organ as above; 1st D spines 6-8; A II,8-18 2

2a First D spines 6; A II,8-18 3
2b First D spines 7; A II,8-11 7
2c First D spines 8; A II,8; P rays 18 ..... *Neamia*

3a Longest procurrent C ray spiny (unsegmented); A II,9; palatine teeth present; preopercle edge serrated ..... *Sphaeramia*
3b Longest procurrent C rays segmented 4

4a Preopercle edge smooth; A II,9 or II,12-13; scales cycloid to weakly ctenoid; large canines absent (some teeth may be slightly enlarged) ..... *Rhabdamia* (subgenera *Rhabdamia* and *Verulux*)
4b Preopercle edge usually serrate; scales usually ctenoid; A II,8-18; large canine teeth present or absent 5

5a Canine teeth and supramaxilla absent 6
5b Canine teeth and supramaxilla present ..... *Cheilodipterus*

6a A II,12-18 ..... *Archamia*
6b A II,8-9 ..... *Apogon* (most subgenera)

7a A II,10-11; soft D rays 10-11; preopercle edge smooth ..... *Rhabdamia* (subgenus *Bentuviaichthys*)
7b A II,8-9; soft D rays 9; preopercle edge serrate or smooth 8

8a LL complete 10
8b LL incomplete; preopercle edge smooth 9

9a Palatine teeth present ..... *Foa*
9b Palatine teeth absent ..... *Fowleria*

10a Preopercle edge smooth; palatine teeth absent; supramaxilla present; C rounded ..... *Apogonichthys*
10b Preopercle edge serrate; palatine teeth usually present; supramaxilla absent; C emarginate ..... *Apogon* (subgenera *Nectamia, Lepidamia* and *Pristiapogon*)

Genus *Apogon* Lacepède, 1802

Body oblong and compressed; head large, snout short; eye large; 6-7 spines in 1st D; D and A last ray sometimes split to base; LL complete with 23-45 pored scales, the last 2-4 scales on C, usually smaller than body scales; body scales ctenoid; villiform teeth on jaws, vomer, and usually on palatines; preopercle ridge smooth (serrate in *Pristiapogon*); canine teeth absent; C usually emarginate.

A large, varied group of small, colourful fish that inhabit shallow water, mostly coral reefs. Fraser (1972) recognised 10 subgenera within this, the largest genus in the family; about 29 species in our area. *A kiensis* and *A. fragilis* are not known from our area, but they probably occur here.

KEY TO SPECIES

1a First D spines 6 2
1b First D spines 7 9

2a Total GR 20 or more 4
2b Less than 20 GR 3

3a Total GR 14-17; colour uniform scarlet without dark stripes; P 13-14 ..... *A. (Apogon) coccineus*
3b Total GR 12-16; 3 dark stripes on body: upper and middle horizontal, lower diagonal from eye to A base; P 12 ..... *A. (Apogon) semiornatus*

4a Total GR 20-25 5
4b Total GR 26-30 7

5a 1-3 horizontal stripes on body; caudal spot present or absent 6
5b A short dark stripe from snout through eye to angle of opercle; small caudal spot present ..... *A. (Nectamia) thermalis*

6a Upper part of body with 2-3 stripes, the lower 1 from snout to tip of mid C rays; caudal spot absent ..... [*A. (Nectamia) kiensis*]
6b One narrow stripe along centre of body from angle of opercle to C base; small caudal spot present ..... *A. (Nectamia) lateralis*

7a A II,9-10; 2nd D rays 9 8
7b A II,8; 2nd D rays 8; V black ..... *A. (Nectamia) nigripes*

8a Second to 4th D spines ending with filaments, the 2nd spine longest; caudal spot absent; few orange to brown spots on cheek; 3 vertical orange bars behind eye ..... *A. (Zoramia) leptacanthus*
8b D spines not filamentous; small caudal spot present; a dark stripe from snout to rear margin of eye ..... [*A. (Zoramia) fragilis*]

9a Preopercle ridge serrated; suborbitals with spines 10
9b Preopercle ridge smooth; suborbitals without spines 11

10a Dark stripe along body narrowing toward tail; LL covered by lower part of caudal spot; P 14 ..... *A. (Pristiapogon) fraenatus*
10b Dark stripe more or less same width from snout to caudal spot; caudal spot above LL merely touching but not covering it; P 13 .... *A. (Pristiapogon) kallopterus*

11a Two or more horizontal stripes or lines along side of body; caudal spot present or absent 12
11b No horizontal stripes on body; caudal spot (or band) present or absent 18

12a Body orange; horizontal stripes orange to dusky but never dark; caudal spot absent 13
12b Stripes dark brown to black; caudal spot usually present 14

13a Enlarged teeth a symphysis and rear of lower jaw; some enlarged teeth on vomer; 16-17 developed GR; median stripe extends as a dusky line to tip of mid C rays ..... *A. (Nectamia) nitidus*
13b Teeth not enlarged, about the same size on both jaws; 18-19 developed GR; no dusky line on C ..... *A. (Nectamia) cyanosoma*

14a LL scales 43-45; developed GR 9-10; many dark lines along side of body, those above LL follow scale rows and those below LL horizontal ..... *A. (Lepidamia) multitaeniatus*
14b Less than 30 scales in LL 15

15a Two or 3 dark stripes along upper side of body; lower stripe extends to tip of mid C rays; caudal spot absent; P 15-16 ..... *A. (Nectamia) quadrifasciatus*
15b Five dark stripes on body; caudal spot present 16

16a Postocular stripe present; last A ray less than 1.2 times penultimate A ray; V dusky 17
16b Postocular stripe absent; last A ray 1.3-1.6 times length of penultimate A ray; V pale ..... *A. (Nectamia) angustatus*

17a Postacular stripe reaching under second D; caudal spot round to slightly oval, about size of pupil or slightly larger and distinctly darker than the adjacent portion of midlateral (3rd) stripe; P rays 15 ..... *A. (Nectamia) cookii*
17b Postocular stripe short, usually ending on opercle edge; caudal spot oval, usually smaller than pupil, in the form of a slight widening of the midlateral (3rd) stripe; P rays 14 ..... *A. (Nectamia) taeniophorus*

18a Twenty or more developed GR 19
18b Fewer than 20 developed GR 22

19a Dark stripe from lower margin of eye diagonally across cheek; no horizontal stripes on head; a dark saddle (or spot) on C base not completely encircling peduncle; P 13 20
19b Diagonal stripe on cheek absent; a black band completely encircling peduncle at C base or caudal spot present; P usually 14 21

20a Stripe across cheek wide, somewhat triangular with apex at angle of preopercle; total GR 26-29 ..... *A. (Nectamia) savayensis*
20b Stripe across cheek narrow; total GR 24-26 ..... *A. (Nectamia) guamensis*

21a First and 2nd soft rays of 2nd D filamentous; small caudal spot present ..... *A. (Nectamia) flagelliferus*
21b No filamentous rays in 2nd D; a black band around peduncle at C base (or large caudal spot in young specimens) ..... *A. (Nectamia) aureus*

22a Two or 3 dark vertical bars on body; caudal spot present or absent; dark ocellus above P present or absent; V dark 23
22b No vertical bars on body; dark ocellus on body absent; caudal spot absent (present as a large spot or dark band in *A. aureus*); V light 25

23a One faint dusky crossbar under each D and sometimes on C peduncle; caudal spot and ocellus on body absent; developed GR 7-8 ..... *A. (Nectamia) timorensis*
23b Dark crossbar under each D distinct; 9-13 developed GR 24

24a Light brown horizontal lines on side of body; caudal spot present; ocellus on body present in young, may disappear with age; P 14-15; developed GR 9-11 ..... *A. (Nectamia) taeniatus*
24b Ocellus above P usually present; a distinct dark bar on peduncle present; no caudal spot; P 15-16; developed GR 11-13 ..... *A. (Nectamia) nigripinnis*

25a Large dark ocellus on 1st D; P 16; developed GR 12-13 ..... *A. (Nectamia) queketti*
25b No large ocellus on 1st D; P 14-15 26

26a P 14; developed GR 15-17; teeth on lower jaw caniniform, larger; a dark stripe from snout through eye to edge of opercle ..... *A. (Nectamia) apogonides*
26b P 14-15; developed GR 17-19; a dark narrow stripe along A base; a dark band on peduncle at C base (or a large caudal spot in young specimens) ..... *A. (Nectamia) aureus*
26c P 15; developed GR 15; few slightly enlarged teeth on side of lower jaw; colour (in alcohol) brown with edges of scales darker ..... *A. (Nectamia ?) enigmaticus*

175.1 *Apogon angustatus*

(Smith & Radcliffe, 1911)

PLATE 48

Broadstriped cardinal — Breëstreep-kardinaal

Amia angustata Smith & Radcliffe, *in* Radcliffe, 1911: 253, Fig. 1 (Philippines). *Ostorhynchus angustatus:* Smith, 1961: 401*.

D VII+I,9; A II,8; P 14; LL 28; predorsal scales 3-4; GR (5-6)+(13-15) (developed GR 11-15). Depth 2.8-3.0, head 2.6-2.9 in SL; eye 2.5-2.8 in head.

This species belongs to the dark-striped species complex, members of which usually have 5 horizontal stripes and a caudal spot. The species distinction within the complex is not clear. In our area *A. angustatus* can easily be confused with *A. taeniophorus* and *A. cookii*. *A. angustatus* has a distinct, dark, more or less round caudal spot about the size of the pupil; a dark stripe along base of 2nd D rays; the 5th stripe extends onto base of A rays; first D transparent except for some pigment on first 3 spines. All 5 stripes narrower than interspaces. Dark basal stripe of 2nd D is narrow in both sexes. Attains 8 cm. Indo-West and South Pacific; Red Sea to Natal.

175.2 *Apogon apogonides*

(Bleeker, 1856)

PLATES 48 & 51

Short-tooth cardinal — Korttand-kardinaal

Cheilodipterus apogonides Bleeker, 1856: 37 (East Indies). *Apogon monochrous* (*non* Bleeker): Smith, **SFSA No. 480.** *Ostorhynchus apogonides* Smith, 1961: 402*.

D VII1+I,9; A I1,8; P 14; LL 28; 4-5 predorsal scales; GR 5(15-16) (developed GR 15-17). Depth 2.7-3.0, head 2.5-2.8 in SL; eye 2.9-3.3 in head. Teeth on lower jaw caniniform, incurved, largest posteriorly and larger than upper jaw teeth. Upper jaw teeth villiform posteriorly, becoming caniniform and incurved anteriorly.

In alcohol upper ½ of body dusky, lower part yellowish; tip of snout dark; usually a dark horizontal stripe from eye to rear margin of opercle; a few dark spots on body under LL. Attains over 10 cm. Rare in our area; Indo-Pacific; south to Durban.

175.3 *Apogon aureus*
(Lacepède, 1802)
PLATE 48

Bandtail cardinal — Bandstert-kardinaal

Centropomus aureus Lacepède, 1802: 253, 273 (Mauritius). *Apogon fleurieu:* Smith, **SFSA No. 481***. *Ostorhynchus fleurieu* Smith, 1961: 399*.

D VII+I,9; A II,8; P 14; LL 28; 4-5 predorsal scales; GR (5-7)+(15-19) (developed GR 17-23). Depth 2.3-2.7, head 2.5-2.7 in SL; eye 2.7-3.2 in head. Villiform teeth on both jaws, a patch of slightly larger in curved teeth on symphysis of lower jaw.

In alcohol, head dusky and body light yellow, variably spotted; a wide dark band encircling peduncle at C base (usually a large caudal spot in fish < 50 mm SL); snout dark; anterior spines of all fins dusky; upper section of gill chamber and bases of GR on upper limb of gill arches dusky to dark in specimens of 35-40 mm SL; dark pigment spreading ventrally in larger fishes; sometimes small dark spots present in LL; a dark narrow stripe along A base (may not be apparent in fish < 40 mm SL). The genus name *Ostorhynchus* and species *fleurieu* that have been used by many authors for this controversial species are considered invalid (Fraser, 1972). Attains about 12 cm. A common Indo-West Pacific species; Red Sea south to Durban.

175.4 *Apogon coccineus*
Rüppell, 1838
PLATE 48

Ruby cardinal — Robyn-kardinaal

Apogon coccineus Rüppell, 1838: 88, Pl. 22, Fig. 5 (Red Sea); Smith, 1961: 387*. *Apogon campbelli* Smith, **SFSA No. 479a*** (Delagoa Bay).

D VI+I,9; A II,8; P 13-14; 6-8 predorsal scales; LL 25-26; GR (3-4)+(11-12) (developed GR 8-9). Depth 2.6-2.9, head 2.6-2.9 in SL; eye 2.9-3.1 in head. Mouth subterminal; ventral edge of preopercle poorly ossified, appears in the form of a wide flap.

Alive as illustrated; in alcohol light yellow, margin of dorsal scales dark. Attains 5 cm. Widespread in Indo-Pacific; Red Sea south to Sodwana.

175.5 *Apogon cookii*
Macleay, 1881
PLATES 48 & 51

Blackbanded cardinal — Swartband-kardinaal

Apogon cookii Macleay, 1881: 344 (Queensland). *Apogon novemfasciatus (non* Cuvier): Smith, **SFSA No. 487***. *Ostorhynchus endekataenia (non* Bleeker): Smith, 1961: 399*. *Apogon melanotaenia:* Smith, 1980: 177.

D VII+I,9; A II,8; P 15; LL 28; predorsal scales 3-4; GR (4-5)+(12-14) (developed GR 11-14). Depth 2.7-2.8, head 2.6-2.7 in SL; eye 2.6-3.0 in head. A member of the dark-striped species complex.

In alcohol: stripes as in illustration, 1st D and V dusky to dark; basal stripe on 2nd D rays of males black, occupying about ⅓ of fin height, the stripe much narrower in females. Attains 10 cm. Indo-Pacific; common in western Indian Ocean, south to Durban.

175.6 *Apogon cyanosoma*
Bleeker, 1853
PLATE 48

Goldenstriped cardinal — Gouestreep-kardinaal

Apogon cyanosoma Bleeker, 1853: 71 (East Indies). *Ostorhynchus cyanosoma:* Smith, 1961: 403*.

D VII+I,9; A II,8; P 14; LL 28; predorsal scales 3; GR (6-7)+(15-16). Depth 2.7-2.9, head 2.7 in SL; eye about 3.0 in head.

Body pale with orange horizontal stripes arranged as in dark-striped species, including a short postocular stripe reaching under origin of 2nd D; snout dusky; light interspaces on head silvery. Schools of this species are often seen among the long spines of sea urchins. Attains 8 cm. Common from Mozambique Id. northward, in Red Sea, Indo-West Pacific.

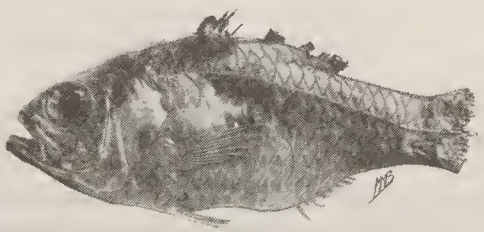
175.7 *Apogon enigmaticus*
(Smith, 1961)

Diamond cardinal — Diamant-kardinaal

Apogonichthyoides enigmaticus Smith; 1961: 396, Pl. 50, Fig. 1 (Durban). *Apogon monochrous* (*non* Bleeker): Barnard, 1927: 517.

D VII+I,9; A II,8; P 15; LL 24 (to end of hypurals; C missing); predorsal scales 3-4; GR 6+15 (developed GR 15). Depth 2.3, head 2.6 in SL; eye 3.2 in head. Some teeth on side of lower jaw enlarged.

Colour in life unknown; in alcohol, body brown with dark edges of scales forming network; few dark spots on nape and top of head. Known from a single specimen found in the South African Museum. Although in generally poor conditions, body scales, GR and dentition were examined and did not agree with any known western Indian Ocean species. It was given a new name "chiefly for the purposes of record in case further specimens come to light". Attains 10 cm. Durban.



175.7 *Apogon enigmaticus:* 8 cm holotype (off Durban).

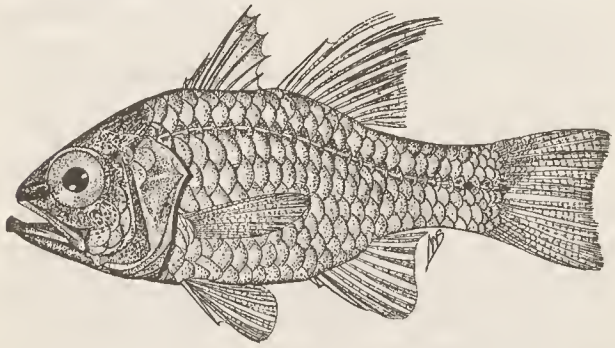
175.8 *Apogon flagelliferus*
(Smith, 1961)

Coachwhip cardinal — Sweep-kardinaal

Ostorhynchus flagelliferus Smith, 1961: 402, Fig. 8 (Mozambique Id).

D VII+I,9; A II,8; P 14; LL 28; predorsal scales 3-4; GR (6-7)+(17-18). Depth 2.4-2.5, head 2.7 in SL; eye 2.8-3.0 in head. One to 3 soft D rays ending with long filaments, 2nd longest.

Colour uniform pinkish red, becoming stronger on head and anterior spines of D, A and V; red spots along LL; edge of scales darker red; alternating red and silvery reflecting vertical bars may show on body under LL; caudal spot small; a dark stripe from tip of snout to eye. Attains 13 cm. Reported from Sodwana Bay and Mozambique.



175.8 *Apogon flagelliferus:* 13.5 cm holotype (Mozambique Id.).

175.9 *Apogon fraenatus*
Valenciennes, 1832
PLATE 48

Spurcheek cardinal — Stekelwang-kardinaal

Apogon fraenatus Valenciennes, 1832: 57, Pl. 4, Fig. 4 (New Guinea and Guam). *Pristiapogon fraenatus* Smith, 1961: 389*.

D VII+I,9; A II,8; P 14; LL 28; predorsal scales 4-5; GR (4-5)+13 (developed GR 10-11). Depth 3.0-3.2, head 2.6-2.7 in SL; eye 3.0-3.3 in head. Suborbital bones with spines. Large specimens with 1-3 small bony knobs on edge of opercle below spine.

Dusky to dark stripe along basal part of 2nd D and A; upper and lower margin of C dark; membrane between anterior spines of 1st D dark. Attains 10 cm. Indo-West Pacific; Red Sea to Durban.

175.10 *Apogon fragilis*
Smith, 1961
PLATE 48

Fragile cardinal — Tenger-kardinaal

Apogon fragilis Smith; 1961: 385, Pl. 46, Fig. H (Pinda, Mozambique).

D VI+I,9; A II,9-10; P 14; LL 23-24; predorsal scales 5; GR 7+(21-22); Depth and head 2.6 in SL; eye 3.0 in head. Unlike most other species of the genus, LL does not extend onto C; last pored scale is on caudal spot and is not elongated with a pointed end.

Body transparent with a small caudal spot and a dark stripe from tip of snout to rear margin of eye. Attains about 5 cm. Mozambique and Seychelles.

175.11 *Apogon guamensis*
Valenciennes, 1832

Pearl cardinal — Pêrel-kardinaal

Apogon guamensis Valenciennes, 1832: 54. *Apogon nubilus* Garman, 1903: 229* (Fiji). *Apogon bandanensis* Weber & de Beaufort, 1929: 317 (in part). *Apogon nubilus* Lachner, 1951: 600*; 1953: 459*. *Ostorhynchus nubilus* Smith, 1961: 398*.

D VII+I,9; A II,8; P 13; LL 26-27; predorsal scales 3-4; GR (7-8)+(17-19) = 24-26. Depth 2.3-2.5, head 2.4-2.5 in SL; eye 2.3-2.4 in head.

Cheek with a narrow dark stripe from eye to angle of preopercle; a dark saddle on peduncle at C base; light vertical bars sometimes show on body. Attains 10 cm. Red Sea, Indian Ocean, western and South Pacific Ocean. (This species may easily be confused with the closely related *A. savayensis*.)

175.11 *Apogon guamensis:* 9.5 cm (Kenya).

175.12 *Apogon kallopterus*
Bleeker, 1856
PLATES 48 & 51

Spinyhead cardinal — Stekelkop-kardinaal

Apogon kallopterus Bleeker, 1856: 33. *Apogon frenatus* (*non* Val.): Smith, SFSA No. 484*. *Pristiapogon snyderi:* Smith, 1961: 390* (Inhaca Id.).

D VII+I,9; A II,8; P 13; LL 28; predorsal scales 4-5; GR 4+(13-15) (developed GR 12-13). Depth 2.9-3.1, head 2.6-2.8 in SL; eye 2.8-3.1 in head. Suborbital bones with spines.

Body light brown to reddish brown; wide dark stripe from tip of snout through eye to upper C base (above LL); stripe sometimes fades out on peduncle; large caudal spot above LL, touching but not covering it; V sometimes dark. Attains 15 cm. Common in Indo-Pacific; Red Sea and south to Algoa Bay.

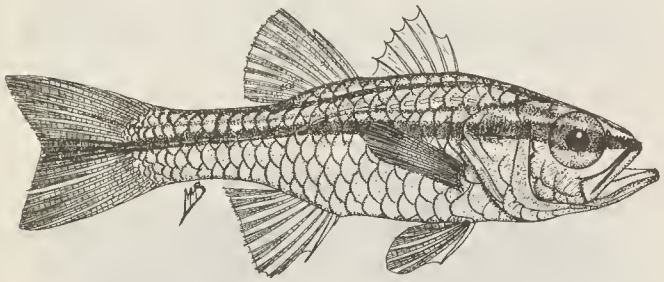
175.13 *Apogon kiensis*
Jordan & Snyder, 1901

Rifle cardinal — Geweer-kardinaal

Apogon kiensis Jordan & Snyder, 1901: 905, Fig. 9 (Japan); Smith, 1961: 388*.

D VI+I,9; A II,8; P 14; LL 28; predorsal scales 4-5; GR (5-7)+(16-18) = 22-25. Depth 3.1-3.4, head 2.7-2.8 in SL; eye 2.7-2.9 in head.

Body pale with dark stripes as shown. May be confused with *A. quadrifasciatus*, which has 7 spines in 1st D and 19-20 lower GR. Attains 8 cm. Mozambique Id. to Red Sea, Philippines, Japan and Taiwan.



175.13 *Apogon kiensis:* 5 cm (N. Mozambique).

175.14 *Apogon lateralis*
Valenciennes, 1832
PLATE 48

Humpback cardinal — Boggel-kardinaal

Apogon lateralis Valenciennes, 1832: 58 (Vanicolo); Smith, 1961: 386*. *Apogon hyalosoma* (*non* Bleeker): Smith, **SFSA No. 479*.**

D VI+I,9; A II,8; P 14; LL 28; predorsal scales 6-7; GR (5-7)+(16-18) = 22-25. Depth 2.5, head 2.6 in SL; eye 3.8 in head.

Predorsal section of head high, forming a hump above eyes; a dark narrow line from angle of opercle to a small spot at C base; front and tip of 1st D black. Attains 10 cm. Indo-West Pacific, often found in freshwater and estuaries, south to Inhaca Id.

175.15 *Apogon leptacanthus*
Bleeker, 1856
PLATE 48

Longspine cardinal — Langstekel-kardinaal

Apogon leptacanthus Bleeker, 1856: 204 (Ternate); 1873: 97, Pl. 71, Fig. 3 (East Indies); Smith, 1961: 385*.

D VI+I,9; A II,9; P 13; LL 24; predorsal scales 5; GR (6-7)+(22-23). Depth 2.2-2.4, head 2.5-2.6 in SL; eye 2.4-2.6 in head. LL not extending onto C, not ending with an elongate scale.

Body pinkish; a few bluish vertical lines and spots on opercle and under 1st D; areas between lines sometimes orange; filament of 2nd D spine black; snout and top of head dusky; caudal spot absent. Attains 6 cm. Indo-West Pacific south to Mozambique Id.

175.16 *Apogon multitaeniatus*
Ehrenberg, 1828
PLATE 49

Smallscale cardinal — Kleinskub-kardinaal

Apogon multitaeniatus Ehrenberg, in Cuv. & Val., 1828: 159 (Red Sea); Smith, **SFSA No. 488*.** *Apogon natalensis* Gilchrist & Thompson, 1908: 149 (Natal). *Lepidamia multitaeniatus:* Smith, 1961: 381*.

D VII+I,9; A II,8; P 15; LL 43-45; predorsal scales 4-5; GR (5-6)+(14-16) (developed GR 10). Depth 2.6, head 2.7-2.8 in SL; eye 3.0-3.5 in head.

Body with 18-20 dark longitudinal lines along scale rows; 1st D black, other fins dusky; P base black; tips of V black. One of the largest cardinal fishes, attains 18 cm. Indo-West Pacific, Red Sea to Durban.

175.17 *Apogon nigripes*
Playfair & Günther, 1866
PLATE 49

Blackfoot cardinal — Swartvoet-kardinaal

Apogon nigripes Playfair & Günther, 1866: 19, Pl. 5, Fig. 1 (Zanzibar); Smith, **SFSA No. 476*;** 1961: 387*.

D VI+I,8; A II,8; P 14; LL 26-27; predorsal scales 2; GR (6-7)+(22-23). Depth 2.2-2.4, head 2.7-3.0 in SL; eye 2.4-2.7 in head. Dorsal profile concave, forming a small hump above eyes; V reaching well past A origin.

Body with dark vertical bars mostly under LL; 1st D, front of 2nd D and A and C lobes dark; V black. Attains 6-7 cm. Lake St. Lucia northwards, probably to the Red Sea.

175.18 *Apogon nigripinnis*
Cuvier, 1828
PLATE 49

Bullseye cardinal — Koloog-kardinaal

Apogon nigripinnis Cuvier, *in* Cuv. & Val., 1828: 113 (India). *Apogonichthyoides uninotatus* (*non* Smith & Radcliffe): **Smith, SFSA No. 494*.** *Apogonichthyoides nigripinnis:* Smith, 1961: 395*.

D VII+I,9; A II,8; P 15-16; LL 27; predorsal scales 2; GR (3-4)+(13-14) (developed GR 12-13). Depth 2.2-2.3, head 2.4 in SL; eye 3.3-3.6 in head. Low hump above eyes; teeth villiform posteriorly on jaws and vomer, becoming larger and incurved anteriorly; C truncate.

Body with a dark vertical bar under each D and another on C base; sometimes a 4th bar between 2nd D and C base; large ocellus above P rarely absent, sometimes present only on 1 side of body; V black; P light and other fins dusky to dark. Attains 10 cm. Indo-West Pacific, Red Sea and south to Delogoa Bay; possibly 1 record from the Mediterranean.

175.19 *Apogon nitidus*
(Smith, 1961)
PLATE 49

Bluespot cardinal — Bloukol-kardinaal

Apogon novemfasciatus (*non* Cuvier): Smith, **SFSA No. 487,** Pl. 102, "golden form". *Ostorhynchus nitidus* Smith, 1961: 403, Pl. 48, Fig. J (Inhaca Id.).

D VII+I,9; A II,8; P 13-14; LL 27-28; predorsal scales 3-4; GR (5-6)+15. Depth and head 2.8 in SL; eye 2.8 in head. A patch of slightly enlarged and incurved teeth on symphysis of lower jaw.

Colour pattern similar to *A. cyanosoma* but lacks the 5th (ventral) stripe, which is replaced here by a few blue spots and markings; stripes fading on peduncle; 3rd (median) stripe becomes dusky on rear part of peduncle and extends to tip of mid C rays. Attains 8 cm. Known from 3 specimens collected at Inhaca Id., Mozambique.

175.20 *Apogon quadrifasciatus*
Cuvier, 1828
PLATE 49

Twostripe cardinal — Tweestreep-kardinaal

Apogon quadrifasciatus Cuvier, *in* Cuv. & Val., 1828: 153 (India); Smith, **SFSA No. 485*.** *Ostorhynchus quadrifasciatus:* Smith, 1961: 404*.

D VII+I,9; A II,8; P 15-16; LL 28; predorsal scales 5; GR (5-6)+14. Depth 2.8-3.0, head 2.5-2.6 in SL; eye 2.9-3.2 in head. Preopercle ridge smooth in young, becoming serrated around angle with age; suborbital usually undulate, sometimes with spinules (in large specimens).

Two dark horizontal stripes. Attains 10 cm. Indo-West Pacific; Red Sea to Inhaca Id. in fairly deep (50 m) sheltered water.

175.21 *Apogon queketti*
Gilchrist, 1903

Spotfin cardinal — Kolvin-kardinaal

Apogon queketti Gilchrist, 1903: 206, Pl. 14 (Natal); Barnard, 1927: 517*. *Apogonichthys queketti:* Smith, **SFSA No. 492*.** *Jaydia queketti:* Smith, 1961: 393*.

D VII+I,8; A II,8; P 16; LL 27-28; predorsal scales 2; GR 5+(11-12) (developed GR 12-13). Depth 2.6-2.8, head 2.3-2.5 in SL; eye 3.4-3.7 in head. Preopercle margin undulate at angle and ventral part, vertical limb smooth. C rounded. May be confused with *Apogonichthys ocellatus,* which differs in having a long flap on the anterior nostril, a smooth preopercle edge, a dark diagonal bar on cheek and in the absence of palatine teeth.

175.21 *Apogon queketti:* 10 cm (Natal).

Large dark ocellus on 1st D. Attains 8 cm. Off Natal coast at about 70 m, southern Red Sea and Arabian Sea.

175.22 *Apogon savayensis*
Günther, 1871
PLATE 51

Ghost cardinal — Spook-kardinaal

Apogon savayensis Günther, 1871: 656 (Samoa). *Apogon bandanensis* (*non* Bleeker): Smith, **SFSA No. 482*.** *Ostorhynchus savayensis:* Smith, 1961: 399*.

D VII+I,9; A II,8; P 13; LL 28; predorsal scales 3; GR (7-8)+(19-21). Depth 2.2-2.4, head 2.4-2.6 in SL; eye 2.6-2.7 in head.

Dark triangular stripe from eye across cheek to angle of preopercle; black saddle on caudal peduncle reaching to, or slightly under LL; 6-7 faint vertical bars sometimes show on body; fins dusky; top of 1st D, front of 2nd D and upper and lower margin of C dark. Often confused with *A. guamensis,* which has a narrower cheek stripe and fewer GR. Attains 10 cm. Indo-Pacific; Red Sea south to Inhaca Id.

175.22 *Apogon savayensis:* 8.5 cm (Seychelles).

175.23 *Apogon semiornatus*
Peters, 1876
PLATES 49 & 51

Threeband cardinal — Drieband-kardinaal

Apogon semiornatus Peters, 1876: 436 (Mauritius); Smith, 1961: 388*. *Apogon warreni* Regan, 1908: 251 (Zululand); Smith, **SFSA No. 477.**

D VI+I,9; A II,8; P 12; LL 27-28; predorsal scales 5-6; GR (3-4)+12 (developed GR 8). Depth 2.6-2.8, head 2.4-2.6 in SL; eye 2.9-3.0 in head. Ventral section of preopercle poorly ossified; ventral edge undulate; vertical edge usually serrate, but sometimes smooth with small spinules at angle.

Preserved: body pale with 3 dark stripes as in live specimens. Attains about 7 cm. Indo-West Pacific; south to Durban.

175.24 *Apogon taeniatus*
Ehrenberg, 1828

Twobelt cardinal — Tweeband-kardinaal

Apogon taeniatus Ehrenberg, *in* Cuv. & Val., 1828: 118 (Red Sea); Smith, **SFSA No. 483***. *Apogonichthyoides taeniatus:* Smith, 1961: 394*.

D VII+I,9; A II,8; P 14-15; LL 27; predorsal scales 3; GR (4-5)+(13-14) (developed GR 9-11). Depth and head about 2.4 in SL; eye 3-3.5 in head.

A dark vertical bar under each D; caudal spot present; dark ocellus may be present above P, mainly in small fish; V dark; anterior spines of D dark. May be confused with *A. nigripinnis,* which has more developed GR, and lacks the caudal spot as well as the lines on the body. Attains 10 cm. Western Indian Ocean; Red Sea, south to Inhambane.

175.24 *Apogon taeniatus:* 10.5 cm (S. Mozambique).

175.25 *Apogon taeniophorus*
Regan, 1908
PLATE 49

Ninestripe cardinal — Negestreep-kardinaal

Apogon taeniophorus Regan, 1908: 226 (Maldives).

D VII+I,9; A II,8; P 14; LL 28; predorsal scales 3-4; GR (4-5)+(12-14) (developed GR 11-13). Depth and head 2.7-3.0 in SL; eye 2.6-2.8 in head.

This species belongs to the dark-striped species complex; easily confused in our area with *A. angustatus* and *A. cookii* see Key for differences). Caudal spot indistinct, sometimes confluent with midlateral (3rd) stripe; first D and V dusky to dark; basal stripe on 2nd D rays of males black, occupying about $^1/_3$ of fin height. Attains 8 cm. Indian Ocean; south to Sodwana Bay.

175.26 *Apogon thermalis*
Cuvier, 1829
PLATE 49

Masked cardinal — Gemaskerde-kardinaal

Apogon thermalis Cuvier, *in* Cuv. & Val., 1829: 492 (Ceylon). *Apogon sangiensis:* Smith, **SFSA No. 478*;** 1961: 386*.

D VI+I,9; A II,8; P 14; LL 28; predorsal scales 4; GR (5-6)+(17-18). Depth 2.6-2.7, head 2.3-2.5 in SL; eye 3.0-3.2 in head. Third or 4th dorsal spine longest; tube of anterior nostril long.

Dark stripe from snout through eye to angle of opercle; tip of 1st D black; small caudal spot present. Attains 8 cm. Indo-West Pacific; to southern Natal.

175.27 *Apogon timorensis*
Bleeker, 1854
PLATE 49

Sad cardinal — Treurige kardinaal

Apogon timorensis Bleeker, 1854: 207. *Apogonichthyoides fraxineus* Smith, 1961: 396, Pl. 48, Fig. D (Pinda, Mozambique).

D VII+I,9; A II,8; P 15-16; LL 28; predorsal scales 3; GR (3-4)+(11-12) = 15-16 (developed GR 7-8). Depth and head 2.5-2.7 in SL; eye 2.8-3.0 in head.

Faint dusky vertical bar under each D; V dark; sometimes a dark line from lower margin of eye to angle of preopercle; no caudal spot and no ocellus on body. Attains 9 cm. Indo-West Pacific, Red Sea south to Sodwana Bay.

Genus ***Apogonichthys*** Bleeker, 1854

Preopercle ridge and edge smooth; reduced supramaxilla; LL complete, extending onto C; last LL scale elongate; no palatine teeth; C rounded. About 4 nominal species, 2 in our area.

KEY TO SPECIES

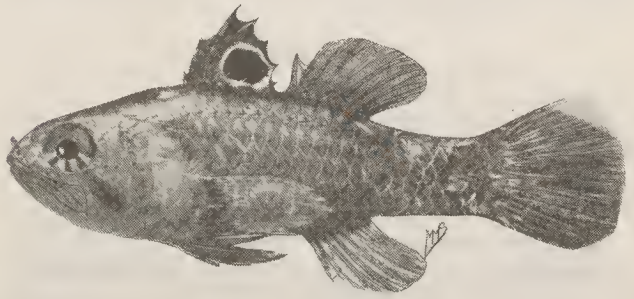
1a Distinct round black ocellus on 1st D; long narrow flap on front nostril ..... *A. ocellatus*
1b No ocellus on 1st D; short flap on front nostril ..... *A. perdix*

175.28 *Apogonichthys ocellatus*
(Weber, 1913)
PLATE 49

Ocellated cardinal — Ogies-kardinaal

Apogon ocellatus Weber, 1913: 231 (East Indies). *Apogonichthys ocellatus:* Smith, 1961: 391*.

D VII+I,9; A II,8; P 15; LL 25; predorsal scales 4; GR 14-15 (developed GR 5-6). Depth 2.6-2.8, head 2.3-2.5 in SL; eye 3.8-4.0 in head. Preopercle edge poorly ossified; anterior nostril with long flap.



175.28 *Apogonichthys ocellatus:* 4.5 cm (Transkei).

Large black ocellus on rear part of 1st D; edge of soft D, A and C white; a wide dark stripe from ventral margin of eye to angle of preopercle and another stripe from rear margin of eye to beginning of LL. Attains 6 cm SL. Widespread in Indo-West Pacific; south to Coffee Bay, Transkei.

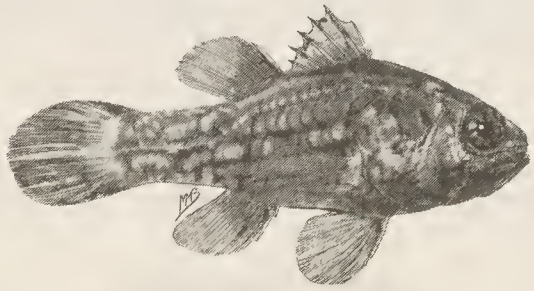
175.29 *Apogonichthys perdix*
Bleeker, 1854

Speckled cardinal — Gespikkelde kardinaal

Apogonichthys perdix Bleeker, 1854: 321 (Floris Id., E. Indies); Smith, 1961: 391*.

D VII+I,9; A II,8; P 14; LL 25; predorsal scales 3-4; GR (1-2)+(11-12) (developed GR 5-7). Depth 2.4-2.6, head 2.1-2.4 in SL; eye 3.2-3.6 in head. Preopercle edge poorly ossified; anterior nostril with short flap; maxilla reaches to rear margin of orbit or slightly beyond; a band of minute villiform teeth on each jaw and vomer.

Colour olive brown, usually with irregular dark spots and streaks; all fins speckled; a dark line from eye to origin of LL and stripe from eye to angle of preopercle usually present. Attains 5 cm. Indo-West Pacific, Red Sea to Sodwana Bay.



175.29 *Apogonichthys perdix*: 5.5 cm (Zanzibar).

Genus ***Archamia*** Gill, 1863

Anal fin long, II,13-18 rays. Body compressed; preopercle ridge smooth, edge serrated; LL complete, extending onto C; palatine teeth present; C emarginate. Nine recognised species, 2 or 3 in our area.

KEY TO SPECIES

1a A II,13-15; red vertical bars on body present or absent; if present, no more than 14 2
1b A II,15-17; 20 or more red vertical bars on body ..... *A. fucata*

2a None or few red vertical bars; live specimens have 2 orange stripes (sometimes broken into spots) along body; caudal spot small, 3-4 in least depth of peduncle ..... *A. mozambiquensis*
2b About 13 narrow red vertical bars on body; caudal spot 2-2.5 in least depth of peduncle ..... *A. lineolata*

175.30 *Archamia fucata*
(Cantor, 1850)
PLATE 49

Redbarred cardinal — Rooibalk-kardinaal

Apogon fucatus Cantor, 1850: 986 (Sea of Pinang); Smith, 1961: 380*. *Archamia lineolata* (*non* Cuvier): Smith, SFSA No. 490*. *Archamia fucata:* Smith, 1961: 380*.

D VII+I,8; A II,15-17; P 14; LL 28; predorsal scales 5-6; GR (5-6)+(14-16) =20-22. Depth 2.3-2.5, head 2.6-2.7 in SL; eye 2.7-2.8 in head. Upper jaw teeth villiform and in a band posteriorly, becoming larger, incurved and uniserial anteriorly, teeth on lower jaw becoming larger posteriorly. Few teeth on vomer, posterior ones largest.

Caudal spot usually large and distinct, sometimes diffused or faint, 1.5-2 in least depth of peduncle; sometimes a dark line from snout to eye. Attains 8 cm. Indo-Pacific; Red Sea to Inhaca Id.

175.31 *Archamia lineolata*
(Ehrenberg, 1828)
PLATE 51

Shimmering cardinal — Glinster-kardinaal

Apogon lineolatus Ehrenberg, *in* Cuv. & Val., 1828: 119 (Red Sea). *Archamia lineolata:* Smith, 1961: 379*.

D VI+I,9; A II,13-14; P 14; LL 26-28; predorsal scales 5-6; GR (5-6)+(14-16). Depth and head 2.6-2.7 in SL; eye 2.8-3.0 in head.

Attains 8 cm. A doubtful record from 3 faded specimens caught in Durban in 1962; Indo-Pacific and Red Sea.

175.32 *Archamia mozambiquensis*
Smith, 1961
PLATES 50 & 51

Mozambique cardinal — Mosambiekse kardinaal

Archamia mozambiquensis Smith, 1961: 380, Pl. 46, Fig. A (Mozambique Id.) *Archamia macroptera* (*non* Cuvier): Smith, SFSA No. 489*.

D VI+I,9; A II,13-15; P 14; LL 26-28; predorsal scales 5; GR (5-7)+(16-17) =22-24. Depth 2.5-2.8, head 2.5-2.7 in SL; eye 2.8-3.2 in head. Teeth small in both jaws; some slightly enlarged anteriorly on upper jaw.

Attains 8 cm. Zanzibar to Sodwana Bay.

Genus ***Cheilodipterus*** Lacepède, 1802

Large canines and supramaxilla present; preopercle ridge smooth, edge serrate or smooth; scales ctenoid; LL complete, the last 2-3 scales on C base; last LL scale elongated and pointed. Vomer and palatines with small teeth; 1-4 larger teeth on posterior end of vomer and sometimes a few larger teeth on anterior end of palatines; C truncate to emarginate. Indo-Pacific; 9-11 valid species (Fraser, 1972). All species in our area are closely related, with colour pattern being a key character; identification of faded specimens of *C. lachneri, C. artus* and *C. caninus* proved to be

troublesome. GR rudiments can easily be confused with tooth patches on gill arch, and are left out of GR counts for this genus.

KEY TO SPECIES

1a Two scales between LL and 1st D (ignore small scales along base of fin) 2
1b One scale between LL and 1st D; developed GR 9-12; 5 narrow black stripes along side of body; midventral stripe from isthmus to anus; caudal spot small, encircled with yellow (in live fish) .... *C. quinquelineatus*

2a Body with 10-15 dark stripes, alternately narrow and wider; P rays 14 (rarely 13) 3
2b Body with 8-10 dark stripes, subequal in width, P 13 4

3a Body with 10-12 stripes, some dark and distinct, others narrower and lighter; caudal spot about pupil size or larger; sometimes a diffuse light brown band around peduncle ..... *C. lachneri*
3b Body with 13-15 dark stripes, varying in width; wide black band around peduncle ..... *C. caninus*

4a Body with 8-10 dark brown stripes, subequal in width and intensity and subequal or wider than interspaces; brown, sometimes diffuse band around peduncle; developed GR 8-10 ..... *C. lineatus*
4b Body with 8-10 dark brown stripes, subequal in width but distinctly narrower than interspaces; sometimes a few stripes lighter, alternating with darker ones; caudal spot about size of pupil or slightly larger, encircled with yellow (in live specimens); developed GR 12-14 ..... *C. artus*

175.33 *Cheilodipterus artus*
Smith, 1961

Wolf cardinal — Wolf-kardinaal

Cheilodipterus artus Smith, 1961: 409, Pl. 50, Fig. F (Seychelles). *Cheilodipterus lineatus* (*non* Lacepède): Smith, 1961: 205, **No. 471** (in part). *Cheilodipterus lachneri australis* Smith, 1961: 408, Pl. 50, Fig. B (in part, holotype only, paratypes *C. lachneri*).

D VI+I,9; A II,8; P 13; LL 28; predorsal scales 6; developed GR 14 in young specimens (< 7 cm SL), 12 in adults. Depth 3.4-3.7, head 2.5-2.7 in SL; eye 3.1-3.3, snout 4.1-4.2 in head.

A tentative identification of specimens (in poor condition) previously identified as *C. lineatus* and *C. lachneri australis* (subspecies holotype). Closely related to *C. lineatus* from which it differs in general lighter colour and presence of a small caudal spot (see Key for other differences). Attains 12 cm. Seychelles, Zanzibar to Inhaca Id.

175.33 *Cheilodipterus artus:* 11.5 cm holotype (Seychelles).

175.34 *Cheilodipterus caninus*
Smith, 1949
PLATE 50

Dogtooth cardinal — Hoektand-kardinaal

Cheilodipterus caninus Smith, **SFSA No. 472,** Pl. 22 (Inhaca); 1955: 690; 1961: 408*.

D VI+I,9; A II,8; P 14; LL 28; predorsal scales 6; total developed GR 12. Depth 3.2-3.5, head 2.6-2.8 in SL; eye 3.2-3.4, snout 4.2-4.5 in head.

General colour dark green or brown; stripes on upper half of body sometimes irregular or wavy; tip of 1st D black. Attains 16 cm. Western Indian Ocean; Red Sea to Inhaca Id.

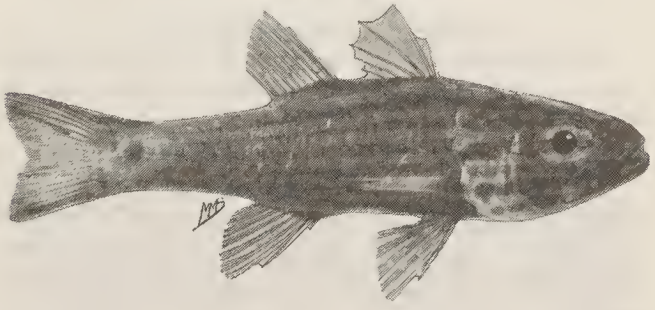
175.35 *Cheilodipterus lachneri*
Klausewitz, 1959

Arrowtooth cardinal — Pyltand-kardinaal

Cheilodipterus lachneri Klausewitz, 1959: 260, Fig. 11 (Red Sea); Smith, 1961: 408*. *Cheilodipterus lineatus* (*non* Lacepède): Smith, **SFSA No. 471*** (in part). *Cheilodipterus lachneri australis* Smith, 1961: 408, Pl. 50, Fig. B (Inhaca Id.).

D VI+I,9; A II,8; P 14; LL 28; predorsal scales 6; developed GR 12 (rarely 13). Depth 3.3-3.5, head 2.8-3.0 in SL; eye 2.8-3.1, snout 4.0-4.1 in head.

General colour light brown; tip of 1st D dark. Attains 12 cm. Western Indian Ocean, Red Sea to Inhaca Id.



175.35 *Cheilodipterus lachneri:* 8 cm holotype of subspecies *australis* (Inhaca Id.).

175.36 *Cheilodipterus lineatus*
Lacepède, 1802
PLATES 50 & 51

Tiger cardinal — Tier-kardinaal

Cheilodipterus lineatus Lacepède, 1802 (Vol. III): 539, Pl. 34, Fig. 1; Smith, **SFSA No. 471** (in part); 1961: 408*.

D IV+I,9; A II,8; P 13 (rarely 12); LL 28; predorsal scales 5; developed GR 10 in young, reduced to 8 in adults. Depth 3.2-3.5, head 2.6-2.7 in SL; eye 3.3-3.4, snout 4.4-4.6 in head.

General colour dark; 1st D varies from completely dark to dark only at tip; C base sometimes almost white; upper and lower margin of C dusky. Attains over 22 cm. Indo-Pacific; Red Sea, south to Sodwana Bay. Smith's illustration (**SFSA No. 471**) does not agree with Lacepède's; a re-examination of Smith's material revealed specimens of *C. lineatus* Lacepède as well as *C. lachneri* Klausewitz and *C. artus* Smith (see account for the latter).

175.37 *Cheilodipterus quinquelineatus*
Cuvier, 1828
PLATE 50

Sharptooth cardinal — Skerptand-kardinaal

Cheilodipterus quinquelineatus Cuvier, *in* Cuv. & Val., 1828: 167 (Society Ids.); Smith, **SFSA No. 470.** *Paramia quinquelineata:* Smith, 1961: 406*.

D VI+I,9; A II,8; P 12-13; LL 27; predorsal scales 6-7; developed GR 9-12. Depth 3.3-3.6, head 2.4-2.6 in SL; eye 2.9-3.3, snout 4.2-4.5 in head. Patches of villiform teeth in both jaws.

General colour light grey; stripes much narrower than interspaces; 1st D spine black; upper and lower margin of C sometimes dusky. Attains 12 cm. Indo-Pacific; Red Sea south to Inhaca Id.

Genus ***Foa*** Jordan & Evermann, 1905

Preopercle ridge and edge smooth; supramaxilla present; C rounded; small fishes closely related to *Apogonichthys* and *Fowleria*; 5 nominal species (3 known from types only), 1 in our area.

175.38 *Foa brachygramma*
(Jenkins, 1903)
PLATE 50

Foa — Foa

Fowleria brachygrammus Jenkins, 1903: 447, Fig. 18 (Honolulu). *Apogonichthys zuluensis* Fowler, 1934: 424, Fig. 10 (Lake St. Lucia, Natal); Smith, **SFSA No. 493*.** *Foa brachygramma:* Smith, 1961: 383*.

D VII+I,9; A II,8; P 12; LL scales 9-10; predorsal scales 4; GR 3+(8-10) (developed GR 7). Depth about 2.3, head 2.6 in SL; eye about 3.3 in head.

Body colour plain, sometimes with few faint vertical bars; V dusky. Attains 6 cm. Indo-Pacific; south to Natal, common among weeds in tidepools.

Genus ***Fowleria*** Jordan & Evermann, 1903

Preopercle ridge and edge smooth; supramaxilla present; C rounded. About 7 nominal species that need revision. Lachner (1953) recognised 4 species, based on colour differences, which were not accepted by Smith (1961); 1 species in our area.

175.39 *Fowleria aurita*
(Valenciennes, 1831)
PLATE 50

Crosseyed cardinal — Skeeloog-kardinaal

Apogon auritus Valenciennes, *in* Cuv. & Val., 1831: 443 (Mauritius). *Papillapogon auritus* Smith, **SFSA No. 491*.** *Fowleria aurita:* Smith, 1961: 382*.

D VII+I,9; A II,8; P 14; LL scales 10-13; predorsal scales 4-5; GR (3-4)+12 (developed GR 4-6). Depth 2.5-2.8, head 2.4-2.5 in SL; eye 3.3-3.6 in head. Ventral edge of preopercle poorly ossified; anterior nostril immediately above upper lip and with a long tube.

Body sometimes with few vertical bars; ocellus on opercle always present. Buccal eggs are red. Attains about 9 cm. Indo-Pacific; Red Sea south to Natal, common among weeds in tidepools.

175.39 *Fowleria aurita:* 4.5 cm (N. Mozambique).

Genus ***Neamia*** Smith & Radcliffe, 1912

Monotypic; differs from all other tropical members of the subfamily in having a well-developed 8th D spine.

175.40 *Neamia octospina*
Smith & Radcliffe, 1912
PLATE 50

Eightspine cardinal — Agstekel-kardinaal

Neamia octospina Smith & Radcliffe, *in* Radcliffe, 1912: 441, Pl. 36, Fig. 2 (Palawan); Smith, 1961: 381*.

D VIII+I,9; A II,8; P 18; LL scales 24; predorsal scales 3-4; GR 2+(10-12) (developed GR 6-7). Depth about 2.5, head 2.6-2.7 in SL; eye 3.8-4.4 in head. Preopercle ridge and edge smooth, ventral edge poorly ossified; supramaxilla present; maxilla reaching well beyond eye; villiform teeth on jaws and vomer, none on palatines; C rounded.

Body pink; head with 3 dark stripes radiating from eye. Attains 5 cm. Mozambique Id. northwards to Red Sea and to Palawan in the Pacific Ocean.

Genus ***Rhabdamia*** Weber, 1909

Six or 7 spines in 1st D; 9-11 soft D rays; 9-13 soft A rays; preopercle ridge and edge smooth, scales cycloid to

ctenoid; supramaxilla absent; palatine teeth present or absent; LL complete. Fraser (1972) recognised 3 subgenera; 4 valid species; 1 in our area.

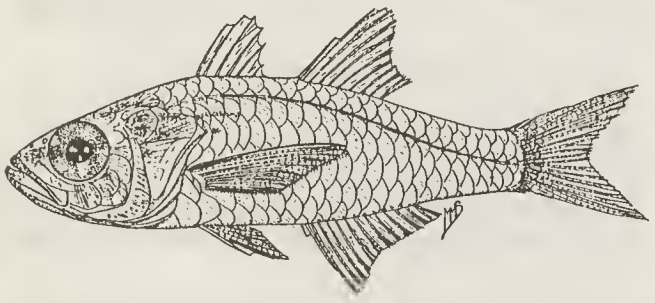
175.41 *Rhabdamia gracilis*
(Bleeker, 1956)

Arrow cardinal — Pyl-kardinaal

Apogonichthys gracilis Bleeker, 1856: 371 (Ternate). *Rhabdamia gracilis:* Smith, 1961: 376*.

D VI+I,9; A II,12-13; P 13; LL 23-24; predorsal scales 4; GR 6+21. Depth 3.4, head 2.6 in SL; eye 3.0 in head. Scales cycloid and deciduous; villiform teeth on jaws, those on vomer slightly larger; few or no teeth on palatines; C forked.

Colour in life translucent pink. Attains 6 cm. Indo-West Pacific, south to Sodwana Bay.



175.41 *Rhabdamia gracilis:* 6 cm (N. Mozambique).

Genus ***Siphamia*** Weber, 1909

Second D with 8-10 soft-rays; preopercle ridge smooth, edge serrated; supramaxilla absent; palatine teeth present, sometimes only few; LL complete or incomplete. About 18 nominal species; some known for their association with sea urchins.

175.42 *Siphamia mossambica*
Smith, 1955

Sea urchin cardinal — Seekastaiing-kardinaal

Siphamia mossambica Smith, 1955: 63, Pl. 1 (Bazaruto, Mozambique); 1961: 567, **No. 488a**; 1961: 405*.

D VII+I,9; A II,8; P 15; LL scales 9-10; predorsal scales 4-5; GR (3-4)+(10-11) (developed GR 9). Depth 2.5, head 2.2 in SL; eye 2.8-3.0 in head. LL incomplete, ends under 2nd D; luminous tissue extends from isthmus into ventral part of gill chamber; C forked; body covered with many dark dots; 2 dark spots on C base and 2 dark spots on tongue.

175.42 *Siphamia mossambica:* 3 cm holotype (S. Mozambique).

Attains 4 cm. Kenya to Sodwana Bay; in tidal pools among spines of sea urchins.

Genus ***Sphaeramia*** Fowler & Bean, 1930

Body short and compressed; LL complete; scales ctenoid; supramaxilla absent; minute teeth on vomer and palatines; a well-developed membrane between last V ray and abdomen. C emarginate. Two species, 1 in our area.

175.43 *Sphaeramia orbicularis*
(Kuhl & van Hasselt, 1828)
PLATE 50

Chubby cardinal — Pokkel-kardinaal

Apogon orbicularis Kuhl & van Hasselt, *in* Cuv. & Val., 1828: 155 (Java); Smith, **SFSA No. 475***. *Sphaeramia orbicularis:* Smith, 1961: 384*.

D VI+I,9; A II,8; P 12; LL scales 26-27; predorsal scales 6-7; GR 6+20. Depth 1.8-2.0, head 2.5-2.6 in SL; eye 2.5-2.7 in head. Preopercle ridge smooth, edge serrated; a low dorsal hump; villiform teeth in both jaws; a patch of slightly enlarged teeth on symphysis of lower jaw.

Colour greenish grey; a dark vertical bar from origin of 1st D to just in front of anus, its width about ½ eye diameter; scattered dark spots on body, head and 1st D membrane; those on peduncle sometimes form a midlateral line; V dark. Attains 10 cm. Indo-West Pacific, south to Maputo.

Subfamily EPIGONINAE

Seven to 8 dorsal spines; LL complete, extending onto C; scales ctenoid; supramaxilla absent; opercular spine short and weak to long and stout, usually with few membranous to bony spinelets on either side; 10+15 vertebrae (except *E. telescopus* and *E. robustus*, with 11+14). Fraser (1972) recognised 3 deep-sea genera, namely *Epigonus, Rosenblattia* and *Florenciella*, excluding from Apogonidae a number of other problematic deep-sea genera that were traditionally considered apogonids such as *Brephostoma, Howella, Neoscombrops* and *Synagrops* (Schultz, 1940; Norman, 1957; Mead and De Falla, 1965). The latter 3 genera are here placed in the Acropomatidae. *Rosenblattia* and *Florenciella* are not known from our area, but they are likely to occur here.

KEY TO GENERA

1a Large antrorse teeth on both jaws; anterior ones visible when mouth is closed; opercular bones strongly serrated 2
1b No large, forward projecting teeth in jaws; opercular bones at most weakly serrated ..... *Epigonus*

2a LL scales on peduncle enlarged, forming lateral keel that extends to C base; body depth 2.4-2.7 in SL ..... *Rosenblattia*
2b No enlarged LL scales and no keel on peduncle; body depth 3.3-3.8 in SL ..... *Florenciella*

Genus ***Epigonus*** Rafinesque, 1810

Body elongate; 7 or 8 spines in D_1; 15-23 P rays; canine teeth absent; jaws, vomer and palatines either toothed or toothless; eye large, round to oval; pyloric caeca proved to be of taxonomic value and range from 5 to 34; caeca sometimes modified as a bioluminescent organ; C forked. Usually found on continental slope at depth range of 200 - 1 200 m. Mayer (1974) revised the genus and recognised 12 species; at least 4 in our area, 1 other (*E. constanciae*) likely to be found here.

KEY TO SPECIES

1a Opercular spine bony and strong; pyloric caeca 5-8 2
1b Opercular spine weak and poorly ossified; 10 or more pyloric caeca 3

2a Tongue bearing tooth patches (not the scattered small papillae found on the tongue of some species); 10+15 vertebrae ..... [*E. constanciae*]
2b Tongue without teeth; 11-14 vertebrae ..... *E. robustus*

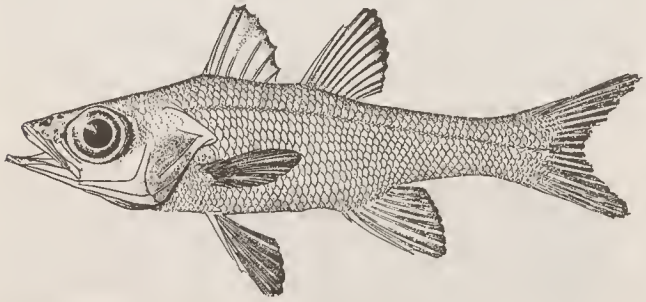
3a P 19-23; total GR 23-26; pyloric caeca 21-34; vertebrae 11+14 ..... *E. telescopus*
3b P 17-20; total GR 26-34; pyloric caeca 10-14; vertebrae 10+15 4

4a Body depth 3.4-4.8 in SL; peduncle length 3.8-5.0 in SL; 1 pterygiophore between neural spines 9 and 10; specimens < 11 cm SL with a dark ring on peduncle ..... *E. pandionis*
4b Body depth 4.2-6.3 in SL; peduncle length 3.1-3.9 in SL; 2 pterygiophores between neural spines 9 and 10; no dark ring on peduncle ..... *E. denticulatus*

175.44 *Epigonus constanciae*
(Giglioli, 1880)

Pomatomichthys constanciae Giglioli, 1880: 20 (Straits of Messina). *Epigonus trewavasae* Poll, 1954: 91, Fig. 27 (off N. Angola); Mayer, 1974: 183*; Karrer, 1975: 72. *Epigonus constanciae:* Mayer & Tortonese, 1977: 1*; Matallanas, 1977: 369*.

D VII+I,9; A II,9; P 16-19; LL 46-52; GR (8-10)+(20-25); pyloric caeca 6-8. Depth 3.3-4.7, head 2.6-3.1, peduncle length 3.5-4.1, least peduncle depth 7.2-10.3, interorbital 9.2-11.5, all in SL; eye 2.0-2.4 in head. Small specimens either lack teeth on jaws or have 1 row of small conical teeth; large specimens have multiple rows on jaws and vomer; palatines toothed or toothless; tongue bearing a triangular patch of glossohyal teeth along midline and a narrow band along each side; lower jaw with 2 chin nubs near symphysis; opercular bones sometimes weakly serrated.



175.44 *Epigonus constanciae:* 19.5 cm (after Poll, 1954).

Colour in alcohol yellowish brown, darker dorsally; D membranes dark; gill chamber and peritoneum black. Attains 16 cm. Western Mediterranean south to Namibia, 18°36′S; depth range 200 - 600 m.

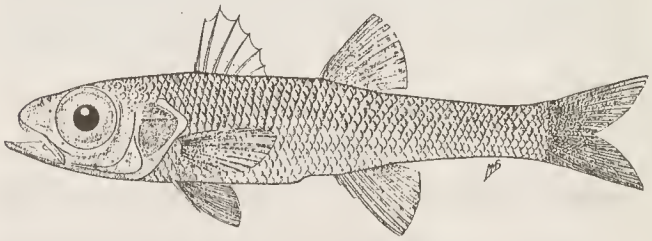
175.45 *Epigonus denticulatus*
Dieuzeide, 1950

Pencil cardinal — Potlood-kardinaal

Epigonus denticulatus Dieuzeide, 1950: 89, Figs. 1-2(Algeria); Mayer, 1974: 175*. *Epigonus atherinoides (non* Gilbert): Smith, 1961: 378*. *Hynnodus atherinoides (non* Gilbert): Smith, **SFSA No. 495a*.**

D VII+I,10; A II,9; P 18-20; LL 46-49; GR (8-9)+(20-25); pyloric caeca 10-14. Depth 4.2-6.3, head 2.6-3.2, peduncle length 3.1-3.9, least depth of peduncle 10, interorbital 9.6-12.2, all in SL; eye 2.1-2.5 in head. Teeth small, conical, some recurved; upper jaw with 1 row of teeth; lower jaw with a narrow band, tapering to 1 row posteriorly; vomer with a round patch of teeth and palatines with a narrow band; no chin nubs; opercle with 3-7 poorly ossified projections above main spine; opercular bones sometimes weakly serrated.

In alcohol body colour reddish brown; head light yellow; all fins light. Attains 20 cm. Mediterranean to South Africa (Walvis Bay to Cape Point); Caribbean, Japan, Australia and New Zealand. Juveniles go through a pelagic stage (Mayer, 1974); depth range 200 - 800 m.



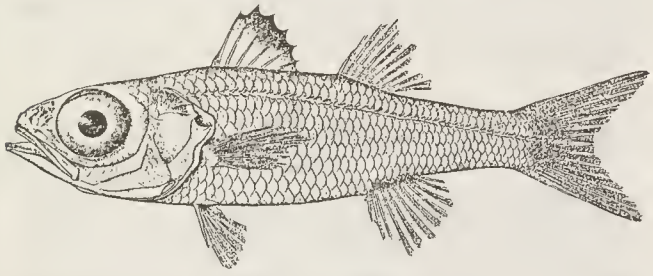
175.45 *Epigonus denticulatus:* 17 cm (off Natal).

175.46 *Epigonus pandionis*
(Goode & Bean, 1881)

Apogon pandionis Goode & Bean, 1881: 160 (off Chesapeake Bay, Virginia, U.S.A.). *Epigonus telescopus* (*non* Risso): Poll, 1954: 89*. *Epigonus pandionis:* Mayer, 1974: 163*.

D VII+I,10; A II,9; P 17-19; LL 46-49; GR (8-10)+(18-23); pyloric caeca 10-13. Depth 3.4-4.8, head 2.6-3.5, peduncle length 3.8-5.0, interorbital 8.7-11.6, all in SL; eye 2.0-2.7 in head. Small specimens (< 8 cm SL) with 1 row of teeth on jaws and palatines; vomer with a V-shaped patch of teeth; larger specimens with increased number of tooth rows on jaws and palatines; vomerine patch may cover entire bone surface; 2-5 poorly ossified projections dorsally to opercular spine; chin nubs absent.

Specimens < 8 cm SL with a dark band on peduncle at C base and a thin black ring on central part of peduncle; ring and band gradually disappear with size and are absent in specimens > 11 cm SL; GR and gill chamber black (light in specimens < 5 cm); fins dark. Attains 20 cm. Caribbean, Gulf of Mexico and Gulf of Guinea south to Agulhas Bank; depth range 200 - 600 m.



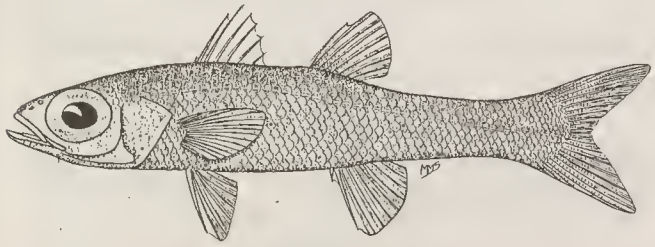
175.46 *Epigonus pandionis:* 21 cm (after Poll, 1954).

175.47 *Epigonus robustus*
(Barnard, 1927)

Parahynnodus robustus Barnard, 1927: 525, Pl. 22, Fig. 4 (off Cape Point). *Epigonus macrops* (*non* Brauer): Gilchrist & von Bonde, 1924: 14, Pl. 1, Fig. 3 (off W. Cape coast); Smith, 1961: 377*. *Hynnodus robustus* Smith, **SFSA No. 495*.** *Epigonus robustus:* Mayer, 1974: 189*; Winterbottom, 1974: 7.

D VII+I,9; A II,9; P 16-18; LL 47-50; GR (8-9)+(22-24); pyloric caeca 5-8. Depth 4.1-4.9, head 2.7-3.6, peduncle length 3.2-3.9, least depth of peduncle 9, interorbital 12.2-15.4, all in SL; eye 2.3-2.7 in head. Upper jaw and palatines toothless or with 1 row on anterior half; lower jaw with a band of teeth tapering posteriorly to 1 row; vomer with few teeth to a patch on centre of bone; chin nubs present; 2-3 projections on opercle above main spine; tongue with scattered minute papillae (no tooth patches); opercular bones weakly serrated.

Colour of preserved specimens light to dark brown; fins yellowish brown; gill chamber dark brown. Attains 20 cm. Southern hemisphere, South American Atlantic coast, off west coast of South Africa and southern Australia; depth range 800 - 1 200 m.



175.47 *Epigonus robustus:* 19 cm (off Cape west coast).

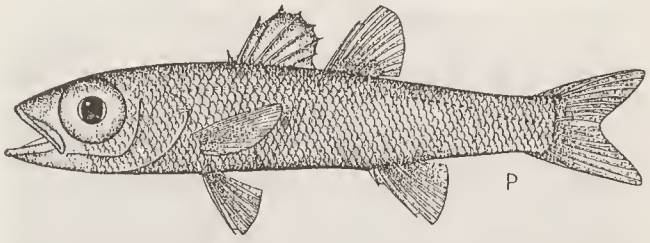
175.48 *Epigonus telescopus*
(Risso, 1810)

Telescope cardinal Teleskoop-kardinaal

Pomatomus telescopus Risso, 1810: 301, Pl. 9, Fig. 31 (Nice). *Epigonus telescopus:* Smith, **SFSA No. 474*;** Mayer; 1974: 152*.

D VIII+I,10; A II,9; P 19-23; LL 46-50; GR 8+(15-18); pyloric caeca 21-34. Depth 3.8-4.7, head 2.6-3.3, length of peduncle 3.8-5.3, interorbital 9.2-11.1, all in SL; eye 1.7-2.0 in head. In specimens < 20 cm SL, jaws and palatines with 1 row of teeth, vomer with few scattered teeth; number of rows on jaws and palatines as well as number and density of vomerine teeth increase with size. One to 8 poorly ossified projections on opercle above main spine; preopercle weakly serrated around angle and ventral edge; chin nubs absent.

Colour of live fish iridescent black or brown-violet; inside of mouth of small specimens light yellow, gradually darkening with size to become completely dark in fish of 30 cm SL or longer. The largest species of the genus; attains over 50 cm. Anti-tropical distribution in Atlantic Ocean; 1 record off northeast coast of United States; common in Mediterranean and northeast Atlantic; also from Walvis Bay to Cape Town; reported off east New Zealand; depth range 80 - 1 200 m.



175.48 *Epigonus telescopus:* 20 cm holotype *of E. macrops* (west coast of Africa).

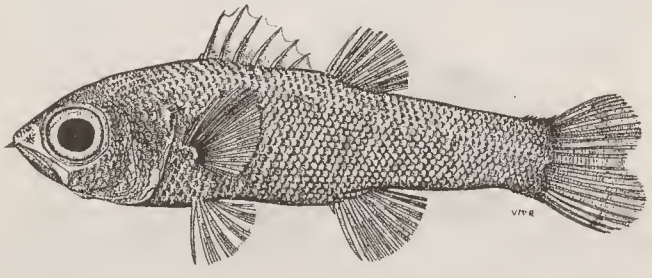
Genus ***Florenciella*** Mead & De Falla, 1965

Closely related to *Rosenblattia,* but without midlateral keel on peduncle; monotypic.

175.49 *Florenciella lugubris*
Mead & De Falla, 1965

Florenciella lugubris Mead & De Falla, 1965: 268 (equatorial Indian Ocean, NE of Seychelles, 01°58′S, 60°06′E).

D VII+I,8; A II,8; P 16-19; GR (5-7)+(15-17) = 20-23; LL 49-53; vertebrae 10+15. Depth 3.3-3.8, head 2.5-3.1, peduncle length about 3.5, least depth of peduncle about 7.0 in SL; eye 2.1-3.0, interorbital 3.0-3.7 in head. Body and head, except for snout in front of eye, covered by strongly ctenoid scales; LL complete, last scales on C; fin spines strong, with longitudinal grooves; opercular spine strong, with smaller accompanying spines above and below it. Edge of opercular bones serrate; preopercle



175.49 *Florenciella lugubris:* 10 cm (Kenya).

ridge smooth. Jaws with 2-3 large, antrorse teeth on each side of symphysis followed by a row of small, conical teeth; palatine with a single row or a narrow band of small teeth; vomer toothless or with a few minute teeth.

In alcohol body light brown, fins darker; scale margins outlined with black; inside of mouth and gill chamber black; opercle, isthmus and chin dark. Attains 10 cm. Depth range 150 - 800 m (and probably deeper). Tropical and subtropical Indian Ocean; closest record to our area from 32°11′S, 59°30′E.

Genus ***Rosenblattia*** Mead & De Falla, 1965

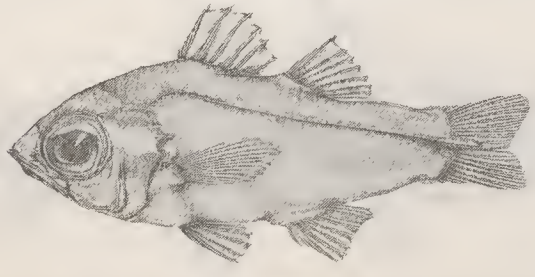
Monotypic; found only in subantarctic waters.

175.50 *Rosenblattia robusta*
Mead & De Falla, 1965

Rosenblattia robusta Mead & De Falla, 1965: 263, Fig. 1 (south of New Zealand); Mayer, 1975: 17*.

D VII+1,8; A II,8; P 16-19; LL 47-53; GR (5-8)++(14-19) = 20-26; pyloric caeca 7-9; vertebrae 10+15. Depth 2.3-2.9, head 2.1-3.0, peduncle length 3.2-4.4, least depth of peduncle 5.5-8.3, all in SL; eye 2.0-2.7, interorbital 2.5-3.9 in head. Body and most of head covered with small, strongly ctenoid scales; LL complete, last 1-4 scales on C; fin spines strong, with deep longitudinal grooves; 8th D spine (rarely present) rudimentary, not connected with membrane to 7th spine; opercular spine strong, with a variable number of spinelets on each side; preopercle edge and ridge, subopercle and interopercle serrated; jaws with 2-5 large antrorse teeth on each side of symphysis, followed by a row of minute teeth posteriorly; vomer with a single tooth to a small patch of teeth; 1 row of small teeth on anterior ½ of palatines.

Juveniles with dark body and pale peduncle; a dark ring encircling peduncle at level of rear A base and a large midlateral patch of melanophores between 2nd D and A; melanophores gradually disperse dorsoventrally to form a wide band that covers the dark ring; peduncle becomes darker and the uniform dark colour of the adult is reached at size of about 5 cm SL. Attains 10 cm. Closest record to our area from 38°14′S, 01°15′E (southwest of South Africa). Circulation patterns of the Antarctic Intermediate water south of South Africa suggest that this species occurs in our area. Mesopelagic, depth range 700 - 2 000 m.



175.50 *Rosenblattia robusta:* 8.5 cm SL holotype (after Mead & De Falla, 1965).

Subfamily PSEUDAMINAE

Six spines in 1st D; preopercle ridge and edge smooth to weakly serrated at angle; supramaxilla absent; body and head with a network of minute papillae (may disappear in long-preserved specimens); 10+14 vertebrae. Three genera of small Indo-Pacific fishes.

KEY TO GENERA

1a Body naked; strong spine and a long, rounded flap present on lower part of preopercle; C emarginate ..... *Gymnapogon*
1b Body scaled; preopercular spine and flap absent; C rounded 2

2a LL incomplete; anterior nostril with a long flap; GR 14-18; hypobranchial bone with GR ..... *Pseudamia*
2b LL absent; anterior nostril without long flap; GR 9-12; hypobranchial smooth or with 1-3 minute tooth patches ..... *Pseudamiops*

Genus ***Gymnapogon*** Regan, 1905

Characters stated in the Key separate this genus from all other members of the family; apparently related to the apogonids (Fraser, 1972); about 7 nominal species that need to be revised; 1 in our area.

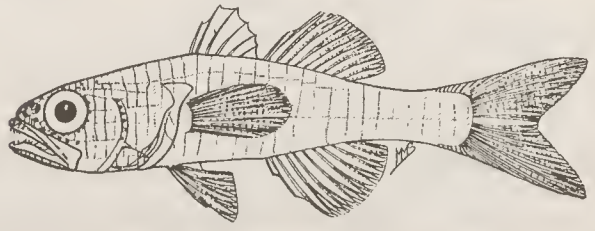
175.51 *Gymnapogon africanus*
Smith, 1954

Crystal cardinal — Kristaal-kardinaal

Gymnapogon africanus Smith, 1954: 791, Fig. 3; Pl. 23, Fig. F (Bazaruto, Mozambique); 1961: 567, **No. 472c**; 1961: 411*.

D VI+I,9; A II,8; P 13-14; GR 2+10. Depth 4.3-4.8, head 2.5-3.0 in SL; eye 3.3-3.8 in head. P reaching beyond A origin; nostrils large, anterior with a short tube; upper jaw with canine teeth anteriorly followed by a narrow band of minute teeth posteriorly; lower jaw with canines in symphysis and on sides, those on side decreasing in size posteriorly; posteriormost teeth on lower jaw caniniform, in 1-2 rows, larger than posteriormost teeth of upper jaw; 1-4 small canines on vomer; palatines with a single row of minute teeth; C emarginate to forked.

In life translucent, with an orange spot at bases of spines and rays of D, A, P and C; all fins pale pink. Attains 5 cm. Kenya to Bazaruto, Mozambique.



175.51 *Gymnapogon africanus:* 5 cm holotype (Kenya).

Genus ***Pseudamia*** Bleeker, 1865

Scales small, cycloid; anterior LL scales pored, posterior ones notched on rear edge; C rounded; 5 species, 1 in our area.

175.52 *Pseudamia gelatinosa*
Smith, 1955
PLATE 50

Jelly cardinal — Jellie-kardinaal

Pseudamia gelatinosa Smith, 1955: 690, Pl. 18, Fig. A (Aldabra); 1961: 567, **No. 472a;** 1961: 410*. *Pseudamia polystigma* (*non* Bleeker): Smith, 1954: 778*; 1955: 9*.

D VI+I,8-9; A II,8-9; P 16; LL 20-22; predorsal scales 15-18; GR (3-4)+(10-12). Depth 4.2-4.8, head 2.4-2.7 in SL; eye 3.5-4.0 in head. Juveniles with strong triangular spinules around angle of preopercle that becomes undulate to smooth in adults; P reaching A origin or slightly beyond; upper jaw with narrow band of small conical teeth, anterior ones enlarged, and a large canine on each side of symphysis; lower jaw with a band of small teeth tapering to 1-2 rows posteriorly, outer series slightly enlarged anteriorly, cluster of still larger teeth in symphysis; 1-3 large canines on each side of lower jaw accompanied by few smaller caniniform teeth anteriorly and posteriorly; vomer with few teeth, posterior ones larger; a single row of teeth on palatines.

In life, body translucent purplish brown with numerous narrow dark horizontal lines and spots; head with larger dark spots; juveniles with a dark ocellus on upper C that gradually disappears while the dark caudal spot develops. Attains 7 cm. Indo-Pacific south to Sodwana Bay.

Genus ***Pseudamiops*** Smith, 1954

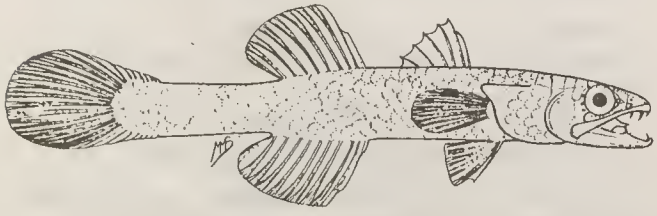
Scales large, cycloid, easily shed; closely related to *Pseudamia;* differs in the absence of epipleurals on pleural ribs, paired uroneurals and medial extrascapular (Fraser, 1972) (see Key for other differences); C rounded. Two species; 1 in our area.

175.53 *Pseudamiops pellucidus*
Smith, 1954

Limpid cardinal — Helder kardinaal

Pseudamiops pellucidus Smith, 1954: 785, Fig. 2, Pl. 23, Figs. A-C (Malindi, Kenya); 1955: 9*; 1961: 567, **No. 472b;** 1961: 411*.

D VI+I,8; A II,9; P 14; predorsal scales 8; GR 3+(6-7) (developed GR 7-8). Depth 6.6-7.2, head 3.2-3.6 in SL; eye 5.4-6.7 in head. Preopercle edge smooth to undulate; eye small, covered by transparent membrane; hypobranchial not bearing GR or rudiments; maxilla reaches well past eye; upper lip wide, flap-like in front, partially overlapping lower jaw when mouth closed; 2 rows of teeth in each jaw, inner row teeth larger; upper jaw with 1-3 large canines on each side of symphysis and 1-3 on sides; 1-3 large teeth on vomer; palatines with smaller caniniform teeth in a single row.



175.53 *Pseudamiops pellucidus:* 4.5 cm holotype (Kenya).

In life, transparent with dark stellate spots about head; pupils rosy. Attains 4 cm. East Africa south to Sodwana Bay.

Family No. 176: ACROPOMATIDAE

by P.C. Heemstra

Lanternbellies — **Lanternpense**

Body oblong, more or less compressed. Dorsal fin divided to base before last spine, or completely separated into spiny and soft-rayed fins; first part with 7-10 spines, second with 1 spine and 9 or 10 soft-rays. Anal fin with 2 or 3 spines and 6-8 soft-rays. Pelvic fins I,5; no large axillary process of fused scales. Gill membranes separate, free from isthmus; branchiostegal rays 7. Gill-rakers well developed. Vertebrae 10+15 = 25.

Widely distributed, deep-water (20 - 700 m) fishes; used for food in some countries, but most are too small to be of much value for human consumption. The fishes here assigned to this ill-defined "family" are placed by some recent authors in the Percichthyidae. (The genus *Percichthys* comprises 2 species of freshwater fishes in Chile and Argentina; they have 31-36 vertebrae and are not closely related to the Acropomatidae.)

KEY TO GENERA

1a Vent nearer V origins than to A; luminescent organ between V (not visible externally) ..... *Acropoma*
1b Vent nearer A than to V origins; no light organ between V 2

2a Teeth uniserial, minute; no canines; no teeth on vomer or palatines; scales ctenoid, not deciduous ..... *Howella*
2b Canines present; also teeth on vomer and palatines; scales cycloid, deciduous 3

3a A III,7 ..... *Neoscombrops*
3b A II,7-9 ..... *Synagrops*

Genus ***Acropoma*** Temminck & Schlegel, 1843

Two species (1 in our area), both bioluminescent. At night or in the dark, the entire ventral region of the body is brightly luminescent. *A. hanedai* Matsubara, 1953 has vent midway between V and A origins, and the light organ extends from isthmus to A.

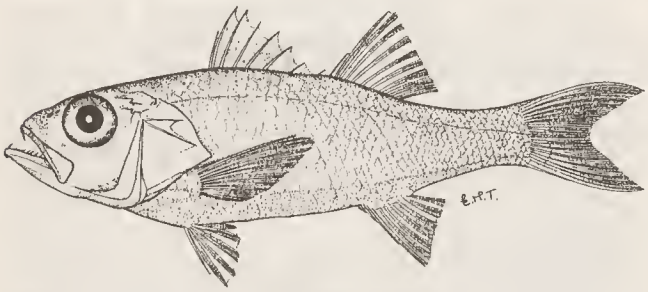
176.1 *Acropoma japonicum*
Günther, 1859

Lanternbelly — Lanternpens

Acropoma japonicum Günther, 1859: 250 (based on *Acropoma* Temminck & Schlegel, 1843: 31, Pl. 12, Figs. 2 & 3; Japan); Smith, **SFSA No.499***. *Synagrops splendens* Lloyd, 1909: 159, Pl. 47, Fig. 5 (Gulf of Oman).

D VIII-IX+I,10; A III,7; P 15-16; LL 43-45; GR (5-8)+(15-18). Light reflector a white, opalescent, opaque membrane extending from isthmus to C base. Scales ctenoid, more or less deciduous. Two large canines at front of upper jaw, between which fits a pair of smaller canines at front of lower jaw; sides of lower jaw with 6 or 7 small, spaced canines, preceded by a row of tiny slender teeth; vomer and palatines with villiform teeth.

Body pink; ventral surface abruptly silver and thickly covered with small dark spots. Attains 20 cm. Off Natal in 200 - 500 m; also northern Indian Ocean, Philippines and Japan.



176.1 *Acropoma japonicum:* 9.5 cm SL (off Natal).

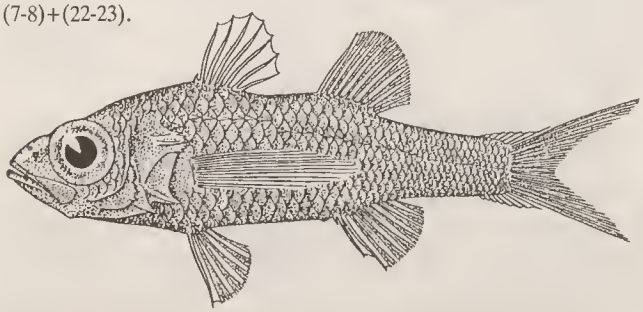
Genus ***Howella*** Ogilby, 1898

Opercle with 1 spine at top and a cluster of spines lower down; subopercle and interopercle with sharp spines; preopercle finely serrate. Two small spines on upper edge of orbit. P reaching past A origin. Fedoryako (1976) recognises 5 species in this genus; 1 species in our area.

176.2 *Howella sherborni*
(Norman, 1930)

Rhectogramma sherborni Norman, 1930: 348, Fig. 3 (west of Cape Town). *Howella sherborni:* Smith, **SFSA No. 498*;** Grindley & Penrith, 1965: 284; Fedoryako, 1976: 168*. *Howella brodiei* (*non* Ogilby): Hulley, 1972: 229; 1972: 242.

D VIII+I,9-10; A III,7-8; P 14-16; LL 35-40 (interrupted below D); GR (7-8)+(22-23).



176.2 *Howella sherboni:* 8 cm holotype (after Norman, 1935).

Head and body dark brown, with silvery reflections. Attains 8 cm. Off Cape Town to Natal in 850 - 950 m; widely distributed in all 3 major oceans.

Genus ***Neoscombrops*** Gilchrist, 1922

Opercle with 2 flat points posteriorly; preopercle weakly serrate. Anus close to A. Two or 3 species; 1 in our area.

KEY TO SPECIES

1a Body depth 3.0-3.6 in SL; head, body and fins dark brownish ..... *N. annectens*
1b Body depth 3.7-3.8 in SL; head and body silvery ..... *N. cynodon*

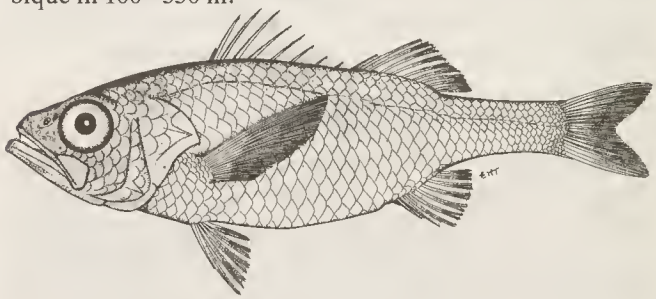
176.3 *Neoscombrops annectens*
Gilchrist, 1922

Sombre splitfin — Donker spleetvin

Neoscombrops annectens Gilchrist, 1922: 68, Pl. 9, Fig. 2 (off Natal in 62-260 fms); Smith, **SFSA No. 497*;** Mochizuki, 1979: 250, Fig. 1B.

D IX-X+I,9-10; A III,7; P 15-17; LL 36-41; GR (5-6)+(15-16). Broad band of granular teeth in upper jaw and 2 widely-spaced canines at symphysis; lower jaw with a row of small canines laterally, preceded by a short band of granular teeth and 2 or 3 canines at symphysis.

Attains 25 cm. Common off Natal and southern Mozambique in 100 - 550 m.



176.3 *Neoscombrops annectens:* 21 cm SL (off Durban).

176.4 *Neoscombrops cynodon*
(Regan, 1921)

Silver splitfin — Silwer spleetvin

Acropoma cynodon Regan, 1921: 415 (off Umvoti River Natal; 120-130 fms).

D IX+I,10; A III,7; P 16; LL about 40; lower GR 16. Upper jaw with a band of villiform teeth and 2 widely-spaced canines at symphysis; a row of small canines in lower jaw with a pair of enlarged teeth at symphysis.

Attains 20 cm? Known from 2 specimens from off Natal (both in British Museum); possibly a synonym of *N. annectens*.

Genus ***Synagrops*** Günther, 1887

Opercle with 2 flat points posteriorly; preopercle with strong serrae. Five or 6 species; 2 in our area.

KEY TO SPECIES

1a Distinct longitudinal ridge on lateral surface of maxilla; entire vertical edge of preopercle finely serrate; A II,7-8 ..... *S. japonicus*
1b No ridge on maxilla; only lower part of preopercle serrate; A II,9 ..... *S. microlepis*

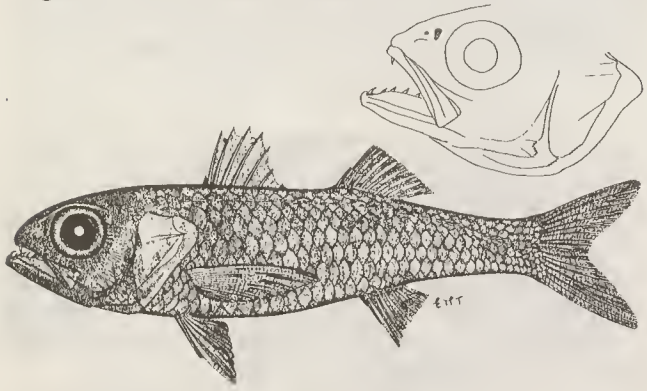
176.5 *Synagrops japonicus*
(Doderlein, 1884)

Japanese splitfin — Japanse spleetvin

Melanostoma japonicum Doderlein, *in* Steindachner & Doderlein, 1884: 5, Pl. 1, Fig. 2 (Tokyo). *Synagrops natalensis* Gilchrist, 1921: 69 (off Natal). *Synagrops japonicus:* Smith, **SFSA No. 473*;** Smith, 1961: 413.

D VIII-IX+I,9-10; A II,7-8; P 16-17; LL 28-30? Developed GR 3+12. No fin spines serrate. Preopercle ridge smooth; subopercle and interopercle with strong serrae. Band of villiform teeth on upper jaw, separated by a gap at symphysis, with a canine on each side of this gap; lower jaw with narrow band of small teeth anteriorly, 3-5 canines laterally, and a pair of retrorse canines at symphysis. Swimbladder bifurcate anteriorly, connected to skull.

Head, body and fins brownish black; P pale. Attains 30 cm. Widely distributed from South Africa to Hawaii; caught off Natal in 180 - 400 m.



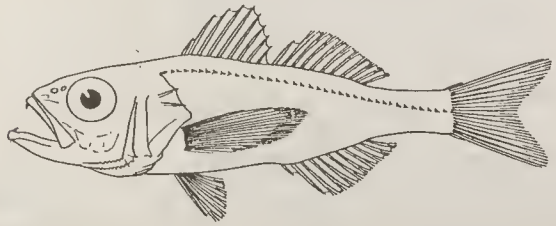
176.5 *Synagrops japonicus:* 16.5 SL (off Natal) and head.

176.6 *Synagrops microlepis*
Norman, 1935

Synagrops microlepis Norman, 1935: 12, Fig. 3 (off Luanda, Angola; 64-65 m); Lloris, 1982: 9, 14.

D IX/I,9; A II,9; P 17-19; LL 40? Developed GR 5+(16-17). No fin spines serrate. Preopercle ridge with 4-6 serrae at the angle; dorsal ⅔ of vertical edge of preopercle smooth; ventral edge of subopercle and interopercle smooth or with weak serrae. Teeth as in *S. japonicus,* except there are only 2-4 large canines at sides of lower jaw. Swimbladder not connected to skull and not bifurcate anteriorly.

Head and body dark brownish dorsally, paler below. Attains 10 cm. Known only from Luanda to Walvis Bay.



176.6 *Synagrops microlepis:* 5 cm holotype (after Norman, 1935).

Family No. 177: SCOMBROPIDAE

by P.C. Heemstra

Gnomefishes — **Kaboutervisse**

Body oblong, somewhat compressed, covered with deciduous, cycloid scales. Two separate dorsal fins; soft dorsal and anal fins with 11-14 soft-rays; first dorsal fin with 8 or 9 spines; anal fin spines 3; median fins scaly. Jaws with large, somewhat compressed canines; 1 or 2 rows of compressed canines on palatines and a patch of smaller teeth on vomer. Maxilla scaly, with large supramaxilla; upper jaw not protrusile. Gill membranes separate, free from isthmus; branchiostegal rays 7. Vertebrae 10+16.

Moderate sized predators of the outer continental shelf region; good eating. One genus, *Scombrops* Temminck & Schlegel, 1845 with about 4 species, 1 in our area.

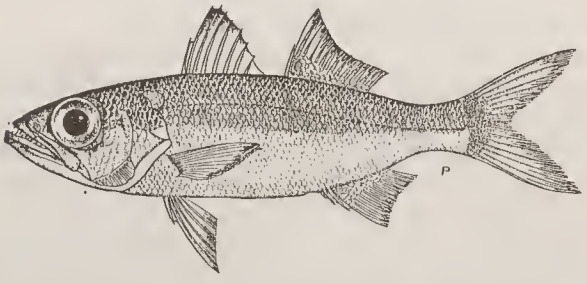
177.1 *Scombrops boops*
(Houttuyn, 1782)
PLATE 52

Gnomefish — Kaboutervis

Sparus boops Houttuyn, 1782: 311 (Nagasaki, Japan). *Scombrops dubius* Gilchrist, 1922: 66, Pl. 11, Fig. 1 (off Natal; 160 & 207 fms); Smith, **SFSA No. 496*.**

D VIII-IX+I,13-14; A III,12-13 (1st spine minute); P 15; LL 51-55; GR (2-3)+(12-15). Eye diameter greater than snout length or interorbital width. Lower jaw with 2 or 3 small canines at front, followed by a row of 8 or 9 large, knife-like, spaced teeth; upper jaw with 12-13 large canines and 2 or 3 fang-like teeth just in front of vomer tooth patch; 2 elongate patches of cardiform teeth on tongue.

Juveniles dusky silver; large adults black. Attains 60 cm. Feeds on squid and fishes. Well known in trawl catches from the Cape to Delagoa Bay in 20 - 400 m.



177.1 *Scombrops boops:* 25 cm (off Algoa Bay).

Family No. 178: POMATOMIDAE

by M.M. & J.L.B. Smith

Elf **Elwe**

Body oblong, compressed, robust. Small, deciduous, cycloid scales cover body, cheek and opercles. Mouth large; maxilla exposed; lower jaw prominent; sharp compressed teeth in each jaw in single row, an inner series of small depressible teeth in upper jaw, and villiform teeth on vomer and palatines. Two dorsal fins, the 1st of 7 or 8 low spines connected by a membrane and depressible into a groove; anal fin slightly shorter than soft dorsal fin, both densely scaled basally.

One genus, *Pomatomus* Lacepède, 1802, with a single species in all oceans (except eastern Pacific) between 50° latitudes.

178.1 *Pomatomus saltatrix*

(Linnaeus, 1766)
PLATE 52

Elf Elwe

Gasterosteus Saltatrix Linnaeus, 1766: 491 ("Habitat in Carolina"). *Temnodon conidens* Castelnau, 1861: 141 (Cape of Good Hope, Algoa Bay). *Pomatomus saltator:* Smith, **SFSA No. 547***; Smith & Smith, 1966: 53*; van der Elst, 1981: 259*.

D VII-VIII+I,23-28; A II,23-27 (spines minute, embedded); P 16; LL 90-100; GR 3+(10-13).

Head and body dark bluish green dorsally, silvery below. Attains 120 cm and 14.4 kg. Known as "tailor" in Australia and "bluefish" in America; the Natal name "shad" is a misnomer and should not be used, as it is the name of a clupeid fish, related to our pilchard, in Europe and America.

Known from our whole region as one of the best angling fishes. Swift and voracious, elf bite viciously and fight well; large fish often jump repeatedly ("*saltatrix*" is Latin for a dancing girl). Elf take almost any moving lure and most flesh. With a shoal of sardines or other small fishes as their prey, they will gorge themselves in a veritable feeding frenzy, regurgitate, and then start all over again. They are, in turn, preyed upon by larger fishes, such as kob and sharks. Elf are delicious eating, both fresh and smoked, but the delicate flesh softens rapidly and does not keep well; excellent bait, especially for line-boat fishing. Van der Elst (1976) has published a comprehensive work on the biology of the elf; spawning takes place off Natal from September to December, hence to conserve the stock, the closed season in Natal is from September to November inclusive.

Family No. 179: HAEMULIDAE

by M.M. Smith & R.J. McKay

Rubberlips and grunters **Rubberlippe en knorders**

The Plectorhynchidae (sometimes referred to as Gaterinidae) have been recognised as a separate family by some authors, but here they are given subfamily rank in the oldest family name Haemulidae (often known as Pomadasyidae). Small to moderate-sized fishes with fairly compressed body and moderate or small scales; V I,5; anal fin short, 2nd spine frequently stout and long, height of fin exceeds base; feeble teeth in bands in jaws, palate and tongue edentate; preopercle serrate, serrae disappear in very large fishes. Gill-rakers well developed; branchiostegals 7; lateral line continuous, parallel with dorsal profile; scale counts sometimes difficult as rows may be irregular and not all scales in the lateral line bear tubules.

Generally occur around rocks or among weeds (juveniles in tidal pools or estuaries) and down to about 80 m. The rubberlips (Subfamily Plectorhynchinae) frequent coral reefs and are good eating, being caught in traps, seine nets and on lines in deeper water; being omnivorous they take any bait. Many of the grunters enter estuaries, and the larger species, particularly *Pomadasys commersonnii*, are famous angling and table fish in tropical and temperate waters. The common name "grunter" is due to the fact that when the fish is removed from the water, the pharyngeal teeth are rubbed together to produce a rasping "grunt". The food of most species consists of small invertebrates (like shrimps, crabs and marine worms) and sometimes small fish. The Plectorhynchinae (under Gaterinidae) of the western Indian Ocean were studied by Smith, 1962. Family contains about 17-18 genera and about 120 species of which 3 genera and 19 species are known from our area.

KEY TO GENERA

1a Chin with 4-6 distinct pores; no central pit containing two slit-like pores; maxilla in adults does not reach eye; lips thicken with age; 10-18 scales from D origin obliquely downward to LL; vertebrae 11 + 16 (Subfamily PLECTORHYNCHINAE) 2

1b Chin with 2 small pores followed by a central pit containing a slit-like pore on each side; maxilla reaches below front of eye or almost that far; lips not very thick; 4-8 scales from D origin to LL; vertebrae 10 + 16 (Subfamily HAEMULINAE) ..... *Pomadasys*

2a D spines 9-10; 2nd longest (subequal to 3rd) abruptly longer than short 1st; outer teeth in jaws not enlarged ..... *Diagramma*

2b D spines 11-14, 2nd not longest; outer teeth in jaws enlarged ..... *Plectorhinchus*

Genus ***Diagramma*** Oken, 1917

Recognisable by the 1st D spine short and 2nd (with the 3rd) abruptly the longest of 9-10 D spines; scales small, adherent, extend to front of nostrils, and whole preorbital scaly; teeth not enlarged. C peduncle slender, length about equals P. An Indo-West Pacific genus generally considered monotypic, but may contain 2 species.

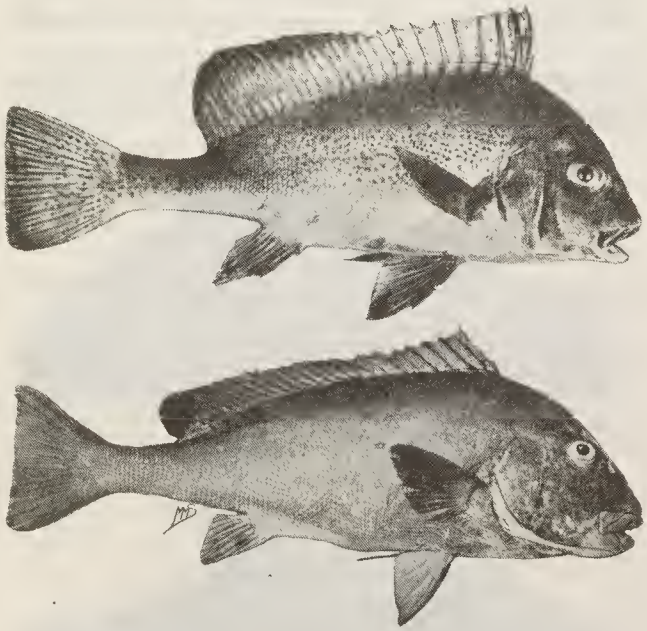
179.1 *Diagramma pictum*
(Thunberg, 1792)
PLATE 52

Sailfin rubberlip — Seilvin-rubberlip

Perca picta Thunberg, 1792: 141, Pl. 5 (Japan). *Spilotichthys pictus:* Smith, **SFSA No. 688***. *Diagramma pictum:* Smith, 1962: 472*; Day, 1974: 95; Blaber, 1978: 40; van der Elst, 1981: 247*. *Plectorhynchus (Spilotichthys) pictus:* Sanches, 1963: 90*.

D IX-X,22-25; A III,7; P 16-17; GR (6-8)+(14-15); LL about 65; SL above LL 110-115; lips increase little with age; 1st D spine about 0.3 of 2nd (longest), D not notched. C rounded, becoming truncate with growth.

The colourful juveniles are often weed-dwelling; large adults in small schools or solitary around coral. With growth, stripes and colour disappear, medium-sized fishes are grey with spots, and large adults become uniform greyish. Attains about 1 m. Reported to be ciguatoxic in other areas. Indo-West Pacific to south Natal.



179.1 *Diagramma pictum*. top: 34 cm (Inhaca Id.), bottom: 75 cm (Kenya).

Genus ***Plectorhinchus*** Lacepède, 1802

Soft D base not longer than spinous D base; second A spine usually longest and strongest. With age some fish develop enormous lips; scales moderate; preorbital naked or partly scaly; C peduncle moderately deep, length less than that of *Diagramma; P. diagrammus* (Linnaeus, 1758) (**SFSA No. 696**) and *P. faetela* (Forsskål, 1775) are apparently *nomina dubia; P. lineatus* (Linnaeus, 1758) (Smith, **SFSA No. 695** (see Smith, 1962: 496)) has not been found in our area. Numerous species, 9 in our area; *P. orientalis* (Bloch, 1793) is known from northern Mozambique and may be found in our area.

KEY TO SPECIES

1a D spines 11 (rarely 12) ..... *P. chubbi*
1b D spines 12 or more 2

2a D spines 12 3
2b D spines 13 or 14 6

3a Body uniform grey or dusky 4
3b Body grey to black with 4 narrow white crossbars ..... *P. playfairi*

4a GR (13-16)+(22-24); D XI-XII(16-17) ..... *P. chubbi*
4b GR (9-12)+(16-17); D XII(17-20) 5

5a Longest D spine subequal to depth of C peduncle; soft D base distinctly longer than head; eye 5 × in head of adult ..... *P. schotaf*
5b Longest D spine about 1.2 times C peduncle depth; soft D base about equals head length; eye 3 × in head of adult ..... *P. sordidus*

6a D XIII-XIV,17-22 7
6b D XIV,15-16, spines long and strong, fin deeply notched 11

7a Wavy lines (orange in life) along cheek and opercle; many orange spots on body, fewer with age; D rays 20-22; GR (12-14)+(19-20) ..... *P. flavomaculatus*
7b No wavy lines along side of head; D rays 17-20 8

8a Dark stripes or bands along body 9
8b Body without horizontal stripes 10

9a Stripes converge down front of head; D rays 19-20; GR 8+(18-19) ..... *P. gaterinus* juvenile
9b Stripes continuous round front of head; D rays 17-18; GR (10-12)+(22-23) ..... *P. orientalis* adult (Indo-West Pacific to northern Mozambique)

10a Body silvery with dark spots; D rays 19-20; GR 8+(18-19) ..... *P. gaterinus* adult
10b Body light with dark blotches; D rays 17-18; GR (10-12)+(22-23) ..... *P. orientalis* juvenile

11a Uniform dark, no crossbars ..... *P. gibbosus*
11b Oblique dark and reddish crossbars ..... *P. plagiodesmus*

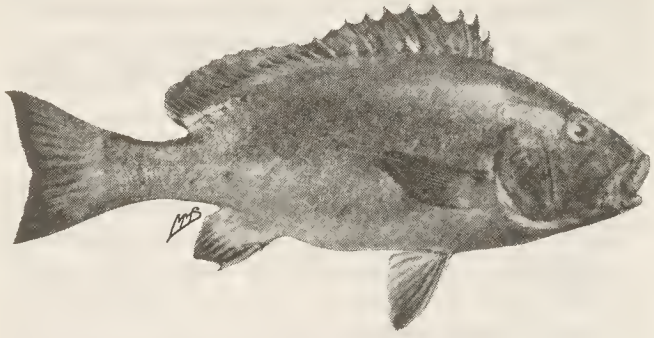
179.2 *Plectorhinchus chubbi*
(Regan, 1919)

Dusky rubberlip — Donker rubberlip

Diagramma chubbi Regan, 1919: 199, Fig. 2 (Natal). *Pluchus chubbi:* Smith, **SFSA No. 689***; 1952: 716*; 1958: 125*; 1961: 568*. *Gaterin chubbi:* Smith, 1962: 476*. *Plectorhynchus chubbi:* van der Elst, 1981: 248*.

D XI (rarely XII),16-17; A III,7-8; P 17-18; GR (13-16)+(22-24); LL about 60; LS above LL 105-110; 5th D spine longest; 2nd A spine longest and stoutest; upper lip swollen in adult; predorsal scales reach nostrils.

Young dusky olive to greyish; adults bronze with small white spots, lips pink. Attains 75 cm. Young in intertidal weedy areas, sometimes among floating weeds; adults coral-haunting. Transkei to Kenya and India.



179.2 *Plectorhinchus chubbi*: 48.5 cm (Natal).

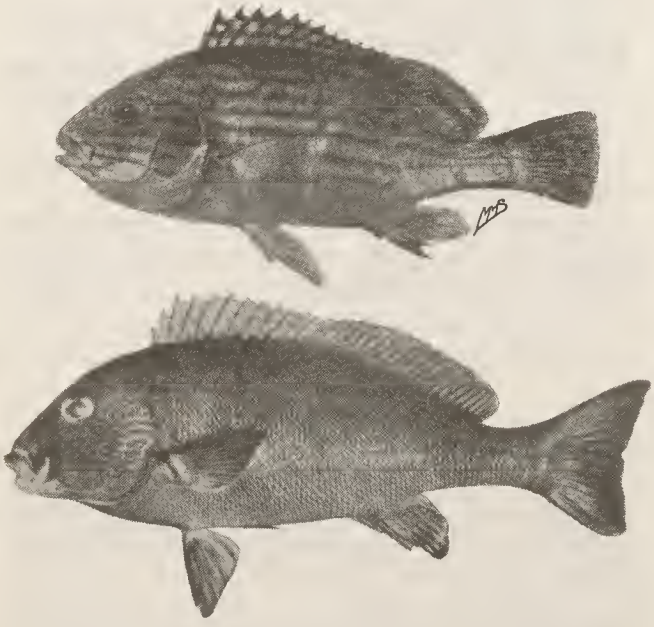
179.3 *Plectorhinchus flavomaculatus*
(Ehrenberg, 1830)
PLATE 52

Lemonfish — Lemmetjievis

Diagramma flavomaculatum Ehrenberg, *in* Cuv. & Val., 1830: 304 (Red Sea). *Gaterin reticulatus*: Smith, **SFSA No. 693.** *Gaterin citronellus* Smith, 1956: 101, Pl. 11C (Delagoa Bay); 1961: 568. *Gaterin flavomaculatus*: Smith, 1956: 484*; Winterbottom, 1976: 62. *Plectorhynchus (Gaterin) reticulatus*: Sanches, 1963: 93*. *Plectorhynchus flavomaculatus*: van der Elst, 1981: 249*.

D XIII-XIV,20-22; A III,7; P 17; LL about 60, LS above LL about 90; GR (12-14)+(18-20); lips moderate; 4th-5th D spines longest; fin barely notched; soft D base subequal to spinous base.

Golden lines on side of head always present; on body, juveniles have lines, then reticulate pattern and finally golden spots which disappear on adults over 50 cm. Attains at least 60 cm. Juveniles to 20 cm plentiful in weeds; adults solitary, found in deeper water, usually near coral. Indo-West Pacific, Red Sea to Transkei.



179.3 *Plectorhinchus flavomaculatus*: top: 10.5 cm (Inhaca Id.); bottom: 55 cm (Kenya).

179.4 *Plectorhinchus gaterinus*
(Forsskål, 1775)
PLATE 52

Blackspotted rubberlip — Swartspikkel-rubberlip

Sciaena gaterina Forsskål, 1775: 50 and *Sciaena abu mgaterin* Forsskål, 1775: 51 (Red Sea). *Gaterin gaterinus*: Smith, **SFSA No. 694*;** 1953: Pl. 107, No. 694*. *Gaterin lineatus* (*non* Linnaeus): Smith, **SFSA No. 695*** (figure only).

D XIII,19-20; A III,7; P 16; LL 55-60; LS above LL 70-75; GR 8+(18-19); 3-5th D spines subequal, longest, no notch in adult; soft D base about 1.3 in spinous D base; 2nd A spine stouter and slightly longer than 3rd. V longer than P; lips moderate; scales extend to nostrils.

Mouth red inside; small juveniles up to 12 cm with stripes that break up to spots on silvery body in adults. A shy fish lurking among coral reefs and often caught in traps. Flesh not greatly esteemed due to iodoform taste. Red Sea south to Natal, Mauritius, Madagascar and Comoro Ids.

179.5 *Plectorhinchus gibbosus*
(Lacepède, 1802)

Harry hotlips — Swart rubberlip

Holocentrus gibbosus Lacepède, 1802: 344, 389 (no locality). *Pseudopristipoma nigrus*: Smith, **SFSA No. 690*.** *Gaterin nigrus*: Smith, 1962: 490*; Blaber, 1978: 40.

179.5 *Plectorhinchus gibbosus*: top: 27.5 cm; bottom: 66 cm (both Zanzibar).

D XIV,15-16; A III,7; P 17; LL 50-55; LS above LL about 60; GR (9-10)+(19-20); lips, especially upper, greatly swollen with age; D spines strong and heteracanth, 4th-5th longest, fin deeply notched; base spinous D 2.0 (juvenile) - 1.8 (adult) times base soft D; 2nd A spine longer and stouter than 3rd; P slightly longer than V. Scales do not reach nostrils.

Uniform dark, sometimes reddish tinge; iris brown to yellow; juveniles with C, distal soft D and A yellowish or pink. Attains 75 cm. Huge lips of adults resemble sponges. Closely related to *P. macrolepis* (Boulenger, 1899) from tropical west African coast. Flesh excellent; reported as ciguatoxic in other areas. Indo-West Pacific, south to Natal.

179.6 *Plectorhinchus plagiodesmus*
Fowler, 1935
PLATE 52

Barred rubberlip — Balk-rubberlip

Plectorhynchus plagiodesmus Fowler, 1935: 387, Fig. 20 (Zululand). *Pseudopristipoma plagiodesmus:* Smith, **SFSA No. 691*.** *Gaterin plagiodesmus:* Smith, 1962: 491*; 1971: 348*; Day, 1974: 96.

D XIII-XIV,15-16; A III,7; P 17; LL 48 tubular, GR (9-10)+(19-20); upper lip greatly swollen with age projects beyond lower; D spines strong, heteracanth, 4th to 5th longest, fin deeply notched; 2nd A spine stouter and longer than 3rd; spinous D base twice base of soft D. Scales moderate, do not reach nostrils.

About 12 oblique alternating black bars always present on body, orange bars between black bars most vivid up to about 40 cm, thereafter fading to a bronze fish with black bars and huge orange or yellow lips. Attains 90 cm or more. Juveniles frequently caught with *P. gibbosus*. Large adults lie in coral crevices with protruding lips looking like orange sponge. Somalia to Madagascar and Natal.

179.7 *Plectorhinchus playfairi*
(Pellegrin, 1914)

Whitebarred rubberlip — Witbalk-rubberlip

Diagramma griseus var. *playfairi* Pellegrin, 1914: 226 & 1933: 100, Fig. 59 (Madagascar). *Gaterin schotaf* (*non* Forsskål): Smith, **SFSA No. 692*;** Sanches, 1963: 91*. *Gaterin batata* Smith, 1952: 713 (Transkei to Zanzibar); 1953: **No. 692*.** *Gaterin playfairi:* Smith, 1962: 480*; Blaber, 1978: 40. *Plectorhynchus (Gaterin) schotaf* (*non* Forsskål): Sanches, 1963: 91*. *Plectorhynchus playfairi:* van der Elst, 1981: 250*.

179.7 *Plectorhinchus playfairi:* 35 cm (Kenya).

D XII,19-20; A III,7; P 16; GR 11+(21-23); LL about 58-60; LS above LL 76-80; 4th and 5th D spines longest but shorter than longest rays, fin notched; spinous D base longer than soft D base; 2nd A spine stout and longer than 3rd; V little shorter than P; scales extend to front nostril.

Black with vivid white crossbars in life, fades to grey with the 4 white bars, 1st over nape least marked; lips, skin about mouth and base of P pink; D spine tips and opercular membrane red to scarlet. Attains 90 cm. Solitary about reefs from tidal pools to 80 m. Western Indian Ocean south to Port St. Johns, Transkei.

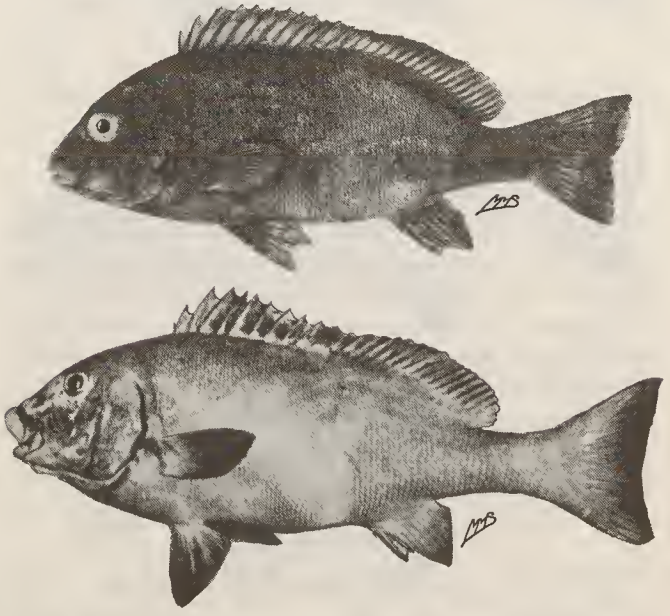
179.8 *Plectorhinchus schotaf*
(Forsskål, 1775)
PLATE 52

Minstrel — Minstreel

Sciaena schotaf Forsskål, 1775: 51 (Red Sea). *Diagramma durbanense* Gilchrist & Thompson, 1908: 155 (Natal). *Gaterin sordidum* (*non* Klunzinger): Smith, 1952: 715; 1953: 519, **No. 692a*.** *Plectorhynchus schotaf:* van der Elst, 1981: 251*.

D XII,18-21; A III,7; P 16-17; GR (10-12)+(16-17) = 26-28; LL about 55; LS 90 above LL; lips swollen with age; lower jaw shorter; 4th and 5th D spines longest; soft D base slightly greater than spinous D base; 2nd A spine stronger and generally longer than 3rd; C truncate (young) to slightly emarginate in adults; scales extend to nostrils, front preorbital naked.

Dusky to silvery grey, darker with age; young sometimes with faint blue lines below eye and along body; head scarlet. Rarely exceeds 40 cm. Around rocks and coral from surf zone to 80 m; use tide pools as nursery areas. Indo-West Pacific south to Port St. Johns.



179.8 *Plectorhinchus schotaf:* top: 25 cm (Inhaca Id.); bottom: 70 cm (Kenya).

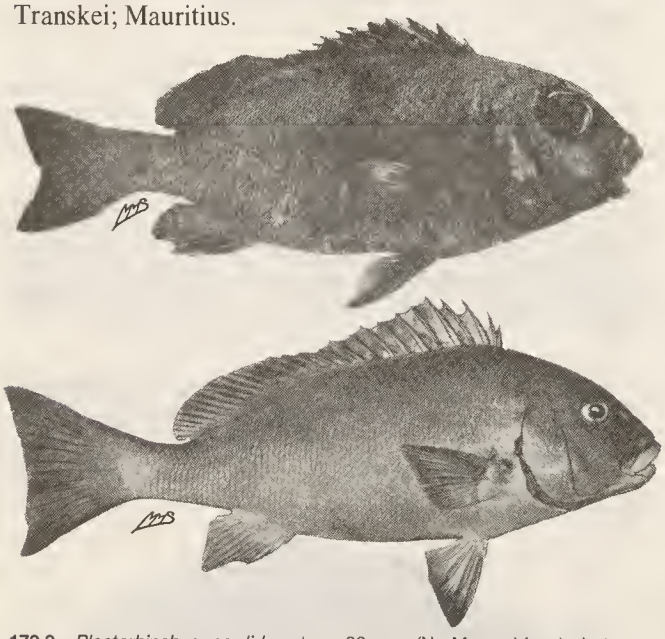
179.9 *Plectorhinchus sordidus*
(Klunzinger, 1870)
PLATE 52

Redlip rubberlip — Rooilip-rubberlip

Diagramma sordidum Klunzinger, 1870: 735; 1884: 31, Pl. 3, Fig. 6 (Red Sea). *Gaterin sordidum:* Smith, 1962: 479*.

D XII,17-18; A III,7-8; P 17; GR (9-10)+(15-16) = 25-26; LL about 50 tubules, LS about 85; eye 3 × in head; prominence above eye with age; 4th & 5th D spines longest; soft D base 1.1-1.25 (adult) in spinous D; 2nd A spine markedly stronger and longer than 3rd; P slightly longer than V, C rounded in young to emarginate in adults; lips fairly swollen with age; scales extend to nostrils; front half of preorbital naked.

In life juveniles colourful (see illustration); adults dark grey with orange-red lips and opercle edge; fins dark with membrane at front of D narrowly black. Attains over 60 cm. Rare; frequents weedy and coral-reef habitats. Red Sea to Transkei; Mauritius.



179.9 *Plectorhinchus sordidus:* top: 30 cm (N. Mozambique); bottom: 72.5 cm (Kenya).

Genus ***Pomadasys*** Lacepède, 1802

Small juveniles (<4 cm SL) with only 2 A spines; with growth, the first A ray develops into a spine. This genus contains about 25 species of which 10 are described here. "*Pomadasys guoraka*" recorded by Fowler (1925) from Natal (Smith, **SFSA No. 674***) was probably *P. olivaceum*. *P. guoraca* (Cuvier, 1830) occurs in the northern Indian Ocean and is easily differentiated from the uniformly coloured *P. olivaceum* by having 7-8 A rays. Markings of all species remain on preservation.

KEY TO SPECIES

1a Body uniform olive or silvery, no spots, bars or horizontal lines 2
1b Body with dark spots, bars or horizontal lines 3
2a A rays 11-13; TL less than 30 cm ..... *P. olivaceum*
2b A rays 7-8; TL more than 30 cm ..... adult *P. kaakan*
3a Spots or blotches on body, no horizontal bands 4
3b Body with 3 or more horizontal bands 8
4a Dark crossbars or series of large blotches on body 5
4b Many small dark spots on body but no dark crossbars or blotches 6
5a Black blotch on opercle; bars on body neat and vertical ..... *P. kaakan*
5b No blotch on opercle; bars on body disjointed and mostly oblique ..... *P. maculatum*
6a Spots on head, no large blotch on opercle; D spines 12 ..... *P. multimaculatum*
6b No spots on head, large dark blotch on opercle; D spines 11 7
7a Eye (small) 6.9-7.2 in head, 2.8-3.0 in snout, 1.8-2.0 in interorbital; (Indian Ocean) ..... *P. commersonnii*
7b Eye (larger) 3.3-5.4 in head, about 2 in snout, 1.6-1.8 in interorbital; (Atlantic Ocean) ..... *P. jubelini*
8a 3-4 bands along body 9
8b More than 4 bands along body 10
9a Band through eye to opercle and lowest body band; scale rows below LL run obliquely up and back; basibranchial expanded with reduced or no GR ..... *P. striatum*
9b Large dark blotch on opercle; scale rows below LL horizontal; basibranchial not expanded but bears GR ..... *P. stridens*
10a Bands along body bifurcating at least in front, in adults double lines; body depth 2.2-2.7 in SL; dorsal profile elevated ..... *P. furcatum*
10b Bands along body equidistant from each other; body depth 3.25 in SL; dorsal profile not elevated ..... *P. laurentino*

179.10 *Pomadasys commersonnii*
(Lacepède, 1801)
PLATE 52

Spotted grunter — Gespikkelde knorder

Labrus Commersonnii Lacepède, 1801: 431,477, Pl. 23, Fig. 1 (Great Ocean (= Indo-Pacific), probably collected at Madagascar where it is very plentiful). *Pomadasys operculare:* Smith, 1933: 201; **SFSA No. 679***; Sanches, 1963: 88*. *Pomadasys commersonni:* Smith, 1962: 257*; Smith & Smith, 1966: 64*; Penrith, *in* Day et al., 1969: 227*; van der Elst, 1981: 252*.

D XI,14-15; A III,9-10; P 17-19; GR (9-10)+(16-17); LL 52-54. All spines strong; 2nd A spine very stout and longer than rest of A. Mouth small, pig-like and protrusible; preopercle serrate with 2 large flat blunted projections at angle. Supraoccipital hyperostosis responsible for the bumps above eye.

Juveniles (7 cm SL) with no spots on body. Attains over 80 cm. Indian Ocean from India round to False Bay but absent from central islands like Seychelles. On the southern Cape coast it is caught mainly in estuaries during summer; from Algoa Bay northwards it is also caught in the sea, particularly near river mouths. The spotted grunter is the best

known of the grunters; it is a fine game fish, but wary and easily frightened by noise, certainly in Cape estuaries, except that in the Swartkops estuary it is apparently not disturbed by motorboats (Bennett, 1977). It frequently blows small creatures from holes in mud or sand, and in shallow water the tail may wave above the water. Hooked fishes blow the bait, especially bloodworms, with such force that it is often shot far up the line. Takes prawn, crayfish, razor-shell, sea-lice, marine worms, cheese and bacon but rarely fish bait. Flesh delicate and tasty, improved by bleeding the fish and keeping cool, not frozen, for 12-18 hours. When served cold it resembles tasty chicken. The strong spines and serrated preopercle can inflict deep cuts.

Easily killed by the cold upwelling on our south Cape coast, and this was probably responsible for numerous grunters consumed by the strandlopers at the Cape. Numerous enlarged supraoccipital bones have been discovered in the middens in False Bay, indicating that the seas were warmer about 5 000 years ago and that large numbers of these fishes were killed in that area, probably when upwelling occurred. Not rock haunting, they were not likely to be caught in primitive stone traps, and too wary to have been caught or speared by primitive man.

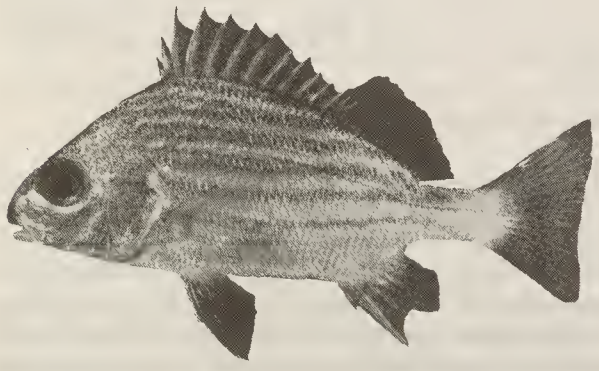
179.11 *Pomadasys furcatum*
(Bloch & Schneider, 1801)
PLATE 52

Grey grunter — Grys knorder

Pristipoma furcatus Bloch & Schneider, 1801: 187, Pl. 43 (East Indies). *Pomadasys taeniophorus* Regan, 1908: 251, Pl. 39 (Kosi Bay). *Rhonciscus anas:* Smith, **SFSA No. 682*;** van der Elst, 1981: 257*.

D XII,14-15; A III,7; P 15-17; GR 5+(12-13); LL 50-52.

In juveniles, the bands are bifurcated anteriorly; in adults, the bands are double lines. Attains 50 cm. Frequents sandy areas near rocks; flesh good but softens rapidly. Madagascar to Natal; rare south of Durban.



179.11 *Pomadasys furcatum.* 15 cm (Natal; photo J.E. Randall).

179.12 *Pomadasys jubelini*
(Cuvier, 1830)

Atlantic spotted grunter — Atlantiese gespikkelde knorder

Pristipoma Jubelini Cuvier, *in* Cuv. & Val., 1830: 250 (Senegal, Goree). ?*Pristipoma macracanthum* (*non* Günther): Pauca, 1930: 35. *Pomadasys jubelini:* Penrith, 1982: 91*.

D XI,15-17; A III,9; P 16-17; GR 9+14; LL 53-59.

Attains 60 cm. Eastern Atlantic, from Senegal to southern Angola, in clear water of temperatures 20 °C and above; occasional specimens that reach as far south as Swakopmund are unusual in tolerating temperatures of 13.5-14.5 °C in rough, silt-laden waters.

179.12 *Pomadasys jubelini:* 34.5 cm (after Poll, 1954).

179.13 *Pomadasys kaakan*
(Cuvier, 1830)

Javelin grunter — Spies-knorder

Pristipoma kaakan Cuvier, *in* Cuv. & Val., 1830: 244 (India). *Pomadasys hasta* (*non* Bloch): Smith, **SFSA No. 676*;** Hill, 1966: 23; Day, 1974: 96; van der Elst, 1981: 253*.

D XII,13-15; A III,7-8; P 17-18; GR (5-6)+(13-14); LL 43-47; fin spines very strong.

179.13 *Pomadasys kaakan:* top: 42 cm (Transkei); bottom: 20 cm (Inhaca Id.).

Silvery, juveniles with lines joining bars; bars break up with growth to become obsolete in large specimens; round spots on basal half of D membrane always present. Attains 45 cm. Over mud or sand, down to about 75 m; enters estuaries and tolerates almost fresh water; adults generally solitary but shoal for spawning near river mouths in winter; estuaries are used as nursery areas. An excellent food-fish; caught by anglers using light tackle. Indo-Pacific, south to Transkei.

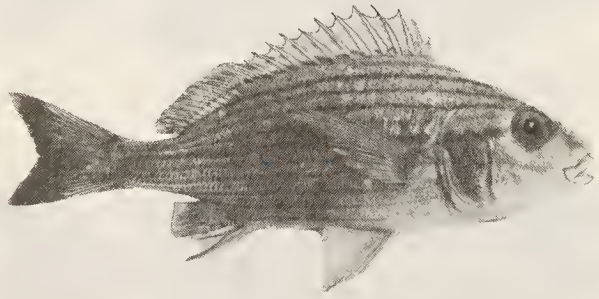
179.14 *Pomadasys laurentino*
(Smith, 1953)

Manylined grunter — Veelstreep-knorder

Rhonciscus laurentino Smith, 1953: 12, Pl. 1, Fig. 1 (Mozambique Channel); 1953: 519, **No. 682a*.**

D XII,15; A III,7; P 17; GR 11+14; LL 52-53.

Colour preserved: greyish, lighter below; 11 dark bands along body and head; fins dusky. Known from a single 18-cm specimen obtained from a naval depth charge in the Mozambique Channel off Inhambane in about 100 m.



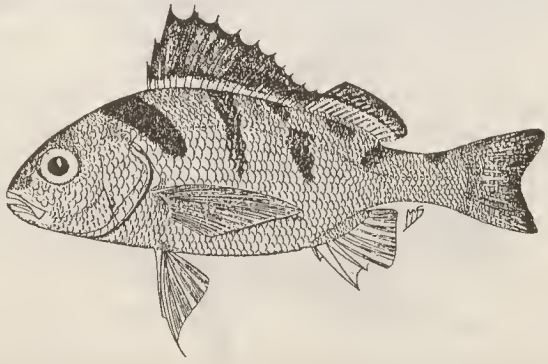
179.14 *Pomadasys laurentino:* 18 cm holotype (Mozambique Channel).

179.15 *Pomadasys maculatum*
(Bloch, 1797)

Saddle grunter — Saal-knorder

Anthias maculatus Bloch, 1797: 7, Pl. 326, Fig. 2 (East Indies); *Pomadasys maculatus:* Smith, **SFSA No. 677*;** Day, 1974: 96; Sanches, 1963: 89*. *Pomadasys maculatum:* van der Elst, 1981: 254*.

D XII,14; A III,7; P 17; GR 6+(14-16); LL 50-52.



179.15 *Pomadasys maculatum:* 15 cm (S. Mozambique).

Characterised by the large oblique saddle on nape. Attains 45 cm. Prefers clear water over sand near reefs and down to 40 m. Although palatable, the flesh softens rapidly, and this species is too small to be of any angling significance. An important food-fish in tropical areas. Indo-West Pacific, south to Transkei.

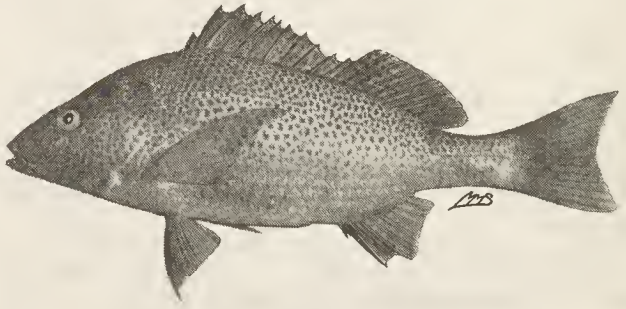
179.16 *Pomadasys multimaculatum*
(Playfair, 1866)

Cock grunter — Haan-knorder

Pristipoma multimaculatum Playfair, *in* Playfair & Günther, 1866: 23, Pl. 3, Fig. 3 (Bagamoia, Tanzanian coast). *Pomadasys multimaculatum:* Smith, **SFSA No. 678*;** Day, 1974: 96; van der Elst, 1981: 255*.

D XII,13; A III,7; P 17; GR 6+(12-13); LL 49-54.

Silvery, darker above, with most of body and head covered with dark spots. Attains 60 cm. Not eaten around the Island of Mozambique because the blacks believe it is responsible for leprosy! Others consider the flesh causes boils. Excellent food-fish, less common than *P. commersonnii* but with similar habits; eagerly takes prawn and sometimes fish bait. Known only from Zanzibar to Algoa Bay.



179.16 *Pomadasys multimaculatum:* 60 cm (Kenya).

179.17 *Pomadasys olivaceum*
(Day, 1875)
PLATE 52

Piggy — Varkie

Pristipoma olivaceum Day, 1875: 73, Pl. 19, Fig. 1 (India). *Pomadasys olivaceum:* Smith, **SFSA No. 675*;** Penrith, *in* Day et al., 1970: 94; Edwards, 1971: 29; van der Elst, 1981: 256*.

D XII,15-17; A III,11-13; P 16-17; GR (5-7)+(13-15); LL 51-54; pre-opercle edge serrate.

Uniform silver to greenish, darker above; dark blotch on upper opercle; fins yellowish in young, becoming more dusky with age. Attains 30 cm. Plentiful among weed in southern Cape estuaries; large shoals of juveniles occur around shallow water reefs where they consume shrimps and other small invertebrates, being themselves eaten by larger fish; larger piggies are found in deeper water where they spawn throughout the year. Cold upwelling causes

heavy mortality of this species at Knysna. Used extensively for bait, flesh rather insipid. India, Arabia, Madagascar to False Bay.

179.18 *Pomadasys striatum*
(Gilchrist & Thompson, 1908)
PLATE 52

Striped grunter — Gestreepte knorder

Pristipoma striatum Gilchrist & Thompson, 1908: 153 (Natal). *Rhonciscus striatus:* Smith, **SFSA No. 680*;** van der Elst, 1981: 258*.

D XII,13-14; A III,6-7; P 16-17; GR (10-11)+(10-11)+3 minute rudiments on expanded basibranchial; LL 51-54; interorbital equals eye.

Attains 22 cm. Known originally from Knysna to Beira down to 30 m; recorded from Red Sea and Gulf of Suez mainly around fringing reefs (Konchina, 1976; but this could be *P. stridens*). Rare in our area, sometimes thrown up after storms.

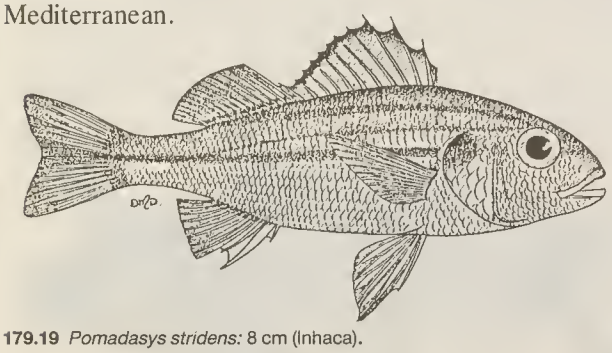
179.19 *Pomadasys stridens*
(Forsskål, 1775)

Lined piggy — Gestreepte varkie

Sciaena stridens Forsskål, 1775: 50 (Arabia). *Rhonciscus stridens:* Smith, **SFSA No. 681*.**

D XII,13-14; A III,7-8; P 16; GR (7-8)+(15-16); LL 49-54; eye greater than interorbital.

Silvery, darker above, with 4 stripes along body and opercular blotch dark brown. Attains nearly 20 cm; too small to be of any importance in our area except possibly as bait. India, Red Sea to Natal and has penetrated to eastern Mediterranean.



179.19 *Pomadasys stridens:* 8 cm (Inhaca).

Family No. 180: DINOPERCIDAE

by P.C. Heemstra

Cavebass — **Spelonkbaars**

Body oval, rather compressed; head, body and fins covered with small, ctenoid scales; lateral line extends to end of caudal fin. Dorsal fin with 9-11 spines and 18-20 soft-rays; anal fin with 3 spines and 12-14 soft-rays. Caudal fin with 8+7 branched rays. Pectoral fins usually larger than pelvics; no scaly axillary process at base of pelvics. Soft dorsal and anal fins high anteriorly. Maxilla exposed, scaly, with a long slender supramaxilla. Small teeth in bands on jaws, vomer, palatines and (in adults) on ectopterygoids. Opercle ends in 2 points; preopercle serrate. Branchiostegal rays 7. Vertebrae 10+16; predorsal bones pattern 0/0/0+2+1/1/1/. Swimbladder large, connected anteriorly to the vertebral column; posterior half of swimbladder covered with 3 pairs of intrinsic muscles.

Two genera; *Dinoperca* and the monotypic *Centrarchops* were previously included in the Serranidae, but Heemstra and Hecht (1986) have established a separate family for these two genera. *Centrarchops chapini* Fowler, 1923 is known only from the northern coast of Angola. It has the second anal fin spine longer than the third, deeper body (depth 1.9-2.0 in SL), dark bars on the body, and 4 large, tubular pores on the chin.

Genus ***Dinoperca*** Boulenger, 1895

Third anal fin spine longer than 2nd; no pores on chin. The northern Indian Ocean species *D. petersi* (Day, 1875) was synonymised with *D. queketti* by Smith (1949). According to Day's original description, *D. petersi* has "ca. 100" lateral-line scales, but 2 recently collected specimens from Pakistan have 56 and 61 lateral-line scales.

180.1 *Dinoperca petersi*
(Day, 1875)
PLATE 53

Cavebass — Spelonkbaars

Haplogenys Petersi Day, 1875: 77, Pl. 20, Fig. 3 ("Sind und Meckran coast" = Pakistan). *Dinoperca queketti* Boulenger, 1903: 63, Pl. 2 (Natal); Barnard, 1927: 490; Fowler, 1934: 427*; Morgans, 1982: 30. *Dinoperca petersii* Smith, **SFSA No. 454*;** van der Elst, 1981: 287*; Johnson, 1983: 778. *Dinoperca petersi:* Heemstra & Hecht, 1986*.

D IX-XI,18-20; A III,12-14; P 17-18; LL 53-63; GR (13-18)+(23-28). Body depth 2.3-2.5, head length 2.7-3.0 in SL. Eye diameter 2.9-4.2 in head length. Nostrils oval, subequal and close together.

Body, head and fins blackish brown; body with numerous white specks, fading in large adults; cheek brown, with a

180.1 *Dinoperca petersi:* 35 cm (Transkei).

black band from front of snout to angle of preopercle. Attains 62 cm, 5 kg. Usually seen under ledges or at the entrance of caves. Makes a loud drumming noise. The distribution of this species is uncertain, apparently common in Pakistan and South Africa (from Natal to Algoa Bay). Also reported from Kenya and Mozambique.

Family No. 181: LUTJANIDAE

by W.D. Anderson, Jr. (Genus *Lutjanus* by G.R. Allen)

Snappers **Snappers**

Body moderately elongate to deep. Dorsal fin single, sometimes deeply incised. Soft dorsal and anal fins scaleless, scaly, or with a basal scaly sheath. Pelvic axillary process usually well developed. Upper jaw usually moderately protractile (fixed in *Aphareus*); maxilla slipping for most or all of its length under preorbital bone when mouth is closed. Jaws with more or less distinct canines (absent in *Aphareus*); vomer and palatines usually with small conical teeth (toothless in *Aphareus*). Preopercle usually serrate. Scales ctenoid; cheek and operculum scaly; maxilla with or without scales; snout, preorbital and lower jaw naked. Caudal fin truncate to deeply forked, with 17 principal rays. Vertebrae 10+14. Body depth is measured at the dorsal fin origin; gill-raker counts include rudiments.

Adults mostly bottom-associated fishes occurring in 1 - 550 m of warm seas throughout the world. Some species reach 100 to 120 cm, and many are excellent food-fishes, although in some areas certain species are ciguatoxic. Important in both sport and commercial catches. Seventeen genera and about 103 species. The limits and relationships of the family have been studied in detail recently by Johnson (1981).

Reports of *Apsilus fuscus* Valenciennes, 1830, an eastern Atlantic species, from the western Indian Ocean appear to be based on misidentifications, in part, perhaps of *Paracaesio xanthura.* Alwyne Wheeler examined the specimen (BMNH 1917.11.3.1) from Delagoa Bay which was considered by Smith, **SFSA No. 656,** as a representative of *Apsilus fuscus,* compared it with a specimen of *A. fuscus* (BMNH 1939.7.12.21) of similar size from off west Africa, and concluded that the two specimens are not conspecific. Therefore, *Apsilus fuscus* has been deleted from this revision.

KEY TO GENERA

1a D and A without scales; D X,10 or 11 2
1b Soft D and A with scales; D X-XII,12-16 7

2a Maxilla with scales 3
2b Maxilla without scales 4

3a D notched before soft-rayed portion; D X,11 ..... *Etelis*
3b D not notched; D X,10 ..... *Paracaesio*

4a Upper jaw not protrusible, attached at symphysis by a frenum to skull; vomer and palatines without teeth; teeth in jaws minute ..... *Aphareus*
4b Upper jaw protrusible, not attached by frenum to skull; vomer and palatines with teeth; at least some teeth in jaws caniniform 5

5a Last D and A rays shorter than penultimate ray; D X,10 ..... *Paracaesio*
5b Last D and A rays longer than penultimate ray; D X,11 6

6a Groove present on snout below nostrils; P shorter than half length of head ..... *Aprion*
6b No groove on snout; P longer than half length of head ..... *Pristipomoides*

7a GR long, slender, 60 or more on lower limb of 1st arch ..... *Macolor*
7b GR shorter, 7-19 on lower limb of 1st gill arch ..... *Lutjanus*

Genus ***Aphareus*** Cuvier, 1830

Two species; both in our area.

KEY TO SPECIES

1a GR (6-10)+(16-18); colour steel blue ..... *A. furca*
1b GR (16-19)+(32-35); colour brick red or pink dorsally ..... *A. rutilans*

181.1 *Aphareus furca*

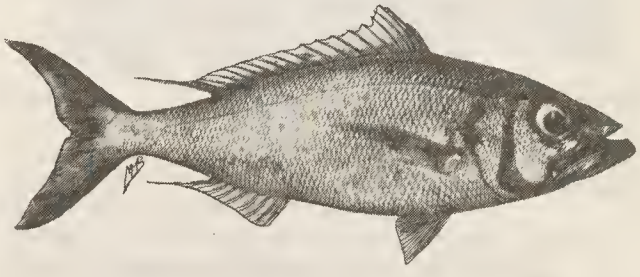
(Lacepède, 1801)

Blue smalltooth job Blou kleintand-job

Labrus furca Lacepède, 1801: 429, 477, Pl. 21, Fig. 1 (Indo-Pacific). *Aphareus furcatus:* Smith, 1954: 491*; Smith, 1980: 179. (The spelling usually given is "*furcatus*", but *furca* is a noun in apposition, so it properly retains the original spelling in whatever genus it is placed.)

D X,11; A III,8; P 15-16; LL 71-74. Depth 2.9-3.5; head 3.1-3.4.

Steel blue. Attains 60-70 cm. Tropical Indo-Pacific, reaches Sodwana Bay.



181.1 *Aphareus furca:* 36 cm (Pemba Id.).

181.2 *Aphareus rutilans*

Cuvier, 1830

PLATE 53

Red smalltooth job Rooi kleintand-job

Aphareus rutilans Cuvier, *in* Cuv. & Val., 1830: 490 (Red Sea); Smith, 1954: 492*; Smith, 1980: 179.

D X,10-11; A III,8; P 15-16; LL 69-75. Lower P rays longer than middle rays. Depth 3.3-4.0; head 3.0-3.3.

Head and body brick red or pink dorsally; inside of mouth, gill chamber and gills shining silver. Attains 110 cm. Tropical Indo-Pacific; extends south to Durban.

181.2 *Aphareus rutilans:* 125 cm (Kenya).

Genus ***Aprion*** Valenciennes, 1830

Interorbital naked, flat; jaws with distinct canines. One species.

181.3 *Aprion virescens*
Valenciennes, 1830
PLATE 53

Green jobfish — Groen jobvis

Aprion virescens Valenciennes, *in* Cuv. & Val., 1830: 544, Pl. 168 (Seychelles); Smith, **SFSA No. 652*;** van der Elst, 1981: 202*.

D X,11; A III,8; P 16-18; LL 48-49; GR (7-8)+(14-16). Depth 3.7-4.2; head 3.0-3.3.

Dark green, bluish, or grey-blue. Attains 100 cm. Tropical Indo-Pacific; occasionally caught off Natal and once found at Knysna.

181.3 *Aprion virescens:* 75 cm (Kenya).

Genus ***Etelis*** Cuvier, 1828

Four species; 1 in our area. *Etelis carbunculus* Cuvier, 1828 (with 17-22 total GR and upper C lobe 3.3-3.8 in SL) is widely distributed in the Indo-Pacific and is known from the Seychelles and Mauritius. *Etelis oculatus* (Valenciennes, 1828) of the western Atlantic tends to have shorter pelvic fins and C lobes than does *E. coruscans*.

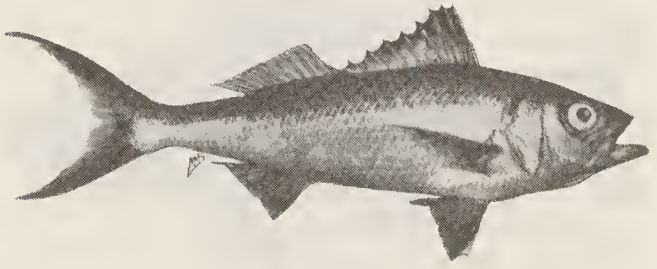
181.4 *Etelis coruscans*
Valenciennes, 1862
PLATE 53

Ruby snapper — Robyn-snapper

Etelis coruscans Valenciennes, 1862: 1166 (Ile Bourbon = Réunion); Anderson, 1981: 824. *Etelis carbunculus* (*non* Cuvier, 1828): Smith, **SFSA No. 651*.**

D X,11; A III,8; P 15-16; LL 47-50; GR (8-10)+(15-18). Depth 3.4-3.8; head 2.8-3.3; upper C lobe 1.3-3.6.

Generally reddish; darker dorsally, silvery ventrally. Attains 120 cm. Tropical/subtropical Indo-Pacific; extends south to the Bashee River (32°S). Taken in 100 - 400 m; a fine sport and eating fish.



181.4 *Etelis coruscans:* 90 cm (Kenya).

Genus ***Lutjanus*** Bloch, 1790
by G.R. Allen

Medium-sized fishes; body compressed, moderately deep to slender; jaws with several enlarged canine teeth. Colour pattern largely consisting of yellow, pink or red. The flesh is good eating. G.R. Allen and F.H. Talbot are currently preparing a taxonomic revision of this genus. Gill-raker counts include the rudimentary rakers. About 65 species (Indo-West Pacific 39; eastern Pacific 9; western Atlantic 12; eastern Atlantic 5); 15 species in our area.

KEY TO SPECIES

1a Colour brilliant yellow with blue stripes on body 2
1b Colour not as in 1a 3

2a Body with 4 blue stripes; D spines 10 ..... *L. kasmira*
2b Body with 6-7 blue stripes; D spines 11 or 12 ..... *L. notatus*

3a D spines 11 or 12 4
3b D spines 10 (rarely 11) 6

4a D rays 15 or 16; A rays usually 10; colour pattern with 3 reddish-brown bars, faint or absent in large adults ..... *L. sebae*
4b D rays 12-14; A rays 8 or 9; colour not as in 4a 5

5a Body slender, the depth 2.9-3.3 in SL; colour silvery or bronzy with horizontal yellow or brownish lines on sides, the middle one forming a broad stripe ..... *L. lutjanus*

5b Body relatively deep, the depth 2.2-2.8 in SL, adults orange red; juveniles with black saddle on C peduncle and series of fine, red-brown horizontal lines on sides ..... *L. sanguineus*

6a Longitudinal scale rows above LL horizontal or rising only below rear part of spinous D or below soft D 7
6b Longitudinal scale rows above LL rising obliquely 8

7a Distinct black spot crossed by LL below front of soft D ..... *L. ehrenbergii*
7b No black spot; generally brownish or red ..... *L. argentimaculatus*

8a Wavy blue lines on head and small pale spots on body scales; white LL spot in juveniles and subadults, but lost in adults ..... *L. rivulatus*
8b Colour not as in 8a 9

9a Black spot crossed by LL below front of soft D (rarely absent in large *L. monostigmus*); fins yellowish 10
9b No black spot; colour of adults more or less uniform, often red or with reddish hue; fins variable 12

10a Vomerine tooth patch with posterior extension 11
10b Vomerine tooth patch without posterior extension ..... *L. monostigma*

11a D rays usually 14; width of preorbital about equal to width of fleshy interorbital; a relatively wide gap between temporal scale band of each side; spot on upper side situated mainly above LL; juveniles with 4-7 stripes (blackish or orange or yellow-brown in life) on side ..... *L. russellii*
11b D rays usually 13; width of preorbital much less than width of interorbital; little or no gap between temporal scale band of each side; spot on upper side situated mostly below LL or bisected by it, spot sometimes elongate; juveniles without 4-7 stripes on side ..... *L. fulviflamma*

12a Nostrils in deep groove in fish over 20 cm; juveniles frequently with 2 whitish spots on upper back; 8-9 transverse scale rows on cheek ..... *L. bohar*
12b Nostrils not in deep groove; no whitish spots on upper back; 6-7 transverse scale rows on cheek 13

13a Preopercle notch deep or moderately well developed; small juveniles without blackish stripes on sides; adults either reddish or bronzy 14
13b Preopercle notch weakly developed or absent; juveniles less than 15 cm with 1 or more horizontal stripes on sides; adults overall grey to reddish ..... *L. lemniscatus*

14a C distinctly forked with rounded lobes; longitudinal scale rows below LL rising obliquely; head profile of adults markedly concave ..... *L. gibbus*
14b C slightly emarginate with pointed lobes; longitudinal scale rows below LL parallel to axis of body; head profile straight or slightly convex ..... *L. fulvus*

181.5 *Lutjanus argentimaculatus*
(Forsskål, 1775)
PLATE 53

River snapper — Rivier-snapper

Sciaena argentimaculata Forsskål, 1775: XI, 47 (Arabia). *Lutianus salmonoides* Gilchrist & Thompson, 1908: 146 (Natal). *Lutianus argentimaculatus:* Smith, **SFSA No. 664*;** Talbot, 1957: 244*. *Lutjanus argentimaculatus:* van der Elst, 1981: 203*.

D X,13-14; A III,7-8; P 16-17; LL 46-47; GR (6-7)+(10-11). Depth 2.5-2.9; head 2.3-2.7. Preopercle notch shallow.

Generally greenish brown on back grading to reddish on sides and ventral parts; scales with dark centres and white margins giving overall reticulated effect; 1 or 2 horizontal blue lines on cheek sometimes present; median fins dusky brown often with reddish hue; front half of A darker brown or blackish; V dusky brown, blackish or red with narrow white anterior margin; P translucent to slightly dusky. Juveniles greenish brown with 10-12 narrow whitish bars on flanks (every second bar relatively broad, 2-3 scales in width, with the intervening bars about ½ width of others and sometimes very faint). Attains 100 cm. Often found in shoals over trawling grounds and around coral reefs to depths of 30 m or more; juveniles common in estuaries. Red Sea and tropical Indo-West Pacific region, south to East London. A fine game fish, enters our southeast coast estuaries and takes most baits. A real "snapper" with strong canines. Flesh excellent.

181.6 *Lutjanus bohar*
(Forsskål, 1775)
PLATE 54

Twinspot snapper — Tweekol-snapper

Sciaena bohar Forsskål, 1775: XI, 46 (Arabia). *Lutianus bohar:* Smith, **SFSA No. 667*** (and Fig. 662, adult labelled "*L. gibbus*"); Talbot, 1957: 249*. *Lutjanus bohar:* van der Elst, 1981: 205*.

D X,13-14; A III,8; P 17; LL 48-50; GR 6+16. Depth 2.4-2.9; head 2.4-2.9. Preopercular notch shallow or absent; 1 or 2 patches of teeth on tongue; interorbital flat.

Generally dark brown dorsally, grading to whitish or pink below with strong reddish hue, particularly on cheeks and lower half of sides; alternating dark and light horizontal lines following scale rows below LL; juveniles less than 20 cm with 1 or 2 white spots, 1st directly below middle of D base, 2nd below end of D; D blackish to dark brown with narrow white margin posteriorly; C dusky brown, dorsal and ventral edges white; A blackish distally grading to brown at base; V blackish with anterior margin white; P with uppermost rays dark brown and remainder white, upper ⅔ of P axil blackish. Attains 80 cm. Found on coral reefs to at least 70 m. Red Sea and tropical Indo-West Pacific, south to Durban.

181.7 *Lutjanus ehrenbergii*
(Peters, 1869)
PLATE 54

Blackspot snapper — Swartkol-snapper

Lutianus ehrenbergii Peters, 1869: 704 (Red Sea); Talbot, 1957: 242*; Smith, 1980: 180. *Lutianus johni* (*non* Bloch): Smith, **SFSA No. 661*.**

D X,13-14; A III,7-8; P 15-16; LL 42-47; GR (6-7)+(11-14). Depth 2.5-3.0; head 2.5-2.8. Shallow notch in preopercle.

Generally lemon yellow grading to white or silvery on lower sides and head; yellow-brown horizontal stripes frequently present on sides; sometimes a brown stripe from snout, through eye, to middle of sides; a large black spot on LL below anterior soft D rays; fins yellow; P mainly translucent. Attains 30 cm. Usually found on turbid inshore reefs or in mangrove estuaries to about 10 m. Red Sea and tropical Indo-West Pacific, south to Natal.

181.8 *Lutjanus fulviflamma*
(Forsskål, 1775)
PLATE 54

Dory snapper — Dorie-snapper

Sciaena fulviflamma Forsskål, 1775: XI, 45 (Arabia). *Lutianus fulviflamma:* Smith, **SFSA No. 659*;** Talbot, 1957: 253*. *Lutjanus fulviflamma:* van der Elst, 1981: 205*.

D X (rarely XI),12-14; A III,8; P 15-17; LL 46-49; GR (6-7)+(7-11). Depth 2.6-2.9; head 2.4-2.7. Preopercle notch shallow.

Generally pearly white or silvery with yellow lines along scale rows, imparting overall pale yellow coloration; elongate blackish spot on LL below anterior soft D rays; fins yellow; P mainly translucent. Attains 30 cm. Common on rock and coral reefs to at least 10 m; also in mangrove estuaries and over muddy bottoms. Red Sea and tropical Indo-West Pacific, south to East London.

181.9 *Lutjanus fulvus*
(Schneider, 1801)
PLATE 54

Yellow striped snapper — Geelstreep-snapper

Holocentrus fulvus Schneider, *in* Bloch & Schneider, 1801: 318 (Tahiti). *Lutianus vaigiensis:* Smith, **SFSA No. 669*;** Talbot, 1957: 256*. *Lutjanus fulvus:* Smith, 1980: 180.

D X,13-14; A III,8; P 16; LL 47-48; GR 6+(7-11). Depth 2.3-2.8; head 2.4-2.7. Preopercle notch well developed in adults.

Generally bronze or roseate with 6 distinct horizontal golden bands, and thinner ones between these; lower portion of head and body white; soft D and C dusky submarginally with a distinct white edge; other fins yellow, A with white edge. Attains 40 cm. Usually solitary on coral reefs to at least 15 m. Tropical Indo-West Pacific, south to the Bashee River.

181.10 *Lutjanus gibbus*
(Forsskål, 1775)
PLATE 54

Humpback snapper — Boggel-snapper

Sciaena gibba Forsskål, 1775: IX, 46 (Arabia). *Lutianus gibbus:* Smith, **SFSA No. 662*** (in part, not adult on Plate 37); Talbot, 1957: 247*. *Lutjanus gibbus:* van der Elst, 1981: 206*.

D X,13-14; A III,8; P 16-17; LL 47-51; GR (9-10)+(15-19). Depth 2.2-2.5; head 2.4-2.6. Preopercle notch very deep; knob on interopercle pronounced.

Generally grey to deep red grading to silver below; eye and P base and axil orange; median fins dusky red with narrow white margin. Juveniles silvery white below with distinct grey lines along scale rows; spinous D grey with dusky margin, soft D bright yellow with white margin; C bright yellow, with dark grey peduncle; V pink. Attains 40 cm. Found solitarily or in large shoals usually on rocky or coral reefs to at least 120 m. Juveniles frequent mangrove estuaries. Red Sea and tropical Indo-West Pacific, south to Durban.

181.10 *Lutjanus gibbus:* 28 cm (Kenya).

181.11 *Lutjanus kasmira*
(Forsskål, 1775)
PLATE 54

Bluebanded snapper — Blouband-snapper

Sciaena kasmira Forsskål, 1775: XI, 46 (Arabia). *Lutianus kasmira:* Smith, **SFSA No. 657*;** Talbot, 1957: 245*. *Lutjanus kasmira:* van der Elst, 1981: 207*.

D X,14-15; A III,7-8; P 15-16; LL 49-51; GR 7+(13-14). Depth 2.4-2.8; head 2.3-2.7. Deep notch in preopercle.

Generally bright yellow including fins; head and body abruptly white ventrally; 4 black-edged, blue, horizontal stripes along side of head and body; snout dark grey; a large black spot sometimes present on LL below anterior soft D rays. Attains 33 cm. Found on coral and rocky reefs to at least 60 m. Red Sea and tropical Indo-West Pacific, south to East London.

181.12 *Lutjanus lemniscatus*
(Valenciennes, 1828)
PLATE 55

Sweetlip snapper — Soetlip-snapper

Serranus lemniscatus Valenciennes, *in* Cuv. & Val., 1828: 240 (Ceylon). *Lutjanus janthinuropterus:* Smith, **SFSA No. 668*.** *Lutianus rangus:* Smith, **SFSA No. 670*.**

D X,13-14; A III,8; P 16; LL 49; GR 6+(9-12). Depth 2.5-2.8; head 2.5-2.8. Preopercle notch shallow.

Generally dusky brown grading to white or pinkish below; specimens from deep water may be red or pink; D and C dusky brown to reddish, other fins light brown to pinkish. Juveniles less than 15 cm with 1-6 broad, horizontal black stripes, blackish C, and bright yellow V, A & P. Attains 45 cm. Usually found solitarily over coral reefs to at least 30 m. Tropical Indian Ocean to Durban, and western tropical Pacific.

181.12 *Lutjanus lemniscatus:* 60 cm (after Halstead, 1978).

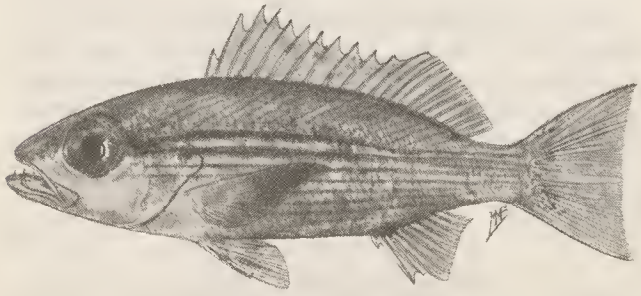
181.13 *Lutjanus lutjanus*
Bloch, 1790
PLATE 55

Yellow snapper — Geel snapper

Lutjanus lutjanus Bloch, 1790: 107 (Japan). *Lutianus lineolatus:* Smith, **SFSA No. 671*;** Talbot, 1957: 256*.

D X1-XII,12; A 111,8; P 16-17; LL 48-50; GR (7-8)+18. Depth 2.9-3.3; head 2.4-2.9. No preopercle notch.

Generally silvery to bronzy with horizontal yellow to brown lines on flanks, 1 per scale row, those above LL oblique; broad stripe from snout, through eye to base of C; median fins yellowish; paired fins white or translucent. Attains 33 cm. Found solitarily or in large aggregations usually on coral or rocky reefs to at least 40 m. Red Sea and tropical Indian Ocean south to Delagoa Bay, and western tropical Pacific.



181.13 *Lutjanus lutjanus:* 20 cm (Inhaca Id.).

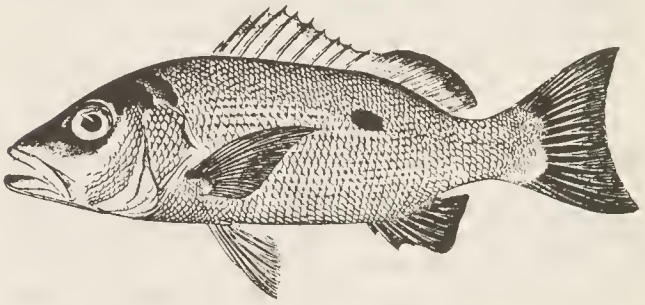
181.14 *Lutjanus monostigma*
(Cuvier, 1828)

Onespot snapper — Eenkol-snapper

Mesoprion monostigma Cuvier, *in* Cuv. & Val., 1828: 446 (Seychelles). *Lutianus monostigma:* Talbot, 1957: 252*. *Lutjanus monostigma:* Smith, 1975: 50.

D X,12-14; A III,8; P 15-17; LL 47-49; GR 7+(9-10). Depth 2.6-3.0; head 2.5-2.7.

Generally grey to yellowish, with faint brownish lines following scale rows; lower parts sometimes with pinkish hue; black spot usually present on LL below anterior D rays, although sometimes faint or absent in large adults; fins yellow. Attains 45 cm. Found solitarily on coral reefs to at least 30 m. Tropical Indo-West Pacific south to Mozambique.



181.14 *Lutjanus monostigma:* 30 cm (after Halstead, 1978).

181.15 *Lutjanus notatus*
(Cuvier, 1828)
PLATE 55

Bluestriped snapper — Bloustreep-snapper

Diacope notata Cuvier, *in* Cuv. & Val.,1828: 422 (Indian Ocean). *Lutianus duodecimlineatus:* Smith, **SFSA No. 658*;** Talbot, 1957: 246*.

D X1-X11,12-13; A 1II,7-8; P 15-16; LL 48-49; GR (5-7)+(11-13). Depth 2.5-2.7; head 2.4-2.7. Deep notch in preopercle.

Generally yellow, including fins, grading to white on breast and lower part of head; 6 or 7 blue stripes on sides, the uppermost 3 or 4 slanting obliquely towards D base; a black spot, pupil size or smaller, just above LL or touching it below middle of D. Attains 22 cm. Found on coral reefs to at least 35 m. East African coast south to Durban; also at Madagascar, Réunion and Mauritius.

181.16 *Lutjanus rivulatus*
(Cuvier, 1828)
PLATE 55

Speckled snapper — Gespikkelde snapper

Diacope rivulata Cuvier, *in* Cuv. & Val., 1828: 414, Pl. 38 (Coromandel, Pondicherry, Java, Red Sea, Malabar). *Lutianus rivulatus:* Smith, **SFSA No. 666*;** Talbot, 1957: 255*. *Lutjanus rivulatus:* van der Elst, 1981: 208*.

D X,15-16; A III,8-9; P 17; LL 47-49; GR 6+(12-13). Depth 2.1-2.4; head 2.4-2.5. Preopercle notch wide and distinct.

Generally bluish or greenish grey with a yellowish hue dorsally, each scale with 1 or more bluish spots; head covered with numerous fine, wavy, blue lines; lips whitish; D yellowish, dusky on soft portion; C greyish with yellow

posterior border; A base greyish, outer portion yellow; V yellowish with anterior rays dusky; P dusky suffused with yellow. Juveniles with broad dark bar across body at level of P base and black-margined, white spot on LL below anterior soft D rays. Attains 60 cm and weight of 11 kg. Found solitarily or in small aggregations over coral or rocky reefs to at least 30 m. Throughout tropical Indo-West Pacific, south to Durban.

181.17 *Lutjanus russellii*
(Bleeker, 1849)
PLATE 56

Russell's snapper — Russell se snapper

Mesoprion russellii Bleeker, 1849: 41 (India). *Lutianus russellii:* Smith, **SFSA No. 660***. *Lutjanus russelli:* van der Elst, 1981: 209*.

D X,14; A III,8; P 16; LL 48-50; GR (5-6)+(10-13). Depth 2.6-2.8; head 2.5-2.7. Preopercle notch shallow. Scales on top of head begin behind eyes.

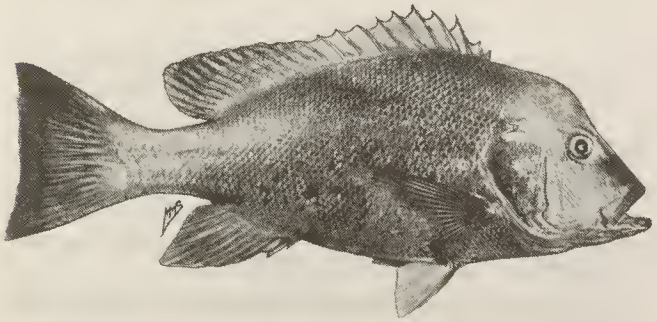
Generally yellow-brown above grading to yellow or pinkish below; head reddish; black spot below anterior D rays and mostly above LL; sides frequently with about 8 brownish horizontal bands. Small juveniles with 4-7 narrow bronze horizontal stripes, except those above LL slanting obliquely towards D base, this pattern sometimes evident in adults, particularly from the northern Indian Ocean; fins of adults and juveniles yellowish. Attains 40 cm. Usually found on coral reefs to at least 40 m. Juveniles frequent tidepools and mangrove estuaries. Throughout tropical Indo-West Pacific, south to Durban.

181.18 *Lutjanus sanguineus*
(Cuvier, 1828)
PLATE 55

Blood snapper — Bloed-snapper

Diacope sanguinea Cuvier, *in* Cuv. & Val., 1828: 437 (Red Sea). *Diacope erythrina* Rüppell, 1838: 92, Pl. 23, Fig. 3 (Red Sea). *Lutianus sanguineus:* Smith, **SFSA No. 663***; Talbot, 1957: 250*. *Lutjanus sanguineus:* van der Elst, 1981: 210*.

D XI,12-14; A III,8-9; P 16-17; LL 49-51; GR (6-7)+(12- 14). Depth 2.2-2.8; head 2.3-2.8. Preopercle notch shallow; 7-9 scales from LL to middle D spines.



181.18 *Lutjanus sanguineus:* 68 cm (Algoa Bay).

Generally rich orange-red with silvery belly; fins red to pink. Juveniles yellow-red with distinct brown band on forehead extending from D to upper jaw and encompassing eye; black saddle on peduncle, preceded by a pearl-coloured patch; V dusky to blackish; flanks with numerous red-brown horizontal lines. Attains 80 cm and weight of 22 kg. Found on coral and rocky reefs, often in deep water to at least 100 m. Western Indian Ocean south to Algoa Bay. Adults develop a pronounced hump on the forehead.

181.19 *Lutjanus sebae*
(Cuvier, 1816)
PLATE 56

Emperor snapper — Keiser-snapper

Diacope sebae Cuvier, 1816: 275 (Walgiv, Pondicherry, Java). *Lutianus sebae:* Smith, **SFSA No. 665***; Talbot, 1957: 251*. *Lutjanus sebae:* van der Elst, 1981: 211*.

D XI,15-16; A III,10; P 17; LL 49-50; GR 6+(10-12). Depth 2.1-2.4; head 2.3-2.5.

Juveniles and subadults silvery white with 3 broad, reddish-brown bands as shown. With age the bands become paler, and the body assumes a deep red coloration; large adults show no trace of the dark bands. Attains 80 cm and weight of 27 kg. Usually found on coral or rocky reefs to at least 100 m. Juveniles frequent shallow inshore reefs and mangrove estuaries. Throughout tropical Indo-West Pacific, south to Durban.

181.19 *Lutjanus sebae.* 45 cm (Seychelles).

Genus ***Macolor*** Bleeker, 1860

Two species; *M. macularis* Fowler, 1931 has 70-80 lower-limb GR (pers. comm., G.R. Allen).

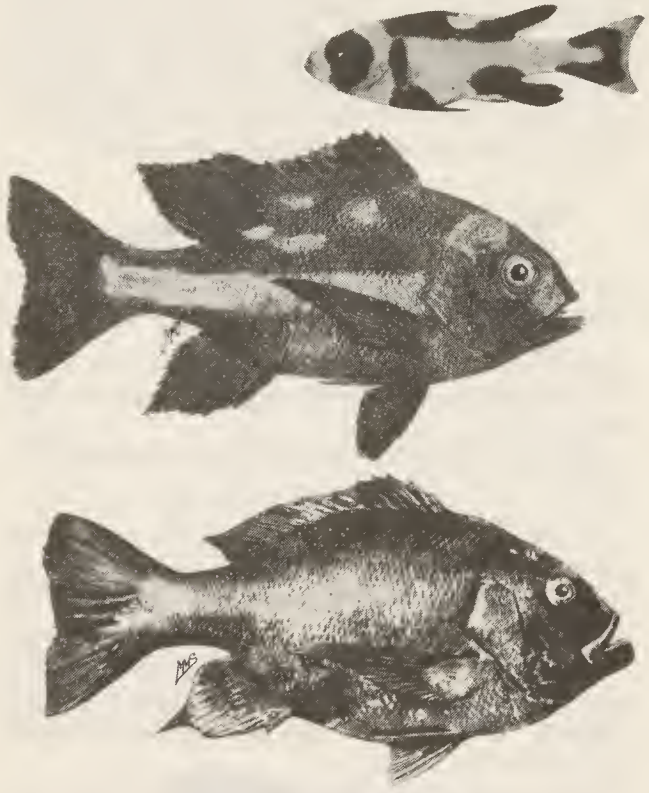
181.20 *Macolor niger*
(Forsskål, 1775)

Black beauty — Swartnooi

Sciaena nigra Forsskål, 1775: 47 (Red Sea, off Jidda). *Macolor niger:* Smith, 1962: 508*; Smith, 1980: 180.

D X,13 or 14; A III,10 or 11; P 16-18; LL 49-55; GR (31-41)+(60-70). Depth 2.3-2.9; head 2.6-2.8. Preopercle with deep notch (or gash) receiving elongate interopercular knob (or spine).

Juveniles and small adults with striking black and white pattern; large adults completely black. Attains 75 cm. Tropical Indo-Pacific to Sodwana Bay; rare; 1 juvenile found at Durban.



181.20 *Macolor niger:* top: 5 cm (Durban); middle: 35 cm (N. Mozambique); bottom: 70 cm (Seychelles).

Genus ***Paracaesio*** Bleeker, 1875

Several species; 1 in our area.

181.21 *Paracaesio xanthura*
(Bleeker, 1869)
PLATE 56

Yellowtail fusilier — Geelstert-piesang

Caesio xanthurus Bleeker, 1869: 78 (Nossi-Bé, Madagascar). *Aetiasis cantharoides* Barnard, 1937: 60* (Natal coast). *Paracaesio xanthurus:* Smith, **SFSA No. 655*;** 1953: 11.

D X,10; A III,8; P 16-18; LL 68-72; GR (9-11)+(20-23). Depth 2.6-3.1; head 3.2-3.8. Maxilla with or without scales.

Upper part of body and C yellow; head and rest of body slate blue. Attains 45-50 cm. Tropical Indo-West Pacific; extends south to Durban.

Genus ***Pristipomoides*** Bleeker, 1852

Eleven species; 7 in Indian Ocean; 3 known from our area.

KEY TO INDIAN OCEAN SPECIES

1a LL 48-50 2
1b LL 57-71 3

2a No golden bands on snout and cheek; longitudinal vermiculations on top of head ..... *P. typus* Bleeker, 1852
2b Two golden bands bordered with dark blue on snout and cheek; transverse vermiculations on top of head ..... *P. multidens*

3a Total GR 28-33; LL 67-71 4
3b Total GR 17-25; LL 57-67 5

4a Vomerine tooth patch triangular in shape, without backward prolongation in midline; no teeth on tongue ..... *P. auricilla* (Jordan, Evermann & Tanaka, 1927)
4b Vomerine tooth patch with backward prolongation in midline; patch of teeth on tongue ..... *P. sieboldii* (Bleeker, 1857)

5a LL 63-67; sides of body with alternating red and yellow bars ..... *P. zonatus*
5b LL 57-62; sides of body without red and yellow bars 6

6a Total GR 23-25; side of body without irregular dark markings ..... *P. filamentosus*
6b Total GR 17-21; side of body with numerous irregular dark markings, including zig-zag line which runs at about level of LL anteriorly and then onto dorsolateral part of caudal peduncle posteriorly ..... *P. argyrogrammicus* (Valenciennes, 1832)

181.22 *Pristipomoides filamentosus*
(Valenciennes, 1830)
PLATE 56

Rosy jobfish — Dagbreek-jobvis

Serranus filamentosus Valenciennes, *in* Cuv. & Val., 1830: 508 (Ile Bourbon = Réunion Id.). *Pristipomoides argyrogrammicus* (*non* Valenciennes): Smith, **SFSA No. 653*;** van der Elst, 1981: 212*. *Pristipomoides microlepis:* Smith, 1954: 488*; 1961: 568, **No. 653.**

D X,11; A III,8; P 15 or 16; LL 57-62; GR (7-8)+(15-17). Depth 3.2-3.8; head 2.9-3.4.

Mainly reddish. Attains 90-100 cm. Tropical Indo-Pacific; extends south to East London.

181.23 *Pristipomoides multidens*
(Day, 1870)
PLATE 56

Striped jobfish — Gestreepte jobvis

Mesoprion multidens Day, 1870: 680 (Andaman Ids.). *Pristipomoides typus* (*non* Bleeker): Smith, 1954: 486*. *Pristipomoides multidens:* Senta & Tan, 1975: 68*.

D X,11; A III,8; P 15-16; LL 48-50; GR (6-8)+(13-15). Depth 3.0-3.6; head 2.7-3.1.

Two golden bands bordered with dark blue on snout and cheek; transverse vermiculations on top of head. Attains 90 cm. Tropical Indo-Pacific.

181.24 *Pristipomoides zonatus*
(Valenciennes, 1830)
PLATE 56

Obliquebanded snapper — Skeweband-snapper

Serranus zonatus Valenciennes, *in* Cuv. & Val., 1830: 509 (Ile de France = Mauritius). *Tropidinius zonatus:* Smith, **SFSA No. 654*.**

D X,10-11; A III,8; P 15-16; LL 63-67; GR (5-8)+(12-14). Depth 2.7-3.1; head 2.7-2.9.

Sides of body with alternating, oblique, red and yellow bars. Attains 50 cm. Tropical Indo-Pacific from Delagoa Bay to Hawaii.

Family No. 182: CAESIONIDAE

by M.M. Smith

Fusiliers — **Piesangvisse**

Body rounded, fusiform, rather elongate; mouth small with a row of fine teeth in front of a band of minute teeth (no teeth in *Dipterygonotus*); upper jaw highly protrusible; palate usually edentate; 1 or 2 distinct bony processes on premaxilla, sliding beneath maxilla, clearly visible inside the mouth; scales feebly ctenoid; caudal fin forked.

Tropical planktivorous fishes, usually associated with coral reefs, previously included in the Lutjanidae. Four genera occur in the Indo-West Pacific: *Gymnocaesio* Bleeker, 1876 (9 dorsal spines) with 2 species, *Dipterygonotus* Bleeker, 1849 (13-15 dorsal spines) with 2 species, and *Caesio* and *Pterocaesio* (10-12 dorsal spines) with about 20 species. The latter 2 genera contain most of the species in this family and differ from the first 2 genera in having the dorsal and anal fins scaly.

Nine species (1 *Gymnocaesio,* 5 *Pterocaesio* and 3 *Caesio* spp.) are common in the tropical western Indian Ocean; although only 3 species in 2 genera have been recorded from our area, all 9 are illustrated on Plate 57 to aid identification should they be found here.

KEY TO GENERA

1a Premaxilla with 1 post-maxillary process; C uniform or with black band along each lobe ..... *Caesio*
1b Premaxilla with 2 post-maxillary processes; C lobes with black tips ..... *Pterocaesio*

Genus ***Caesio*** Lacepède, 1801

KEY TO SPECIES

1a C uniform yellow in life with pink hind margin; no median lateral golden band ..... *C. teres*
1b C with a black band along each lobe; a dark spot at upper P axil ..... *C. caerulaureus*

182.1 *Caesio caerulaureus*
Lacepède, 1801
PLATE 57

Blue-and-gold fusilier — Blou-en-goue piesangvis

Caesio caerulaureus Lacepède, 1801: 85 (Moluccas); Smith, **SFSA No. 687*.**

D X,14-15; A III,11-13; P 18-22; GR (8-9)+(22-25); LL (48-56)+(4-7). Depth 3.0-3.6, head 2.8-3.6; more or less single row of small conical teeth in jaws; palatine teeth minute or absent. Preopercle with broad lobe and margin with concealed serrae.

Preserved: brown above, light below; dark median broad band along each C lobe; dusky triangular blotch less than pupil at upper P base. The only other western Indian Ocean form with these 2 characteristic markings is *Pterocaesio tile* (Cuvier, 1830), which has D X,21-22. Attains about 30 cm. Widespread in Indo-Pacific, south to Port Alfred. These fishes swim in large shoals between the reefs, and suddenly the diver will find himself in the midst of a whirling flock reminiscent of being caught in a swarm of locusts, only the fish never bump into the diver.

182.2 *Caesio teres*
Seale, 1906
PLATE 57

Beautiful fusilier — Pragtige piesang

Caesio teres Seale, 1906: 44, Fig. 13 (Solomon Ids.). *Caesio pulcherrimus* Smith & Smith, 1963: 29, Pl. 95 E (Assumption Ids.); Smith, 1963: 36; Smith, 1980: 180.

D X,15; A III,12; P 22; GR (10-11)+(24-26) = 35-37; LL 55-58. Depth 3.4-3.6, head 3.8-4; eye 1.0-1.3 in interorbital, slightly less than snout.

Yellow of back always ends close to predorsal, leaving nape and top of head blue. In preserved specimens D is always dusky. Attains 30 cm. One of the loveliest and most shapely of fishes, swims in small shoals. Seychelles and Kenya to Sodwana Bay.

Genus ***Pterocaesio*** Bleeker, 1876

Several species, 1 in our area.

182.3 *Pterocaesio capricornis*
(Smith & Smith, 1963)
PLATE 57

Southern fusilier — Suidelike piesang

Caesio capricornis Smith & Smith, 1963: 29, Pl. 94E (Pinda, Mozambique); Smith, 1963: 37.

D X,15; A III,12; P 20; GR 8+(26-27); LL 67-70. Depth 4, head 3.4; eye 1.0-1.1 in interorbital, 1.1-1.2 in snout.

Preserved: dark above, pale below, yellow line indistinct, but tips of C always black. Attains 17 cm; rare, solitary, round coral reefs in about 20 m. Seychelles and western Indian Ocean islands; east African coast to 20°S.

Family No. 183: SPARIDAE

by J.L.B. Smith and M.M. Smith

Seabreams **Seebrasse**

Body oblong to ovate, compressed. Caudal fin more or less forked; dorsal fin with 10-13 spines and 8-15 soft-rays; 3 anal spines; last ray of dorsal and anal fins usually double (split to its base). Preopercle margin smooth. Scales usually feebly ctenoid; cheeks and opercles scaly (cheeks naked in *Gymnocrotaphus*). Teeth conical or incisiform; molars present in some species; no teeth on vomer, palatines or tongue. This family is characterised by a groove in the outer end of the premaxilla, into which the maxilla fits.

Sparids occur in temperate and tropical waters of all oceans, and are usually concentrated along the shore in fairly shallow water. Some enter and live in estuaries, while a few penetrate deeper water. They are important as food, and several are fine sporting fishes: some species attain a great size. The young are often quite different from the adult in shape and markings, sometimes more strikingly and vividly coloured.

Many species have been found to be hermaphroditic; some have male and female gonads developed simultaneously; others change sex from males to females (protandrous), or go from females to males (protogynous) as they get larger.

With 22 genera in 4 subfamilies containing 41 species, southern Africa is rich in Sparids, 25 species or subspecies being found nowhere else (another 4 reach Madagascar and/or Mauritius). Some of them are abundant, and among our best-known fishes.

KEY TO SUBFAMILIES AND GENERA

1a Distinct, separate group of enlarged teeth in front of each jaw 2
1b No group of enlarged teeth in front of each jaw 3

2a Jaws with bluntly rounded molars posteriorly; front teeth with 4-9 enlarged conical canines or compressed incisors ..... (Subfamily SPARINAE) 4
2b No molars; jaws with enlarged canines in front, smaller conical teeth behind ..... (Subfamily DENTICINAE) 12

3a Outer teeth small, conical; inner teeth small molars ..... (Subfamily PAGELLINAE) 15
3b Outer teeth compressed, incisiform ... (Subfamily BOOPSINAE) ... 17

SPARINAE
(Carnivores, eating mostly crustaceans, molluscs and small fish)

4a Head between eyes not scaly 5
4b Head between eyes wholly scaly 8

5a 4-6 enlarged teeth in front of upper jaw 6
5b 8-12 enlarged incisors in front of upper jaw ..... *Diplodus*

6a LL 43-50; 2nd A spine distinctly longer than 3rd ..... *Acanthopagrus*
6b LL 55-61; 2nd and 3rd A spines subequal 7

7a 4-8 front teeth about equal; P longer than head ..... *Rhabdosargus*
7b Middle pair of teeth very large; P shorter than head ..... *Sparodon*

8a No scales on preopercle flange; at least one D spine longer than head ..... *Argyrops*
8b Preopercle flange at least partly scaly; no D spine longer than head (except in *Chrysoblephus lophus*) 9

9a D spines 13, short; LL 71-73 ..... *Porcostoma*
9b D spines 11 or 12; LL 49-68 10

10a Soft D not scaly; hind margin of preorbital undulate, not covered by scales; LL 56-59 ..... *Pterogymnus*
10b Soft D scaly at base; hind margin of preorbital covered by scales 11

11a Adults dull greyish; soft D blackish; scales above LL much smaller than those below ..... *Cymatoceps*
11b Adults pink or red, soft D not blackish; scales above LL about equal to those below ..... *Chrysoblephus*

DENTICINAE (Piscivorous)

12a First and 2nd D spines short, 3rd abruptly longer ..... *Cheimerius*
12b No D spines elongate 13

13a D spines 11; lower GR short, stubby, 9-11 ..... *Petrus*
13b D spines usually 12; lower GR normal, 12-20 14

14a Head length equal to body depth; hind nostril circular ..... *Argyrozona*
14b Head length less than body depth; hind nostril oval ..... *Polysteganus*

PAGELLINAE (Carnivorous on small invertebrates)

15a Interorbital scaly; 12 D spines ..... *Pagellus*
15b Interorbital naked; 11 D spines 16

16a Body silvery, usually with dark crossbars; eye diameter much less than snout length ..... *Lithognathus*
16b Body bronzy, no dark crossbars; eye diameter greater than snout length ..... *Boopsoidea*

BOOPSINAE (Typical herbivores, small invertebrates also eaten)

17a Cheek naked; iris deep blue; D spines 10 ..... *Gymnocrotaphus*
17b Some scales on cheek, iris not blue; D spines 10 or 11 18

18a Only one series of notched incisors in upper jaw; A III,13-15 ..... *Sarpa*
18b Jaws with 2 or more series of teeth; A III,10-11 19

19a Outer teeth movable 20
19b Outer teeth fixed 21

20a Edges of outer teeth wavy; LL 55-60 ..... *Crenidens*
20b Edges of outer teeth evenly pointed; LL 80-92 ..... *Spondyliosoma*

21a Only 1 outer series of incisors; inner teeth conical or molariform; LL 67-78 ..... *Polyamblyodon*
21b More than 1 series of incisors, no molars; LL 60-65 and 80-86 ..... *Pachymetopon*

Genus ***Acanthopagrus*** Peters, 1852

D and A spines strong and heteracanth; 43-50 scales in LL. Preopercle flange and interorbital naked. Soft D and A with scaly sheath. The genus name *Mylio* Lacepède, 1802 is sometimes used for these fishes, but this name is not valid because Lacepède did not use it as a generic name but in the combination "*Sparus mylio*". Rather rodent-like fishes of shallow water of the tropical Indo-Pacific. Two species in our area.

KEY TO SPECIES

1a No dark bars across head; A III,8-9 ..... *A. berda*
1b Head with 2 vertical black bars; A III,10-12 ..... *A. bifasciatus*

183.1 *Acanthopagrus berda*
(Forsskål, 1775)
PLATE 58

Riverbream — Slimjannie

Sparus berda Forsskål, 1775: xvi, 32 (Arabia). *Acanthopagrus vagus* Peters, 1852: 681 (Mozambique). *Pagrus caffer* Castelnau, 1861: 30 (Durban). *Pagrus estuarius* Gilchrist & Thompson, 1908: 170 (Natal). *Pagrus robinsoni* Gilchrist & Thompson, 1908: 170 (Natal). *Acanthopagrus berda:* Smith, 1938: 237*; **SFSA No. 707***, Smith & Smith, 1966: 130*; van der Elst, 1981: 303*.

D XI-XII,10-13; A III,8-9; P 14; GR (6-7)+(9-10); LL 43- 47; depth 1.9-2.5; 4-6 incisors at front of upper jaw, 6-8 in lower jaw, followed by 3-5 rows of molars.

Head, body and fins greyish silver to black; A yellowish, the membrane blackish basally. Attains 75 cm in our area, 90 cm in tropical waters. Abundant and widespread in tropical Indo-Pacific and plentiful in Mozambique; adults and juveniles are found in freshwater and estuaries in Natal and Transkei, occasional specimens wander as far as Swartvlei, west of Knysna. A well-known angling fish, cunning, furtive and wary, it rarely takes any bait in clear water in daylight, but often bites freely on most baits towards dusk, fighting gamely.

When asked if he considered this fish "rodent-like" (see above in genus description), A.R. Thorpe replied: "I certainly understand what J.L.B. meant when he said the riverbream was 'rodent-like'. I grew up catching riverbream and spent many hours as a youngster persuading them to take a bait. I often used to scatter 'putu' (mielie pap) in the shallow water and watch them warily approach; keep absolutely still, move a little closer, still again, until they would dart forward, grab the food and dash off, just like a mouse or rat. The only food left eventually would be the piece with my hook in it."

Flesh excellent. Spawns in winter. Variable in form and colour; has often been described under different names, and anglers constantly distinguish different forms, but careful investigation so far indicates only one species.

183.1 *Acanthopagrus berda:* right half of upper jaw (after Bauchot & Smith, 1984).

183.2 *Acanthopagrus bifasciatus*
(Forsskål, 1775)
PLATE 58

Twobar seabream — Tweebalk-seebras

Chaetodon bifasciatus Forsskål, 1775: xiii, 64 (Djedda, Red Sea). *Acanthopagrus bifasciatus:* Smith, 1938: 239*; **SFSA No. 706***.

D XI-12-15; A III,10-12; P 15; LL about 49; GR (6-7)+(11-12); depth 1.9-2.2. Bulge develops between eyes with age; 4-6 incisors at front of jaws followed by 4-6 rows of molars.

Attains 50 cm. Western Indian Ocean, from Red Sea and Persian Gulf to Natal; rare in our area, a tropical species of coral reefs, occasionally found at Durban.

Genus ***Argyrops*** Swainson, 1839

Interorbital scaly; preopercle flange naked. Snout blunt, head becomes heavy with age. Third D spine, sometimes also 4th-7th, filamentous, longer than head. Front teeth conical, with 2-3 rows of small molars within. Colour reddish. Three species, 2 rather rare species in our area. Flesh good.

KEY TO SPECIES

1a Only 1 or 2 D spines elongate; interorbital scaling ends in a broad U-shaped edge ..... *A. filamentosus*

1a

1b 4-5 spines elongate; interorbital scaling ends in a point ..... *A. spinifer*

1b

183.3 *Argyrops filamentosus*
(Valenciennes, 1830)
PLATE 58

Soldier bream — Soldaatbras

Pagrus filamentosus Valenciennes, *in* Cuv. & Val., 1830: 158 (Réunion; Malacca ?). *Argyrops filamentosus:* Smith, 1938: 257; **SFSA No. 716*.**

D XI-XII,8-10; A III,8; P 15; LL 51-54; GR 6+(10-11); depth 2.0-2.5. First 2 D spines minute, 3rd twice 4th and longer than head (except in large adults).

Attains 70 cm. Red Sea and western Indian Ocean, reaches Natal. Rare.

183.4 *Argyrops spinifer*
(Forsskål, 1775)
PLATE 58

King soldierbream — Koningsoldaatbras

Sparus spinifer Forsskål, 1775: xi, 32 (Djedda, Red Sea). *Pagrus ciliaris* von Bonde, 1923: 19, Pl. 5 (Natal). *Argyrops spinifer:* Smith, 1938: 256; **SFSA No. 715*.**

D XI-XII,10-11; A III,8; P 15; LL 49-53; GR 6+(10-11); depth 1.75-2.0. First 2 D spines short, 3rd-7th elongate, in young longer than whole fish, relatively short in adults.

Attains 70 cm. Widespread in tropical Indo-West Pacific, common off Natal, occasionally reaches Knysna, nowhere plentiful; to depths of 150 m.

Genus ***Argyrozona*** Smith, 1938

Body depth about equals head length. Lower jaw protrudes slightly; rear margin of maxilla exposed, pointed upwards. Hind nostril circular. One species, found only in South Africa.

183.5 *Argyrozona argyrozona*
(Valenciennes, 1830)
PLATE 58

Carpenter — Kapenaar

Dentex argyrozona Valenciennes, *in* Cuv. & Val., 1830: 235 (Cape of Good Hope). *Polysteganus (Argyrozona) argyrozona:* Smith, 1938: 300. *Argyrozona argyrozona:* Smith, **SFSA No. 745*,** Smith & Smith, 1966: 63*; van der Elst, 1981: 304*.

D XII,10; A III,8; LL 59-62; P 15-16; GR (9-10)+(17-19); depth 3.0. Scales between eyes and on all but outer margin of preopercle flange. P much shorter than head. Profile of head smooth. Preorbital depth $\frac{2}{3}$ eye diameter or less. Outer front teeth long slender canines, inner smaller.

Attains at least 90 cm. Found only from Table Bay to Natal. Sometimes caught from the rocks in winter, but not a common angling fish; usually taken in 20 - 200 m. This species is of considerable commercial significance, and the flesh is esteemed. Spawns at the Cape during spring and summer. Before 1915, exceedingly abundant, with individuals of 2 kg commonly sold for about 2c each, but since then numbers have declined markedly. At the Cape, juveniles known as "Doppies" are believed by many to be a distinct species. There is, however, no feature of scientific value by which they can be distinguished.

Genus ***Boopsoidea*** Castelnau, 1861

No scales between eyes. Head length about $\frac{2}{3}$ body depth. One endemic species.

183.6 *Boopsoidea inornata*
Castelnau, 1861
PLATE 58

Fransmadam — Fransmadam

Boopsoidea inornata Castelnau, 1861: 26 (Kalk Bay, Algoa Bay); Smith, 1938: 273, **SFSA No. 729*;** Smith & Smith, 1966: 92*; van der Elst, 1981: 305*. *Pagrus (Chrysophrys) holubi* Steindachner, 1881: 203 (Algoa Bay).

D XI,10-11; A III,11; P 15-16; LL 60-65; GR (8-10+(14-16); depth 2.0-2.25. No scales on preopercle flange, soft D or A. Fine sharp teeth, small molars within.

Body bronzy; young are most vividly coloured. Attains 30 cm. Known only from the Cape to Natal, in 10 - 30 m at rocky areas; probably spawns in spring and summer. Regarded as a pest by anglers as it occurs in shoals, can strip any bait in a short time, but is too small to catch easily. Flesh good but spoils rapidly.

Genus ***Cheimerius*** Smith, 1938

First 2 D spines short, 3rd-7th filamentous, the 3rd always longest, very long in juveniles. Only 1 species in our area, although 2 others may be found on the west coast. Considered by some to be a subgenus of *Dentex. Cheimerius barnardi* (Cadenat, 1970) and *C. gibbosus* (Rafinesque,

1810) have been reported (Poll, 1971) from southern Angola, and occasional strays may reach our area. They can be distinguished as follows:

1a GR (6-8)+(8-10) = 15-18; small black spot at rear end of D base ..... *C. gibbosus*
1b GR (8-11)+(14-16) = 23-27; dark red blotch at base of last 3-5 D rays ..... *C. barnardi*

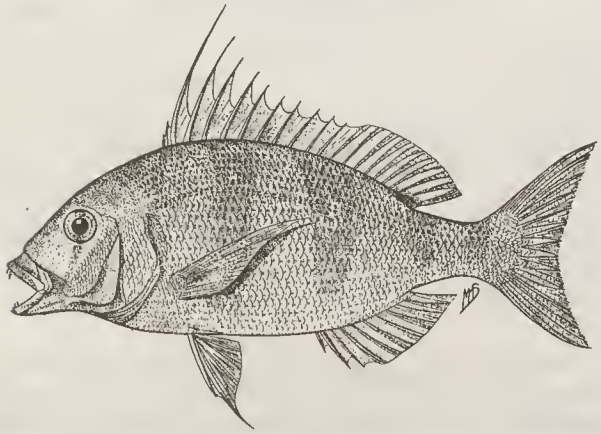
183.7 *Cheimerius nufar*
(Ehrenberg, 1830)
PLATE 58

Santer Santer

Dentex nufar Ehrenberg, *in* Cuv. & Val., 1830: 240 (Egypt, Red Sea). *Dentex miles* Gilchrist & Thompson, 1908: 155 (Natal). *Dentex albus* Gilchrist & Thompson, 1914: 128* (Natal). *Cheimerius nufar:* Smith, 1938: 292*; **SFSA No. 740*;** Smith & Smith, 1966: 58*; van der Elst, 1981: 306*.

D XI-XII,10-11; A III,8; P 16; LL 59-63; GR (8-11)+(13-16) = 22-25; depth 2.2-2.5. A few small scales on margin of preopercle, interorbital partly scaly; no scales on soft D or A. Outer V ray usually elongate.

When alive, bright silvery with faint red crossbars; after death, usually fades to almost white, but some specimens darken to almost purple. Attains 75 cm; spawns in summer. Widespread in tropical Indo-Pacific down to at least 80 m. Extends to the Cape. Poll (1971) reported *C. nufar* from the west coast of Africa between 10°N and 10°S; but his specimens have fewer GR (6-9)+(11-13) = 18-21, and they were redetermined as *C. canariensis* by Bauchot et al. (1981). A variable species with numerous synonyms. The shape of the body and fins varies with age, the 3rd D spine being shorter in large specimens. Taken by line and trawl in deepish water; not very abundant in our area. Large specimens are rarely caught from shore, and then only with stormy weather at sea. The young shelter in estuaries when stormy weather approaches; *Cheimerius* means "sign of storm". A common food-fish in Mozambique; flesh excellent.



183.7 *Cheimerius nufar*: 25 cm juvenile (Knysna).

Genus ***Chrysoblephus*** Swainson, 1839

Head between eyes scaly except in *Chrysobelphus lophus*. Preopercle flange and bases of soft D and A scaly. Jaws with 4-6 canines at front and 3 or more series of small molars within. More or less reddish, well known to line-boat anglers and the fishing industry as "reds"; 6 species, 4 endemic, remaining 2 reach Madagascar or Mauritius. *Chrysoblephus laticeps* and *C. cristiceps* have been shown to be protogynous, i.e. specimens smaller than 25 cm are females and by 34 cm for *laticeps* and 41 cm for *cristiceps* they have changed into males.

KEY TO SPECIES

1a Black blotch at base of last D ray; LL 59-61 ..... *C. cristiceps*
1b No blotch at base of last D ray 2

2a Triangular white blotch on side; LL 58-64 ..... *C. laticeps*
2b No triangular white blotch on side 3

3a Marked blue line below eye; lower GR 14-16; LL 49-52 ..... *C. puniceus*
3b No blue line below eye; lower GR 10-13 4

4a Third to fifth D spines abruptly long; pitted bony interorbital; LL 56-58 ..... *C. lophus*
4b Third D spine shorter than head; interorbital normal, scaly 5

5a P bent forward reaches beyond snout tip; LL 65-68; no black spots on body ..... *C. anglicus*
5b P bent forward does not reach beyond snout tip; LL 52-55; irregular black spots all over body ..... *C. gibbiceps*

183.8 *Chrysoblephus anglicus*
Gilchrist & Thompson, 1908
PLATE 59

Englishman Engelsman

Chrysoblephus anglicus Gilchrist & Thompson, 1908: 172 (Durban); Smith, 1938: 269; **SFSA No. 724*;** van der Elst, 1981: 307*.

D XII,10; A III,8; P 16-17; LL 65-68; GR 6+(10-12); depth 2.0-2.25. Snout steep.

Attains over 100 cm. Found only on east coast in deepish water. Spawns in summer and is most abundant and of largest size off Sodwana and Mozambique. Reaches Algoa Bay but better known in Natal waters. Takes fish bait. Flesh good.

183.9 *Chrysoblephus cristiceps*
(Valenciennes, 1830)
PLATE 59

Dageraad Dageraad

Chrysophrys cristiceps Valenciennes, *in* Cuv. & Val., 1830: 132 (Cape of Good Hope). *Chrysoblephus cristiceps:* Smith, 1938: 264*; Smith, 1943: 50* juv.; **SFSA No. 720*;** Smith & Smith, 1966: 56*; Robinson, 1976: 43*; van der Elst, 1981: 308*.

D XII,10; A III,8; P 16; LL 59-61; GR (6-7)+(10-13); depth 2.0-2.25.

Marked change in colour and markings from juvenile to adult (see Plate). Adults at death one of the most beautiful of all creatures as waves of different colours pass over the body, hence the early Dutch name of "dageraad", dawn. Attains 75 cm. Found only from the Cape to Natal. Taken in fair numbers by line boats on almost any bait; most abundant on the Cape south coast, where it shoals in deepish water (down to 100 m) over rocky banks. Not often caught from the shore. Flesh good.

183.10 *Chrysoblephus gibbiceps*
(Valenciennes, 1830)
PLATE 59

Red stumpnose — Rooistompneus

Chrysophrys gibbiceps Valenciennes, *in* Cuv. & Val.,21830: 127, Pl. 147 (Cape of Good Hope). *Chrysoblephus gibbiceps:* Smith, 1938: 267; **SFSA No. 725***; Smith & Smith, 1966: 60*; van der Elst, 1981: 309*.

D XI-XII,10-11; A III,7-9; P 17; LL 52-55; GR (6-7)+(10-12); depth 2.0-2.4.

Sometimes darker crossbars. Attains 75 cm. Adult males develop a big hump on forehead. A rather untidy-looking fish. Found only from the Cape to Natal, rarely in Natal waters, mostly in deepish water. Spawning period spring to summer. Of considerable commercial significance about the Cape. Flesh good. Said to occur in Australian waters, but this needs confirmation.

183.11 *Chrysoblephus laticeps*
(Valenciennes, 1830)
PLATE 59

Roman — Roman

Chrysophrys laticeps Valenciennes, *in* Cuv. & Val., 1830: 122 (Cape of Good Hope). *Chrysoblephus algoensis* Castelnau, 1861: 22 (Algoa Bay). *Chrysophrys pugicephalus* Gilchrist & Thompson, 1909: 234 (off Durban). *Chrysoblephus laticeps:* Smith, 1938: 263, **SFSA No. 721***; Smith & Smith, 1966: 57*; Penrith, 1972: 135*; van der Elst, 1981: 310*.

D XI-XII,10-11; A III,7-9; P 17-18; LL 58-64; GR (6-7)+(10-12); depth 2.3-2.5.

Usually reddish orange, but a blue colour variety is known and shows the white patch on the side. Attains at least 50 cm. These fishes are first gregarious females, then with growth they change sex and become solitary, territorial males, each living in its own particular cave (van der Elst, 1981). Spawns during summer. Occurs from the Cape to Mauritius. Favours rocky ground in deepish water (to 100 m) but often taken from shore. Voracious but sluggish; takes any bait. Flesh good. Fresh from the water or even in an aquarium it is a gorgeous creature.

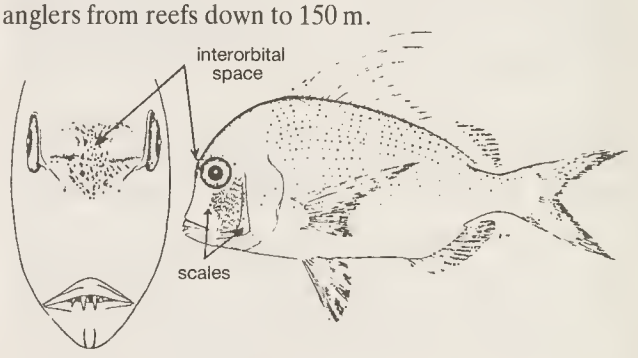
183.12 *Chrysoblephus lophus*
(Fowler, 1925)
PLATE 59

False Englishman — Vals Engelsman

Sparus lophus Fowler, 1925: 234, Fig. 3 (Natal). *Chrysoblephus lophus:* Smith, 1938: 268; **SFSA No. 723***; van der Elst, 1981: 311*.

D XI,10; A III,9; P 16-17; LL 55-58; GR (7-9)+(10-13); depth 2.0-2.25; 3rd D spine about as long as or longer than head, probably reduces with age.

Immediately recognisable by red and yellow lines across naked bony interorbital which becomes more corrugated and pitted with age. Attains 50 cm. Spawns in spring. Previously confused with *C. gibbiceps*. Known only from Natal where it is caught by line fishermen and ski-boat anglers from reefs down to 150 m.



183.12 *Chrysoblephus lophus:* bony interorbital space, front and lateral views (after Bauchot & Smith, 1984).

183.13 *Chrysoblephus puniceus*
(Gilchrist & Thompson, 1908)
PLATES 59 & 62

Slinger — Slinger

Chrysoblephus puniceus Gilchrist & Thompson, 1908: 173 (Natal); Smith, 1938: 265*; 1943: 52* juvenile; **SFSA No. 722***; van der Elst, 1981: 312*.

D XII,10; A III,8; P 16; LL 49-52; GR (9-12)+(14-16); depth about 2.

Adults have a trenchant nape, a more prominent hump above eyes and longer C lobes than half-grown fishes. Attains 85 cm. Often caught with fish bait from boats in deepish water (down to 100 m) along the east coast. Its shoaling habits and great numbers make it probably the most important food-fish off Natal and southern Mozambique; occasional migrants reach East London, and small juveniles are sometimes found at Knysna. Apparently occurs in numbers on banks about Madagascar. Spawning occurs off Natal during the summer when this species is most plentiful.

Genus ***Crenidens*** Valenciennes, 1830

Jaws with 2 series of incisors (sometimes a third series in upper jaw); cutting edge of each with 5 points, 3 median

points distinct. Outer teeth movable, with brown edges; several rows of small molars within. One species.

183.14 *Crenidens crenidens*
(Forsskål, 1775)
PLATE 59

Karanteen Karanteen

Sparus crenidens Forsskål, 1775: xv, 15 (Djedda, Red Sea and Suez). *Crenidens crenidens:* Smith, 1938: 361*; **SFSA No. 732*;** van der Elst, 1981: 313*.

D XI,11; A III,10; P 13-14; LL 50-60; GR (6-8)+(9-11); depth 2.5. No scales between eyes, on preopercle flange, or on soft D or A, but these fins with marked basal sheath. Cheeks scaly.

Attains 30 cm. A small shoaling species known from Red Sea and Persian Gulf to Durban, rarely as far as East London; spawns in tropical waters. Caught on shrimp or prawn with a small hook. Excellent bait. May always be recognised by the generally dull colouring and the brown crenulate tips of outer teeth. Quite good eating.

183.14 *Crenidens crenidens:* upper and lower teeth (after Bauchot & Smith, 1984).

Genus ***Cymatoceps*** Smith, 1938

Head between eyes scaly, also bases of soft D and A. Preopercle flange partly scaly. One large species, found only in South Africa.

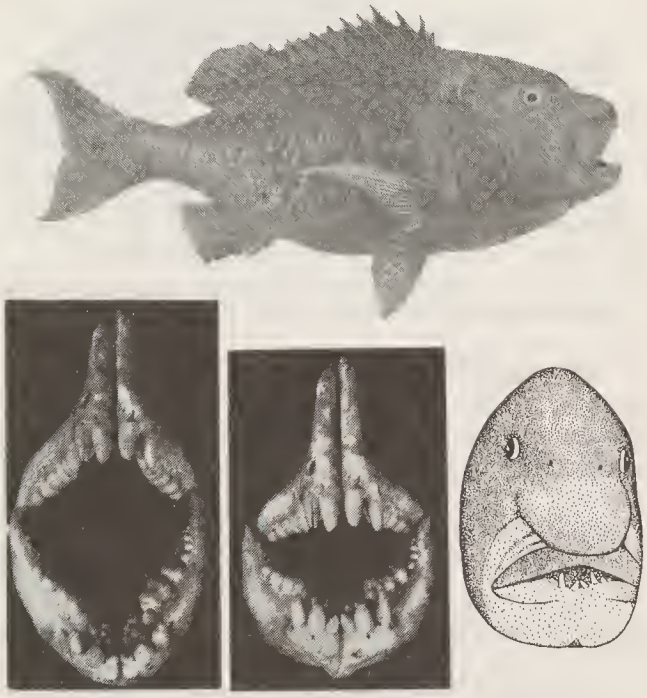
183.15 *Cymatoceps nasutus*
(Castelnau, 1861)
PLATE 59

Black musselcracker Poenskop

Chrysophrys nasutus Castelnau, 1861: 24 (Table Bay). *Pagrus nigripinnis* Boulenger, 1903: 67, Pl. 7 (Natal). *Cymatoceps nasutus:* Smith, 1938: 260*; **SFSA No. 719*;** Smith & Smith, 1966: 51*; van der Elst, 1981: 314*.

D XII,10; A III,8; P 16-17; LL 61-65; GR (6-8)+(10-11); depth 2.3-2.5. In front of upper jaw 4 large conical teeth, 4-6 in lower, 2 series of rounded molars behind in each jaw, not nearly as massive as those of *Sparodon durbanensis* and none oval (see Fig. 183.40).

Adults develop a large fleshy "nose". Not uncommon in all sizes up to 20 kg, this is a solitary, sluggish but powerful species that attains over 45 kg and about 130 cm. Nowhere abundant, it frequents rocky areas from the Cape to Natal, often feeding in shallow water, but rarely entering estuaries. One of our premier angling fishes. Takes almost any bait and fights doggedly but is not speedy. The flesh of large specimens is coarse. In some areas the body used to be cooked for pigs or dogs, while the head was retained as a delicacy.



183.15 *Cymatoceps nasutus:* 127 cm (East London, photo G.G. Smith) and front view of large male to show "nose", jaws to show teeth.

Genus ***Diplodus*** Rafinesque, 1810

Preopercle flange not scaly. More than 50 scales in LL. About 10 species represented on both sides of the North Atlantic Ocean; 2 species in our area (one subspecies endemic to southern Africa and the other reaches Madagascar). Although Bauchot (1981) states that the Atlantic *Diplodus vulgaris* (Geoffroy St. Hilaire, 1817) reaches South Africa, she was unable to confirm this (personal communication). It differs from *D. sargus capensis* in having a dark band across nape. *Diplodus puntazzo* (Cetti, 1777) of the northwest coast of Africa was erroneously included in the South African fish fauna by Barnard (1927: 709) and Smith (**SFSA No. 712**). This error was based on a specimen from Mossel Bay sent to the British Museum by J.D.F. Gilchrist in 1900 and the presumed synonymy of *D. puntazzo* with *Charax capensis* Castelnau, 1861. The specimen from Mossel Bay, recently examined by Dr P.J.P. Whitehead of the British Museum, proves to be *D. cervinus hottentotus*. The species description of *Charax capensis* by Castelnau (a notoriously inaccurate worker) does not fit any known sparid fish and is best regarded as a doubtful species (*nomen dubium*).

KEY TO SPECIES

1a Body yellowish, with 5 broad black crossbars dorsally, between which are small bars up from belly; A III,11 ..... *D. cervinus hottentotus*

1b Body uniform silver, with large black saddle on C peduncle; A III,13-14 ..... *D. sargus capensis*

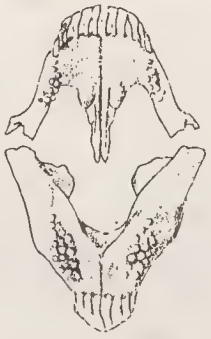
183.16 *Diplodus cervinus hottentotus*
(Smith, 1844)
PLATE 60

Zebra Wildeperd

Sargus hottentotus Smith, 1844, Pl. 23, Fig. 1 (South Africa). *Diplodus trifasciatus:* Smith, 1938: 254*; **SFSA No. 714*;** Smith & Smith, 1966: 41*. *Diplodus cervinus:* Bauchot & Daget, 1971: 322; Smith, 1975: 53; van der Elst, 1981: 315*. *Diplodus cervinus hottentotus:* Smith, 1981: 180.

D XI,12-13; A III,11; P 15; LL 60-67; GR (7-9)+(9-10); depth 2.0-2.25; 12 inclined incisors in front of upper jaw. Lips rather thick.

Young are often bright yellow between the crossbars. *D. cervinus hottentotus* differs from the Mediterranean/Atlantic subspecies *D. cervinus cervinus* Valenciennes, 1843 in having more LL scales and small black bars up from belly between first 3 body bars. Spawns along our south coast during summer. Attains 60 cm. From the Cape to Sodwana Bay down to 60 m. Rather like *Diplodus sargus capensis* in habits, but even more wary and difficult to hook. Fights gamely on light tackle; large specimens, while being played on a line, resemble a disc of gold, especially when catching the oblique rays of the setting sun. Flesh good, but a freshly landed zebra emits a powerful, rather nauseating odour.



183.16 *Diplodus cervinus hottentotus:* upper and lower jaws to show teeth (after Bauchot & Smith, 1984).

183.17 *Diplodus sargus capensis*
(Smith, 1844)
PLATE 60

Blacktail Dassie

Sargus capensis Smith, 1844: Pl. 23, Fig. 2 (South Africa). *Diplodus rondeleti var capensis:* Barnard, 1927: 691. *Diplodus sargus:* Smith, 1938: 253; **SFSA No. 713*;** Smith & Smith, 1966: 40*; van der Elst, 1981: 316*. *Diplodus sargus capensis:* Smith, 1981: 180.

D XII,14-15; A III,13-14; P 16-17; LL 62-72; GR (6+8)+(8-11); depth 2.0-2.25; 8 large inclined incisors in front of upper jaw.

Very young fishes show fine crossbars; large adults become almost uniformly black. Attains 45 cm. From Angola to Mozambique and southern Madagascar and possibly reaches Mauritius; prefers rocky ground and enters estuaries. Spawns all year round and is hermaphroditic. A voracious but cunning fish that will take almost any bait, but is not easily hooked in clear water or with coarse tackle. About the best fighter of our inshore angling fishes. It was J.L.B. Smith's considered opinion that mass for mass the blacktail has twice the vigour of any trout. Hardly of commercial significance. Often used as bait; excellent eating.

183.17 *Diplodus sargus capensis:* upper and lower jaws to show teeth (after Bauchot & Smith, 1984).

Genus ***Gymnocrotaphus*** Günther, 1859

Head naked except for opercles. Prominent curved incisors around each jaw and a band of smaller conical teeth within; a few innermost teeth are small molars. One species, endemic to South Africa.

183.18 *Gymnocrotaphus curvidens*
Günther, 1859
PLATE 60

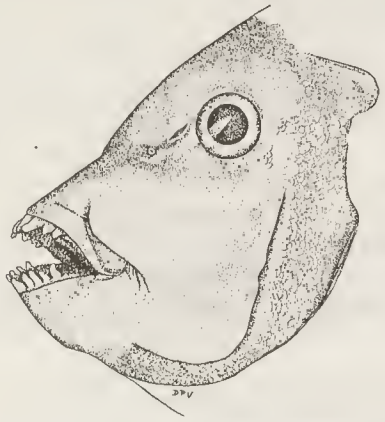
Janbruin Janbruin

Gymnocrotaphus curvidens Günther, 1859: 432 (Cape of Good Hope); Smith, 1938: 280*; **SFSA No. 730*;** Smith & Smith, 1966: 67*.

D X,11-12; A III,9-10; P 17; LL 64-68; GR (5-6)+(7-9); depth 2.25. Body plump. No scales on cheek below eye or between eyes, nor on preopercle flange. Soft D and A scaly at base.

From 4 cm in length, the young resemble adults in shape and coloration. The beautiful deep blue eye of the fresh fish is characteristic and unique. The brown of the live fish fades rapidly, leaving orange lines along the scale rows. Sometimes shows narrow dark crossbars. Attains 50 cm. From the Cape to Durban, mostly in shallow water in

rocky areas, but also found down to 80 m; nowhere abundant. Usually taken from rocks on redbait, rare for more than 2 to be caught in one spot. A shapely fish. Flesh excellent.



183.18 *Gymnocrotaphus curvidens:* head to show teeth of large specimen.

Genus ***Lithognathus*** Swainson, 1839

Silvery body, with fairly large scales, none between eyes, on preopercle flange or on soft D and A. Mouth protrusible, snout long. Teeth feeble, single outer series pointed, 2 or more inner series of small molars, inner posterior teeth larger. Three species of shallow water, 2 endemic.

KEY TO SPECIES

1a LL 60-65; D XI,12-13 and A III,10-11; more than 10 dark narrow crossbars on body ..... *L. mormyrus*
1b LL 44-51; D XI,9-10 and A III,8-9; 7 wide dark crossbars on body that fade with age 2

2a Head length short, about equal to P length in juveniles and less than P in adults; C peduncle depth 2.3-2.6 in head ..... *L. aureti*
2b Head length longer, about equal to body depth, always longer than P length; C peduncle depth 3.0-3.5 in head ..... *L. lithognathus*

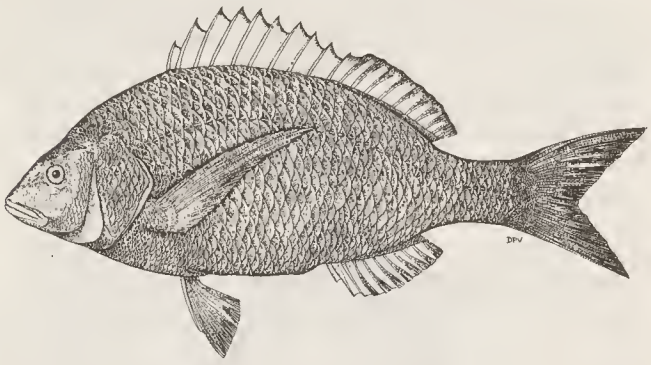
183.19 *Lithognathus aureti*
Smith, 1962

Westcoast steenbras — Weskus-steenbras

Lithognathus aureti Smith, 1962: 112, Pl. 2 (Walvis Bay); van der Elst, 1981: 317*. *Pagellus lithognathus* (*non* Cuvier): Schultz, 1907: 9; Schnakenbeck, 1931: 24*; Poll, 1954: 330*. *Lithognathus olivieri* Penrith & Penrith, 1969: 100, Pl. 1 (Angra Fria: 18°17′S,11°57′E).

D XI,9-10; A III,8-9; P 15-16; LL 45-49; GR (8-9)+13; depth 2.4-2.6. Lips moderate. Previously confused with *L. lithognathus* but adults easily distinguished (see Key). Jaws with outer row of 10-12 enlarged sharp conical teeth, becoming blunter with age; inner teeth molariform, rows increasing with age.

Attains at least 1 m. A famous angling fish from Cape Town to Angola, sometimes occurring in great shoals from Walvis Bay northwards, especially during spring and summer (its spawning period). This species is probably protogynous but specimens sometimes have both male and female gonads well developed at the same time.



183.19 *Lithognathus aureti:* 61 cm holotype (Walvis Bay).

183.20 *Lithognathus lithognathus*
(Cuvier, 1830)
PLATE 60

White steenbras — Witsteenbras

Pagellus lithognathus Cuvier, *in* Cuv. & Val., 1830: 204, Pl. 151 (Cape of Good Hope). *Lithognathus capensis* Swainson, 1839: 222 (on Cuvier, 1830). *Lithognathus lithognathus:* Smith, 1938: 277; **SFSA No. 726*;** Smith, 1962: 111*; Smith & Smith, 1966: 65*; van der Elst, 1981: 318*.

D XI,10; A III,8; P 16-17; LL 44-51; GR (8-10)+(15-16); depth 2.7-3.2. Lips thick in adults. Teeth in bands, feeble, pointed, 2 series of small molars within.

Mainly silvery, crossbars fade with age. Attains 2 m. Known only from Orange River mouth to Natal; prefers sandy areas. Enters lagoons freely, even large individuals penetrating to shallow water, where they may be stunned by rifle fire from adjacent heights. In July 1944, many fishes averaging 14 kg were found stranded in a Transkeian river mouth. Tails may be seen waving above the water as the fishes nose into the sand, blowing small creatures from their burrows. Able to send out a powerful jet of water, a fish when hooked not uncommonly blows a bait some metres up a line. Only rather seldom are numbers taken on any one occasion by an angler, then chiefly in the early morning hours from sandy beaches. This is a famous, vigorous and much-prized angling fish, which when hooked, starts off with great speed and often breaks loose. Takes most baits, fish only rarely. Flesh excellent. Juveniles use estuaries as nurseries although adults spawn in the sea from June to August.

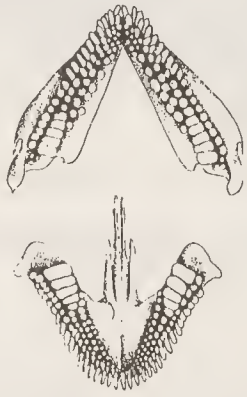
183.21 *Lithognathus mormyrus*
(Linnaeus, 1758)
PLATE 60

Sand steenbras — Sandsteenbras

Sparus mormyrus Linnaeus, 1758: 281 (Mediterranean Sea). *Lithognathus mormyrus:* Smith, 1938: 278*; **SFSA No. 727*;** 1962: 111*; Smith & Smith, 1966: 66*; Bauchot et al., 1981: Litho 1*.

D XI,12-13; A III,10-11; P 15-17; LL 60-65; GR (8-10)+(15-17); depth 2.75. Fine pointed teeth externally, with 2 or 3 series of small molars within; lips thin.

Smaller than our other species of *Lithognathus,* attaining 55 cm. Mediterranean to the Cape and round our coast to Mozambique; recorded from Red Sea, but none found in tropical east Africa. Not abundant; caught by anglers using small hooks mainly in sandy areas of estuaries and down to 30 m; flesh excellent. Spawns in the sea during summer.



183.21 *Lithognathus mormyrus*: upper and lower jaws (after Bauchot & Smith, 1984).

Genus ***Pachymetopon*** Günther, 1859

About 5 rows of incisors round each jaw, no molars. Interorbital naked; soft D and A scaly basally. Three rather plump-bodied fishes found only in South Africa (one reported to reach Madagascar).

KEY TO SPECIES

1a P about as long as head; lower GR 13-14; LL 60-65 ..... *P. blochii*
1b P distinctly longer than head; LL 80-86 2

2a Scales on inner margin of preopercle flange; lower GR 15-18 ..... *P. aeneum*
2b Entire preopercle flange naked; lower GR 10-13 ..... *P. grande*

183.22 *Pachymetopon aeneum*
(Gilchrist & Thompson, 1908)
PLATE 60

Blue hottentot — Blou hottentot

Cantharus aeneus Gilchrist & Thompson, 1908: 166 (Natal). *Cantharus natalensis* Gilchrist & Thompson, 1908: 167 (Natal). *Cantharus simus* Gilchrist & Thompson, 1909: 231 (Durban). *Pachymetopon aeneum:* Smith, 1938: 286; **SFSA No. 737*;** Smith & Smith, 1966: 55*; Smith, 1981: 180; van der Elst, 1981: 320*.

D X-XI,11-13; A III,10; P 17; LL 80-86; Tr. 10/22; GR (6-8)+(15-18); depth 2.2-2.5. Pug-like snout, with characteristic bulge between eyes.

Fresh from the water, this species is of great beauty, with cobalt blue head and blue-streaked bronzy-yellow body. No artist may hope to portray these colours in their natural brilliance. Attains 50 cm. Known only from the Cape to Sodwana Bay. Not often taken by shore anglers, then as a rule only on rocky banks in rather deep water, chiefly on redbait. Flesh excellent.

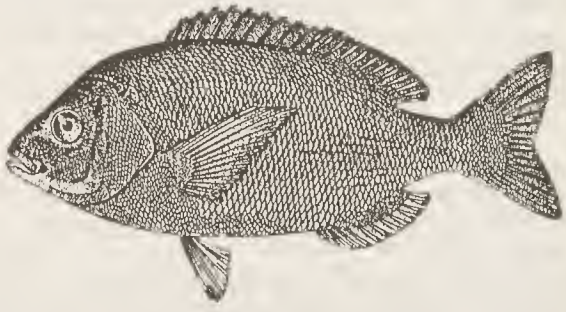
183.23 *Pachymetopon blochii*
(Valenciennes, 1830)
PLATE 60

Hottentot — Hottentot

Cantharus Blochii Valenciennes, *in* Cuv. & Val., 1830: 339 (Cape of Good Hope). *Cantharus castelnau* Bleeker, 1860: 59 (Cape of Good Hope). *Pachymetopon blochii:* Smith, 1938: 285; **SFSA No. 736*;** van der Elst, 1981: 321*. *Pachymetopon canescens* Norman, 1935: 14, Pl. 2 (False Bay).

D X-XI,11-12; A III,10; P 17; LL 60-65; GR (7-8)+(13-14); depth 2.2-2.5. No scales on preopercle flange.

Bronzy brown, lighter below. Attains 46 cm. West coast of South Africa north to Angola, rarely east of Cape Agulhas. Spawns mainly in summer. A common food-fish of the Cape. Not of much significance as an angling fish, occasionally taken in fair numbers from deepish rocky areas.



183 *Pachymetopon blochii:* 31 cm (after Norman, 1935).

183.24 *Pachymetopon grande*
Günther, 1859
PLATE 60

Bronze bream — Bruin hottentot

Pachymetopon grande Günther, 1859: 424 (no locality); Smith, 1938: 365; **SFSA No. 738*;** Smith & Smith, 1966: 54*; van der Elst, 1981: 322*. *Pachymetopon guntheri* Steindachner, 1870: 135 (Cape of Good Hope). *Pachymetopon glaucum* Norman, 1935: 20, Fig. 6 (East London).

D XI,11; A III,10-11; P 17-18; LL 80-85; GR (5-7)+(10-13); depth 2.0-2.3.

Old fishes develop a marked bulge between eyes. Attains 65 cm. Found only from the Cape to Madagascar, in rather shallow water in rocky areas, feeding mainly on seaweeds, and spawning during winter and spring. A premier angling fish, taking only the freshest of redbait or prawn, and can be

most difficult to hook, but at times bites fiercely and fights gamely. J.L.B. Smith (**SFSA**) records 14 different common names for this fish! A beautiful fish: in the water, the head side-on is iridescent blue and sharply differentiated from the bronzy body. Highly esteemed as a food-fish, sometimes taken in fair numbers by rock anglers, but not sufficiently abundant to be of commercial significance. Numbers are often thrown ashore, numbed or dead, when cold water upwelling occurs at Knysna. Preyed on by larger fishes, a strip of its flesh is excellent bait. Once at Knysna a specimen of about 1.5 kg jumped onto a rocky ledge at the water's edge to escape from a large pursuing red steenbras which, with head out of the water, snapped at it and then made off; the bronze bream slipped away with the next wave.

Genus ***Pagellus*** Cuvier, 1829

Body mainly pink; only one subspecies of *P. bellottii* Steindachner, 1882 from the Atlantic in our area (M.L. Bauchot, personal communication).

183.25 *Pagellus bellottii natalensis*
Steindachner, 1902
PLATE 60

Red tjor-tjor — Rooi tjortjor

Pagellus natalensis Steindachner, 1902: 134 (Durban); Smith, 1938: 374*; **SFSA No. 728***; Smith & Smith, 1966: 91*; van der Elst, 1981: 323*.

D XII,10-11; A III,10; P 16; LL 60-67; GR (5-6)+(10-13); depth 2.75-3.0. No scales on preopercle flange, nor on soft D and A. Hind nostrils circular. Small pointed teeth in jaws, and 2 series of small molars within.

Attains 30 cm. This subspecies occurs only from about Mossel Bay to Madagascar, abundant in fairly deep water. Often thrown up when cold upwelling occurs on the Cape south coast. Taken commonly by trawl, but because of its small size is of little commercial value. Grunts when taken from the water.

183.25 *Pagellus bellottii natalensis:* upper and lower jaws to show teeth (after Bauchot & Smith, 1984).

Genus ***Petrus*** Smith, 1938

GR short. Soft D and A with heavy, fleshy, scaly bases. A single species found only in South Africa.

183.26 *Petrus rupestris*
(Valenciennes, 1830)
PLATE 61

Red steenbras — Rooi steenbras

Dentex rupestris Valenciennes, *in* Cuv. & Val., 1830: 231 (Cape of Good Hope); Smith, 1841: Pl. 14. *Dentex brevis* Kner, 1865: 63 (Cape of Good Hope). *Petrus rupestris:* Smith, 1938: 303; **SFSA No. 741***; Smith & Smith, 1966: 62*; van der Elst, 1981: 324*.

D XI,10-11; A III,8; P 16-17; LL 57-63; GR (5-7)+(9-11); depth 2.5-3.0. Partly scaly between eyes and on preopercle flange. Four powerful canines in front of upper, 4-6 in front of lower jaw, with fine teeth behind in a band in each jaw. Ridge above eye increases with age.

Usually reddish or bronzy, but on soft bottoms from Mossel Bay to Natal it is a beautiful golden yellow. The young have a blotch, almost a crossbar, behind D. Adults become more solitary and territorial with age. Attains over 2 m and 70 kg. Found among reefs or rocks in deep water from the Cape to Natal, occasionally enters deep estuaries.

One of the premier gamefishes of South Africa, takes fish baits, preferably live. A great fighter, to be treated with respect, as powerful jaws with large fangs can inflict serious wounds, severing fingers with ease. The mucus on the teeth contains an anticoagulant. Deep-sea line fishermen assert that on the Agulhas Bank this species attains a mass of "several hundred pounds" and that large specimens will attack men in the water. It has even been said that many survivors from the wreck of the *Birkenhead* were mutilated by this fish, but this is questionable as the fish feeds mainly on bottom-dwelling creatures, especially octopi. Not uncommonly taken by trawlers, but seldom by spearfishermen. Flesh excellent, but the liver (like that of the polar bear) has an exceedingly high Vitamin A content and causes poisoning, with the loss of skin and hair.

Genus ***Polyamblyodon*** Norman, 1935

Interorbital naked; soft D and A scaly at base. Two rather rare fishes from tropical waters of our east coast. They change in shape with growth so that identification may be difficult.

KEY TO SPECIES

1a P rays 17; D rays 11 or 12; V reach anus ..... *P. germanum*
1b P rays 15; D rays 13; V do not reach anus ..... *P. gibbosum*

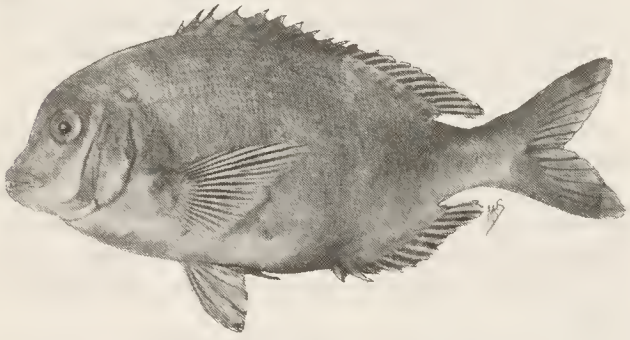
183.27 *Polyamblyodon germanum*
(Barnard, 1934)

German — Duitser

Pachymetopon germanum Barnard, 1934: 230, Fig. 2 (locality unknown, probably Natal). *Polyamblyodon germanum:* Smith, 1938: 288; **SFSA No. 735*.**

D XI,11-12; A III,10-11; P 17; LL 67-71; GR (7-8)+(14-16); depth 2.2-2.5. Nape not sharp. No scales on preopercle flange.

Grey-blue to bronzy, lighter below, forehead, cheeks and fins darker. Easily confused with *Pachymetopon grande,* but the teeth are distinctive (see Key to Genera). Attains 45 cm. Caught in deeper water from East London to Delagoa Bay; not uncommon on reefs off Transkei. Flesh excellent.



183.27 *Polyamblyodon germanum:* 29 cm (off East London).

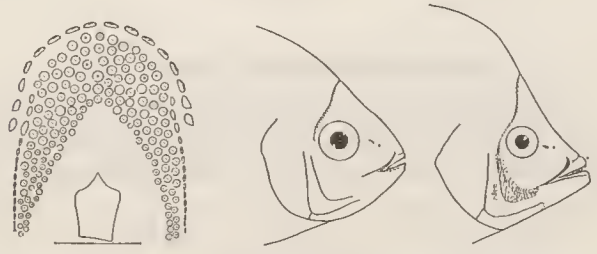
183.28 *Polyamblyodon gibbosum*
(Pellegrin, 1914)

Cristie — Kristie

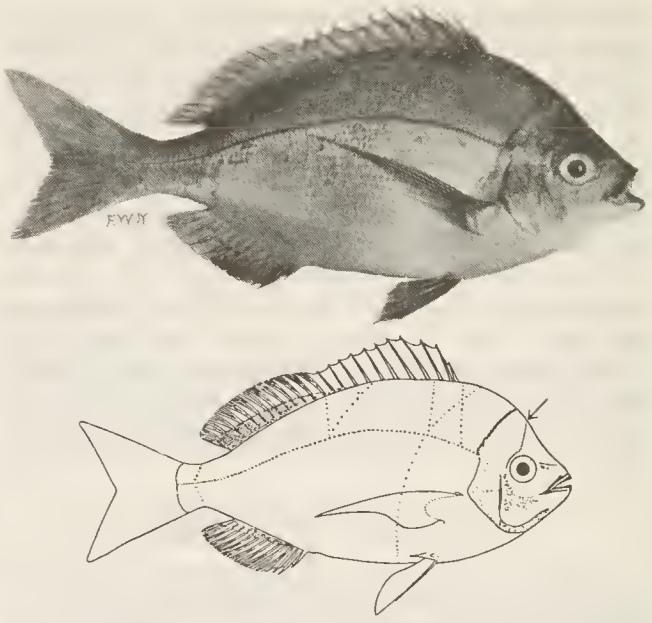
Pachymetopon gibbosus Pellegrin, 1914: 264 (Madagascar). *Polyamblyodon (Leptometopon) cristiceps* Smith, 1940: 178, Figs. 1, 2 (Delagoa Bay). *Polyamblyodon cristiceps:* Smith, **SFSA No. 734*.** *Polyamblyodon gibbosum:* Smith, **SFSA No. 733*.**

D XI,13; A III,10-11; P 15; LL 72-78; GR (6-8)+(15-18); depth 2.0-2.3. Nape sharpens with age. A small patch of embedded scales on preopercle flange, sometimes difficult to see.

Grey-blue. Attains 50 cm; Natal to Beira and Madagascar.



183.28 *Polyamblyodon gibbosum:* change in profile shape with growth; semi-diagrammatic dentition in lower jaw of 51 cm type specimen of *P. cristiceps;* inset (centre) a posterior molariform tooth (after Smith, 1940).



183.28 *Polyamblyodon gibbosum:* 26 cm (photo); 32 cm holotype of *P. cristiceps,* rows of dots show number and disposition of scale rows, arrow indicates anterior margin of scaling on head (both S. Mozambique).

Genus ***Polysteganus*** Klunzinger, 1870

D spines 11 or 12; Interorbital and preopercle flange scaly; D & A not scaly. Front canines not very strong; 4 in upper and 6 (10 smaller in *P. macrophthalmus* and 4 in *P. baissaci*) in lower jaw. Four species in South Africa, 2 found nowhere else. *P. baissaci* Smith, 1978 from Mauritius was for many years confused with *P. undulosus,* but lacks the black blotch on the side, has only 4 enlarged canines in lower jaw and 11 GR on lower arch. The genus *Polysteganus* is considered by some to be a subgenus of *Dentex.*

KEY TO SPECIES

1a Eye diameter greater than snout; lower GR 17-20 (west coast) ..... *P. macrophthalmus*
1b Eye diameter less than snout; lower GR 11-16 (east coast) 2

2a Large dark blotch on side below 6th D spine; lower GR 14-16 ..... *P. undulosus*
2b No dark blotch on side 3

3a Eye diameter less than preorbital depth; scales above LL much smaller than those below; lower GR 15-16 ..... *P. praeorbitalis*
3b Eye diameter not less than preorbital depth; scales on body all about same size; lower GR 11-13 ..... *P. coeruleopunctatus*

183.29 *Polysteganus coeruleopunctatus*
Klunzinger, 1870
PLATE 61

Blueskin — Blouvel

Polysteganus coeruleopunctatus Klunzinger, 1870: 763 (Red Sea); Smith, 1938: 296; **SFSA No. 744*;** van der Elst, 1981: 326*. *Dentex*

lineopunctatus Boulenger, 1903: 66, Pl. 6 (Natal). *Dentex natalensis* Gilchrist & Thompson, 1908: 156 (Natal).

D XII,10; A III,8; P 16; LL 52-56; GR (7-8)+(11-13); depth 2.4, greater than head length. P longer than head. Profile of head smoothly convex. Preorbital depth about ¾ of eye diameter.

The fairly large liquid eye, the red to pink body and blue spots are characteristic of the live fish. Attains 60 cm. Red Sea to Natal south coast, where it frequents reefs, especially during winter, down to 100 m. Not of any great commercial significance in South Africa, but caught by line fishermen and ski-boat anglers. Flesh good.

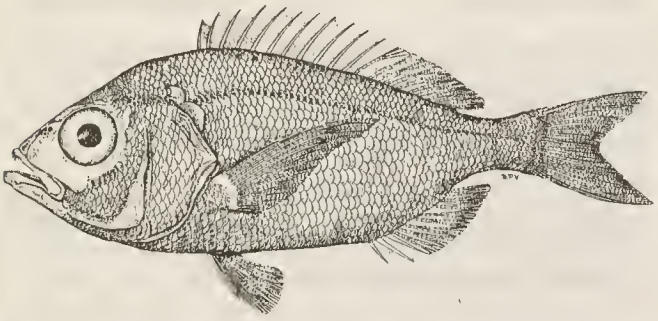
183.30 *Polysteganus macrophthalmus*
(Bloch, 1791)

Large-eyed dentex — Grootoog-denteks

Sparus macrophthalmus Bloch, 1791: 93, Pl. 272 (locality unknown). *Dentex macrophthalmus:* Barnard, 1927: 717; Schnakenbeck, 1931: 25; Bauchot et al., 1981: Dent 3*. *Dentex (Polysteganus) macrophathalmus* Poll, 1971: 25*.

D XI-XII,10-11; A III,8; P 16-17; LL 49-55; GR (9-12)+(17-20). Eye large, diameter 2.5-3.5 in head, greater than interorbital width; preopercle flange scaly; scaling on head does not extend beyond vertical at front margin of eye.

Attains 65 cm. Body and fins reddish; A and lower part of C edged with white. A rare visitor to Walvis Bay, known from rocky or sandy bottoms from 30 m to 500 m in the Mediterranean and west coast of Africa where it is reported to spawn intermittently from October to April.



183.30 *Polysteganus macrophthalmus:* 32 cm (Walvis Bay).

183.31 *Polysteganus praeorbitalis*
(Günther, 1859)
PLATE 61

Scotsman — Skotsman

Dentex praeorbitalis Günther, 1859: 368 ("Cape Seas"). *Polysteganus praeorbitalis:* Smith, 1938: 301*; **SFSA No. 743***; van der Elst, 1981: 327*.

D XII,10; A III,8; P 15-16; LL 59-63; GR 10+(15-16); depth 2.5-2.8. P subequal to head. Profile of head smooth. Preorbital deep, 1.5-2.0 times eye diameter.

The small eye, deep preorbital and steep forehead are characteristic. A beautiful fish, in colour very similar to a *Lethrinus*. Attains 90 cm. Known only from Algoa Bay to Beira, in deepish water (20 - 100 m), rarely caught by shore anglers. Spawns in winter. Flesh good.

183.32 *Polysteganus undulosus*
(Regan, 1908)
PLATE 61

Seventy-four — Vier-en-sewentig

Dentex undulosus Regan, 1908: 252, Pl. 40 (South Africa). *Polysteganus undulosus:* Smith, 1938: 298*, **SFSA No. 742***; Smith & Smith, 1966: 61*; van der Elst, 1981: 328*.

D XII,10; A III,8-9; P 16; LL 58-62; GR (8-10)+(14-16); depth 2.4-2.9. P equals head in young, longer than head in adults. Profile of head evenly convex, but some large adults develop a prominent hump above the eyes. Preorbital depth mostly less than eye, sometimes just greater in biggest fishes.

Attains over 1 m and 15 kg. Spawns during late winter and early spring over reefs off the Natal coast. Known only from the Cape to Delagoa Bay, in deep water. At one time abundant, even taken by shore anglers from deeper water, this elegant fish has become scarce in recent years. The flesh is greatly esteemed. Name supposedly derived from lines on body resembling rows of gun ports along the sides of the old "seventy-four" man-of-war.

Genus ***Porcostoma*** Smith, 1938

Head scaly between eyes. Soft D and A scaly at base. One species with characteristic black streak along first few LL scales. Looks much like a wrasse (Family Labridae).

183.33 *Porcostoma dentata*
(Gilchrist & Thompson, 1908)
PLATES 61 & 62

Dane — Deen

Chrysophrys dentatus Gilchrist & Thompson, 1908: 173 (Natal). *Porcostoma dentata:* Smith, 1938: 271*; **SFSA No. 717***; van der Elst, 1981: 329*.

D XIII,10-11; A III,8-9; P 17-18; LL 71-73; GR (4-7)+(11-13); depth 2.5. Plump body. Preopercle flange partly scaly. In upper jaw 4, in lower 6 projecting canines. C lobes rounded.

Juveniles of 50 mm are yellow, with 2 black blotches on body below D. Attains 30 cm. Occurs only in southern Africa, mainly between Durban and Beira, down to 120 m. Occasional strays reach Algoa Bay, and small juveniles are found offshore along the Cape south coast to near Knysna in about 20 m around rocky outcrops. Spawns during spring. Plentiful at times on Natal reefs; takes almost any bait. Flesh good.

Genus ***Pterogymnus*** Smith, 1938

Head between eyes and preopercle flange scaly. D spines

12. Soft D and A not scaly, but with scaly basal sheath. One species, found only in southern Africa.

183.34 *Pterogymnus laniarius*
(Cuvier, 1830)
PLATE 61

Panga — Panga

Pagrus laniarius Cuvier, *in* Cuv. & Val., 1830: 163 (Cape of Good Hope). ?*Pagellus afer* Pappe, 1853: 204 (Cape of Good Hope). *Chrysophrys laniarius:* Gilchrist, 1902: 112. *Pterogymnus laniarius:* Smith, 1938: 258*; **SFSA No. 718*;** Smith & Smith, 1966: 59*; van der Elst, 1981: 330*.

D XII,10; A III,8; P 15-16; LL 56-59; GR (7-9)+(11-13); depth 2.3-2.5. In upper jaw 4, in lower 6 canines, the outer pair in each jaw flaring outwards, 2 series of molars within. Lips of adults villose, almost furry.

Attains 40 cm. Probably the most plentiful sparid fish in South Africa, occurring from the Cape abundantly to East London; reaches Beira, but rare there. Normally inhabits deepish water, 20 - 140 m, taken by trawl and line-boats on any flesh bait. Does not rank as an angling fish. Too small to be a first-rate food-fish, but flesh good. Easily recognised by the furry lips, flaring canines and the cavernous mandibles. Spawns from late spring to early autumn. At times, for about a month, mostly in midwinter, this fish congregates in certain restricted areas in vast numbers. In one place about 40 kilometres from the Tsitsikama shore in 80 - 120 m a trawler took 20 tons in less than an hour of trawling.

Genus ***Rhabdosargus*** Fowler, 1933

Austrosparus Smith, 1938 is a synonym. More than 50 scales in LL. Jaws with 4-8 enlarged, subequal incisiform teeth at front, followed by 3 or more rows of molars. Interorbital and soft D and A naked. Preopercle flange naked or with a few scales. Four species, 3 endemic to South Africa.

KEY TO SPECIES

1a Body with 6-7 narrow, dusky crossbars; P 1.1-1.2 times head length; P rays 16-17 ..... *R. globiceps*
1b Body with no crossbars or at most very faint; P 1.2-1.3 times head length; P rays 14-15 2

2a Golden mid-lateral stripe along body; a few scales on preopercle flange; anterior teeth in juveniles tricuspid ..... *R. holubi*
2b Golden marks mainly on lower surface; preopercle flange entirely naked, anterior teeth in juveniles not tricuspid 3

3a A III,11; lower GR 7-9; bright yellow flare first up from V then backwards to end before or above A origin ..... *R. sarba*
3b A III,12; lower GR 10-12; whole ventral area including V and A bright yellow ..... *R. thorpei*

183.35 *Rhabdosargus globiceps*
(Cuvier, 1830)
PLATE 61

White stumpnose — Witstompneus

Chrysophrys globiceps Cuvier, *in* Cuv. & Val., 1830: 100 (Cape of Good Hope). *Sargus natalensis* Steindachner, 1861: 180 (Durban). *Sargus nigrofasciatus* Regan, 1908: 253, Pl. 41 (Natal). *Austrosparus globiceps:* Smith, 1938: 243*. *Rhabdosargus globiceps:* Smith, **SFSA No. 708*;** Smith & Smith, 1966: 47*; Smith, 1979: 704*; van der Elst, 1981: 332*.

D XI,11-13; A III,10-11; P 16-17; LL 57-61; GR (5-6)+(8-10); depth 2.2-2.4. Preopercle flange naked. Four to 6 compressed teeth in front of upper jaw, 4-8 in lower; 3-5 rows of rounded molars and 2 huge oval molars at the back in each jaw.

Mainly silvery with darker markings, crossbars usually distinct. Attains over 50 cm. Found only from Angola to Natal down to 100 m; prefers sandy areas; spawns close inshore during spring and summer; juveniles use estuaries as nurseries. Economically important, taken in large numbers by nets and lines at the Cape close inshore at night. A sporting fish on light tackle, taking almost any bait. At Plettenberg Bay some anglers believe that when this fish is caught nothing else is about.

183.36 *Rhabdosargus holubi*
(Steindachner, 1881)
PLATE 62

Cape stumpnose — Kaapse stompneus

Sargus holubi Steindachner, 1881: 208, Pl. 3 (Algoa Bay). *Austrosparus auriventris* (*non* Peters): Smith, 1938: 247*. *Austrosparus tricuspidens* Smith, 1942: 280 (Knysna). *Rhabdosargus tricuspidens:* **SFSA No. 709*;** Smith & Smith, 1966: 48*. *Rhabdosargus holubi:* Smith, 1979: 707*; van der Elst, 1981: 333*.

D XI,12-13; A III,10-11; P 14-15; LL 55-57; GR (5-6)(8-9); depth 2.2-2.4. A few concealed scales on preopercle flange. Six compressed teeth (tricuspid in small juveniles) in front of upper jaw, 6-8 in lower; rounded to oval molars behind in each jaw.

Head and body silvery, with a golden mid-lateral band from head to C peduncle; 5-6 dusky crossbars may show as a nocturnal colour phase. A beautiful, shapely fish, found only from the Cape in shallow water to Natal in deeper water, especially over reefs; most plentiful between Mossel Bay and East London. Spawns in the sea during winter and early spring; uses estuaries as nurseries. Adults also about in estuaries. Average 15 cm, largest 35 cm. Fights well on light tackle, takes almost any bait, preferring marine worms or shrimps. Flesh excellent. Often confused with *Rhabdosargus sarba,* when anglers on the south Cape coast get very excited thinking they have caught a record *R. holubi,* but the latter is always recognisable by the golden band along the middle of the side.

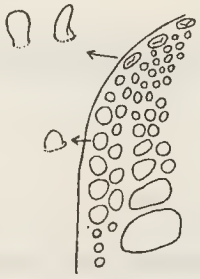
183.37 *Rhabdosargus sarba*
(Forsskål, 1775)
PLATE 62

Natal stumpnose — Natalse stompneus

Sparus sarba Forsskål, 1775: xi, 31 (Djedda, Red Sea). *Sargus auriventris* Peters, 1855: 243 (Mozambique). *Chrysophrys natalensis* Castelnau, 1861: 25 (Natal). *Austrosparus sarba:* Smith, 1938: 245*. *Rhabdosargus sarba:* Smith, **SFSA No. 710*;** Smith & Smith, 1966: 49*; Smith, 1979: 707*; van der Elst, 1981: 334* (in part).

D XI,12-13; A III,11; P 14-15; LL 56-59; GR (6-7)+(7-9); depth about 2.0-2.3. Four to 6 compressed teeth in front of upper jaw, 6-8 in lower; these become heavy and subconical in large adults; large rounded to oval molars behind in each jaw.

Grows to over 12 kg. Red Sea and tropical Indo-West Pacific region; fairly abundant in Natal waters, occasional adults are found as far as Knysna in summer. Spawns in winter; the young use estuaries as nurseries in Natal and further north. A famed and beautiful angling fish, which bites well on most baits, prawn or crayfish being favourites, and fights gamely. Flesh excellent. Easily distinguished by the bright yellow curved mark up and back from the V base.



183.37 *Rhabdosargus sarba:* right half of upper jaw (after Bauchot & Smith, 1984).

183.38 *Rhabdosargus thorpei*
Smith, 1979
PLATE 62

Bigeye stumpnose — Grootoog-stompneus

Rhabdosargus thorpei Smith, 1979: 704, Fig. 1A (Mabibi, Natal). *Rhabdosargus auriventris* (*non* Peters): van der Elst, 1981: 331*.

D XI,13; A III,12; P 14-15; LL 55-60; GR (6-7)+(10-12); depth 1.9-2.2. Each jaw in front has 6 enlarged compressed teeth, behind which are 4-5 rows of molars in upper and 3-4 rows in lower jaw.

Attains 40 cm. Previously confused with *R. sarba,* but differs in having a larger eye and the whole ventral surface, including V and A, bright yellow. An esteemed angling fish. At present known from Natal coast, where juveniles enter estuaries. One juvenile was found in an estuary near Port Alfred. Flesh excellent.

Genus ***Sarpa*** Bonaparte, 1831

One series of notched incisors in upper, pointed incisors in lower jaw; no molars; a typical herbivore. One species.

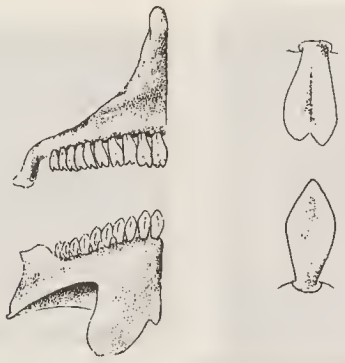
183.39 *Sarpa salpa*
(Linnaeus, 1758)
PLATE 62

Strepie — Strepie

Sparus salpa Linnaeus, 1758: 280 (Mediterranean). *Sarpa salpa:* Smith, 1938: 282; **SFSA No. 731;** Smith & Smith, 1966: 93*; van der Elst, 1981: 335*; Bauchot et al., 1981: Sarpa 1*.

D XI,14-16; A III,13-15; P 16; LL 71-79; GR (6-8)+(12-14); depth 2.75. Body neatly oval and plump. No scales between eyes, on preopercle flange, or on bases of soft D and A, but latter fins with scaly basal sheath. Cheeks scaly below eye.

Attains 45 cm, average much smaller; large fishes commoner in cold water of west coast; abundant in most rocky areas. Mediterranean and eastern Atlantic round South Africa to southern Mozambique. Breeds in winter and uses estuaries as nurseries. A beautiful, shapely fish; one of the best baits. The small mouth and sharp teeth make it a pest to the rock angler. The flesh is tasty when quite fresh, but soon softens and is not much esteemed.



183.39 *Sarpa salpa:* upper and lower jaws to show teeth (after Bauchot & Smith, 1984).

Genus ***Sparodon*** Smith, 1938

More than 50 scales in LL. Interorbital and preopercle flange naked. Middle pair of teeth in each jaw much enlarged. One endemic species.

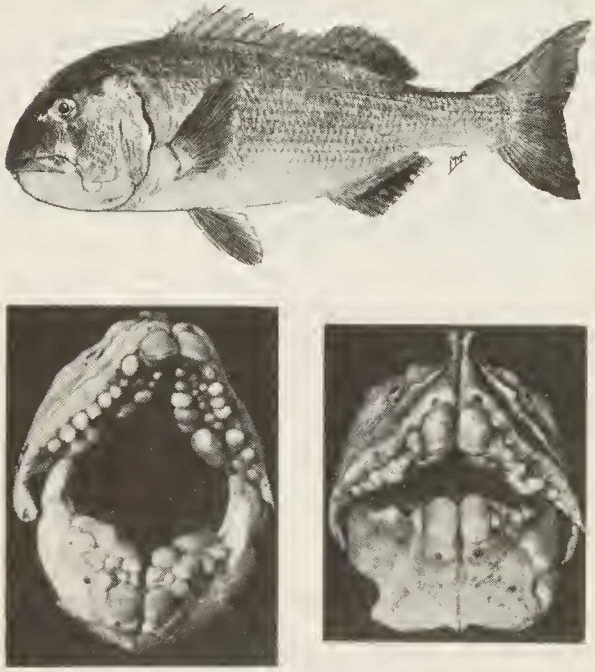
183.40 *Sparodon durbanensis*
(Castelnau, 1861)
PLATE 62

White musselcracker — Witbiskop

Sargus durbanensis Castelnau, 1861: 18 (Durban). *Sparodon durbanensis:* Smith, 1938: 250*; **SFSA No. 711;** Smith & Smith, 1966: 50*; van der Elst, 1981: 336*.

D XI,11-12; A III,10; P 15-17; LL 58-61; GR (5-6)+(7-8); depth 2.5-3.0. No scales between eyes or on preopercle flange; A base scaly. Jaws with 4 flattened teeth at front and many large round or oval molars forming a pavement (compare with Fig. 183.15).

Greyish, with faint stripes along the body; when alive has a bluish glow in the water. Young, frequently found in tidepools, are vividly coloured (see Plate). Adults become solitary except at breeding time. Attains about 115 cm. Found only from the Cape to Natal; rarely enters estuaries, nowhere abundant, often captured in pairs. Spawns during winter and spring along the Cape coast. One of the best-known angling fishes of South Africa, taking almost any bait, and is a splendid fighter. The flesh is good, but coarsens in large fishes. The characteristic heavy head baked whole is regarded as a delicacy.



183.40 *Sparodon durbanensis*: 90 cm (Algoa Bay), jaws to show teeth.

Genus ***Spondyliosoma*** Cantor, 1850

Jaws with pointed incisor teeth in 4-6 rows; larger fishes with 1 row of molars behind; in juveniles these are more conical. Soft D and A naked, with low scaly sheath. One species in South Africa.

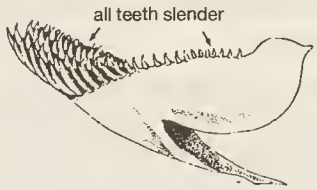
183.41 *Spondyliosoma emarginatum*
(Cuvier, 1830)
PLATE 62

Steentjie — Steentjie

Cantharus emarginatum Cuvier, *in* Cuv. & Val., 1830: 338 (Cape of Good Hope). *Cantharus microlepis* Gilchrist & Thompson, 1909: 231 (Natal). *Spondyliosoma emarginatum*: Smith, 1938: 284; **SFSA No. 739**; Smith & Smith, 1966: 94*; van der Elst, 1981: 337.

D XI,11-13; A III,10; P 16; LL 80-92; GR (7-9)+(15-18), depth 2.0-2.6. No scales between eyes or on preopercle flange. Maxilla with lateral ridge distally which fits into preorbital notch when mouth is closed.

Attains 45 cm. Known from Saldanha Bay to Natal, plentiful on Cape south and southeast coast from estuaries down to 30 m; rare and deeper (60 m near rocky ground) in Natal waters. The bare record of the fish from Mauritius by Bleeker in 1879 is doubtful. Spawns during spring and summer, when courtship display by the male entices the female to lay her eggs in a shallow depression; they are then protected by the male until they hatch. Excellent bait, but normally too small to be of any significance as a food-fish.



183.41 *Spondyliosoma emarginatum*: teeth in anterior half of lower jaw (after Bauchot & Smith, 1984).

Family No. 184: CENTRACANTHIDAE

by P.C. Heemstra

Picarels — **Pikarelle**

Body oblong, somewhat compressed, covered with weakly ctenoid scales. Upper jaw extremely protrusible; maxilla naked and covered by preorbital bone when mouth is closed; jaws with cardiform teeth. Edge of preopercle thin, broadly rounded, smooth; no spines on opercles; gill membranes separate, free from isthmus; branchiostegal rays 6. Gill-rakers long. Dorsal fin continuous, with 11 to 13 spines and 9 to 18 soft-rays; anal fin with 3 spines and 7 to 16 soft-rays; pelvic fins with 1 spine and 5 rays and a well-developed axillary process at base. Snout and interorbital region naked, rest of head covered with small scales. Vertebrae 10+14.

Two or 3 genera, with 8 species; 1 genus with 2 species in our area.

Genus ***Spicara*** Rafinesque, 1810

Body depth greater than head length, contained 2.4-4.7 times in SL. Seven species, 2 species endemic to southern Africa. *Spicara nigricauda* (Norman, 1931) is known from southern Angola and may be found here; it can be distinguished by its fin-ray counts (D XII,15-17; A III,15-16) and black blotch on the C peduncle.

KEY TO SPECIES

1a A III,7-8; LL 57-60 ..... *S. australis*
1b A III,11-12; LL 70-73 ..... *S. axillaris*

184.1 *Spicara australis*
(Regan, 1921)
PLATE 63

Picarel Pikarel

Smaris australis Regan, 1921: 416 (Natal). *Centracanthus australis:* Smith, **SFSA No. 705*.**

D XII,9-10; A III,7-8; P 15; LL 54-60; GR 10+(18-20). Body depth 3.0-3.3 in SL. Swimbladder not bifurcate posteriorly.

Attains 30 cm. Known only from off Natal in 200 - 400 m. Rare.

184.2 *Spicara axillaris*
(Boulenger, 1900)
PLATE 63

Windtoy Windhaan

Caesio axillaris Boulenger, 1900: 10, Pl. 1 (False Bay). *Caesio algoae* Smith, 1935: 195 (Algoa Bay, 60 fms). *Pterosmaris axillaris:* Smith, **SFSA No. 704*;** Smith & Smith, 1966: 130*.

D XI,12-13; A III,11-12; P 16-18; LL 70-74; GR (8-9)+(17-20). Body depth 2.3-2.8 in SL. Swimbladder bifurcate posteriorly, the 2 branches extending to the 4th caudal vertebra.

Body rosy, olive or bluish dorsally, silvery below; black blotch in axil of P. Attains 38 cm. Known only from Cape Town to Natal in 20 - 160 m. Rare, sometimes caught on lines but generally in trawls, usually coming inshore with stormy weather.

Family No. 185: LETHRINIDAE

by M.M. Smith

Emperors **Keisers**

Typical perch-like fishes; body with distinct weakly ctenoid scales. Interorbital, snout, preorbital, preopercle flange and bases of dorsal and anal fins naked; opercle scaly; pelvic fin axillary scale well developed; preopercle margin entire; dorsal fin spines 10; few knob-like gill-rakers and 6 branchiostegal rays; vertebrae 10+14.

Tropical carnivorous fishes, commercially important as they are widely distributed in the Indo-Pacific (only 1 species of *Lethrinus* occurs in the tropical Atlantic) and the largest reaches about 1 m in length. All the genera have been reported to be ciguatoxic in some areas, but as this poisoning does not occur in southern African waters, these fishes are greatly esteemed as food-fishes, except that some species occasionally have a "chemical" flavour.

Previously the Lethrinidae was restricted to those fishes with naked cheeks, but in recent works the Monotaxidae is also included in this family. About 30 species in 5 genera (Springer, 1982); 14 species known from our area; 5 additional species of *Lethrinus* and *Wattsia mossambicus* are also included as they may be found in our area.

KEY TO GENERA

1a Cheek naked, smooth .. (Subfamily LETHRININAE)..... *Lethrinus*
1b Cheek with scales ..... (Subfamily MONOTAXINAE)..... 2

2a Outer surface of maxilla with longitudinal denticulated ridge 3
2b Outer surface of maxilla smooth ..... *Gymnocranius*

3a Teeth at side of jaws all rounded molars; lower canines normal ..... *Monotaxis*
3b Teeth at side of jaws all conical; lower canines flare outwards 4

4a Body ovoid, depth 1.8-2.3 in SL; LL 42-45; A III,10 ..... *Wattsia*
4b Body slender, oblong, depth 2.9-3.3 in SL; LL 70-78; A III,8-9 ..... *Gnathodentex*

Genus *Gnathodentex* Bleeker, 1873

Monotypic.

185.1 *Gnathodentex aureolineatus*
(Lacepède, 1802)
PLATES 63 & 66

Glowfish Glimvis

Sparus aureo-lineatus Lacepède, 1802: 42, 132 (no locality, on Commerson). *Gnathodentex aurolineatus:* Smith, **SFSA No. 648*;** Chan & Chilvers, 1974: 85*.

D X,10; A III,8-9; P 15; GR 5+6; LL 70-78; 4 close-set canines in upper jaw, an outwardly flaring canine each side of front of lower jaw, with smaller pointed teeth between, and within and on sides in each jaw.

About 8 golden lines along body, a silver bar below eye, the golden area on body below end of D glows even in a dark cave and these "lights" can be seen flitting among the corals. Attains over 30 cm. Indo-West Pacific, south to Natal, around coral reefs, down to 20 m; apparently a solitary carnivore. Flesh good, but species too small for commercial exploitation.

Genus *Gymnocranius* Klunzinger, 1870

Cheek with more than 3 rows of scales. At least 3 species, 2 from our area.

KEY TO SPECIES

1a No wavy blue lines on head; no U-shaped naked area on nape ..... *G. griseus*
1b Wavy blue lines usually present along snout and cheek; U-shaped naked area on nape ..... *G. robinsoni*

185.2 *Gymnocranius griseus*
(Schlegel, 1844)
PLATE 66

Grey barenose Grys kaalneus

Dentex griseus Schlegel, *in* Temminck & Schlegel, 1844: 72, Pl. 36 (Japan). *Gymnocranius griseus:* Smith, **SFSA No. 649*;** van der-Elst, 1981: 234*.

D X,9-10; A III,9-10; P 14; GR (3-4)+5; LL 46-51; 4 rows of cheek scales; jaws with outer row of strong conical teeth, inner villiform teeth in 6-7 irregular rows.

Black bar through and above eye, remains visible below eye on preservation; remaining bars in young disappear with growth. Attains 80 cm. Indo-West Pacific south to Natal down to 80 m; rare in our waters.

185.2 *Gymnocranius griseus:* 25 cm (N. Mozambique).

185.3 *Gymnocranius robinsoni*
(Gilchrist & Thompson, 1908)
PLATE 63

Rippled barenose — Gerimpelde kaalneus

Dentex robinsoni Gilchrist & Thompson, 1908: 228 (Natal). *Gymnocranius griseus* (*non* Schlegel): Smith, **SFSA No. 649** (part synonymy). *Gymnocranius rivulatus* (Rüppell, *non* Bennett): Smith, 1953: 518, **No. 649a.**

D X,10-11; A III,9-10; P 13-14; GR 1+6; LL 45-49; 5 series of scales on cheek; opercle scaly with inconspicuous spine.

D and A can be yellowish, edges darker. Attains 60 cm. Indo-West Pacific south to Sodwana Bay. Rare in our area.

Genus ***Lethrinus*** Cuvier, 1829

Most of head, including cheeks, scaleless; preorbitals deep; jaws with canines in front of bands of fine teeth, and acute or molariform lateral teeth. All have D X,9; A III,8; P ii,10,i = 13; GR (4-5)+5; and LL 45-50; any deviation is unusual. For the number of scales between the LL and base of 6th D spine, all scales are counted, irrespective of size. Highly coloured, coral-haunting, tropical fishes of considerable commercial value; the patterns and colours in life are often obscured by mottlings. Caught extensively in traps and also on lines; flesh esteemed, but smaller specimens occasionally have a "chemical" flavour probably due to food consumed. A difficult group for the systematist, Smith (1959) tentatively revised the western Indian Ocean species we encountered, and his nomenclature is mostly followed here. About 26 species (of which 25 are Indo-Pacific), with at least 10 from our area. Sato (1978) has revised the Indo-Pacific species.

KEY TO SPECIES

1a Body depth less than head length; maxilla ends before level of front nostril; head length 1.5 or more times P; no scales on inner P base ..... (Subgenus *Lethrinella*) 2
1b Body depth equal to or greater than head length; end of maxilla reaches level of front nostril or beyond; head length less than 1.5 times P; inner P base scaly (except *lentjan* which has very few or no scales on inner P base) ..... (Subgenus *Lethrinus*) 6

2a Six scales from LL to base of 6th D spine; vertical at rear nostril in adults equidistant from snout tip and rear margin of head; snout profile straight; red line sometimes above and below lips, and 2 or 3 dark streaks from eye ..... *L. elongatus*
2b Five scales from LL to base of 6th D spine 3

3a Vertical at rear nostril distinctly nearer snout tip than rear margin of head ..... *L. variegatus*
3b Rear nostril about midway between snout tip and rear margin of head; in juveniles slightly nearer snout tip 4

4a Interorbital distinctly convex; profile of snout concave; eye below dorsal profile; triangular blotch above P base, edge of opercle, lips and P base bright red ..... *L. concyliatus*
4b Interorbital flat or slightly convex; eye virtually in dorsal profile 5

5a Snout profile bends outwards before eye; interorbital slightly convex; no red spots on P base; a conspicuous red spot on opercle ..... *L. rubrioperculatus*
5b Snout profile gently sloping, sometimes a small hump before eye, then nearly horizontal to D origin because interorbital flat; 1 or 2 spots on P base; opercle margin red ..... *L. xanthochilus*

6a Orange-edged, black, oblong blotch on body below LL and above end of P ..... *L. harak*
6b No black blotch on side of body 7

7a Five scales from LL to base of 6th D spine 8
7b Six scales from LL to base of 6th D spine 10

8a Longest A ray not longer than base of soft A; maxilla reaches vertical at hind nostril; fifth scale near D small; opercle margin not red ..... *L. mahsena*
8b Longest A ray at least 1.25 times base of soft A; maxilla reaches or nearly reaches front of eye 9

9a Hind end of maxilla below front margin of eye; lateral teeth wide, round but not distinct molars; generally small orange spots on side of head ..... *L. kallopterus*
9b Hind end of maxilla below hind nostril; lateral teeth include strong molars in adults; red stripe from tip of snout to eye, red line back from corner of mouth, red spot on upper P base, and margin of opercle red ..... *L. hypselopterus*

10a Head depth through eye centre less than snout plus eye; orange stripes along body ..... *L. ramak*
10b Head depth through eye centre not less than, usually exceeds, snout plus eye 11

11a Body depth 2.4-2.5 in SL; usually dark marks on many scales 12
11b Body depth 2.6-2.8 in SL; usually no dark marks on scales 13

12a Head and front part of body darker (red in life) than rest of body; P reaches little beyond A origin ..... *L. sanguineus*
12b Body uniform or with faint crossbars; P reaches well beyond A origin; opercle margin not red ..... *L. crocineus*

13a Head, except opercle, darker than body; snout blunt: predorsal profile at distinct angle to snout; maxilla reaches to or near level of eye; no red on head ..... *L. mahsenoides*
13b Head not usually darker than body, but, if so, dorsal head profile not angular 14

14a Hind upper molars small, diameter not exceeding that of canines; dense scaling on inner base of P; bright blue lines from eye ..... *L. nebulosus*
14b Hind upper molars broader, diameter exceeds that of canines; snout rather pointed; no, or few, scales on inner P base; red on opercle margin and P base ..... *L. lentjan*

185.4 *Lethrinus concyliatus*
(Smith, 1959)
PLATE 63

Redaxil emperor — Rooiskof-keiser

Lethrinus miniatus (*non* Forster): Smith, SFSA Pl. 43, Fig. 698 only. *Lethrinella concyliatus* Smith, 1959: 292, Pl. 22 E (N. Mozambique). *Lethrinus concyliatus:* Sato, 1978: 50*; 1984; Leth 9*.

See genus *Lethrinus*, key to species and illustration. Five scales from LL to 6th D spine. Note lips curving outward from snout.

Attains 76 cm. Indian Ocean to 22°S from coral reefs down to 200 m.

185.5 *Lethrinus crocineus*
Smith, 1959
PLATE 63

Yellowfin emperor — Geelvin-keiser

Lethrinus crocineus Smith, 1959: 290, Pl. 21, Figs. F & G (Pinda, N. Mozambique); van der Elst, 1981: 198*; Sato, 1984; Leth 10*.

See genus *Lethrinus,* key to species and illustrations. Six scales from LL to 6th D spine.

Fins yellow, sometimes spots on cheek. Preserved: uniform; young may have vague crossbars, adults usually with darker head, lighter body and a dark spot at base of each scale. Attains 60 cm. Western Indian Ocean, south to Natal; generally in deeper waters down to 150 m.

185.6 *Lethrinus elongatus*
Valenciennes, 1830
PLATE 63

Longnose emperor — Langneus-keiser

Lethrinus elongatus Valenciennes, *in* Cuv. & Val., 1830: 289 (Red Sea); Sato, 1984, Leth 9*. *Lethrinus miniatus:* (*non* Forster): Smith, SFSA **No. 698** (not illustration); Sato, 1978: 40* (part); 1984: Leth 5*. *Lethrinella miniatus:* Smith, 1959: 292*.

See genus *Lethrinus,* key to species and illustration. Characterised by the long pointed snout, with dorsal head profile almost straight. Six scales from LL to 6th D spine.

Variable livery; mottled juveniles often have a dark blotch below LL on body above mid P. Preserved: uniform, sometimes with vague mottlings, 1-3 darker streaks forward and down from eye. Attains 100 cm. Indo-West Pacific from Natal northwards; large adults from deeper water down to 200 m.

185.7 *Lethrinus harak*
(Forsskål, 1775)
PLATE 64

Blackspot emperor — Swartkol-keiser

Sciaena harak Forsskål, 1775: xii, 52 (Arabia). *Lethrinus harak:* Smith, **SFSA No. 701*;** 1959: 288*; Sato, 1978: 15*; 1984: Leth 2*.

See genus *Lethrinus*, key to species and illustration. Six scales from LL to 6th D spine.

Easily recognised by the dark area on side of body, which remains on preservation. Attains 60 cm. Indo-West Pacific, south to Natal. Flesh excellent, but spoils rapidly.

185.8 *Lethrinus hypselopterus*
Bleeker, 1873
PLATE 64

Mozambique emperor — Mosambiekse keiser

Lethrinus hypselopterus Bleeker, 1873: 326 (Sumatra); Sato, 1978: 22*; 1984: Leth 11*. *Lethrinus crocineus* (*non* Smith): Smith, 1959: Pl. 21A only.

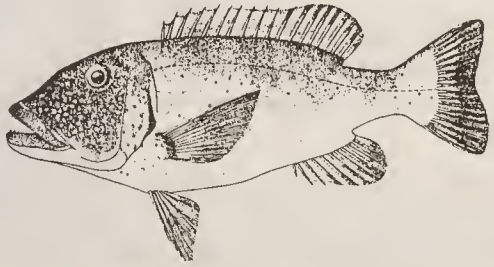
See genus *Lethrinus,* key to species and illustrations. Five scales between LL and 6th D spine.

Body yellowish brown, paler below; fins uniform red. Attains 50 cm. Indo-West Pacific; in the western Indian Ocean known only from coastal waters of Mozambique.

185.9 *Lethrinus kallopterus*
Bleeker, 1856
PLATE 64

Orange-spotted emperor — Oranjekol-keiser

Lethrinus kallopterus Bleeker, 1856: 47 (Menado); Smith, 1959: 288*; Sato, 1978: 20*; 1984: Leth 3*.



185.9 *Lethrinus kallopterus:* ca. 60 cm (after Sato, 1984).

See genus *Lethrinus,* key to species and illustrations. Five scales between LL and 6th D spine. Hind teeth rounded but never molariform. C lobes rounded.

Body sometimes covered irregularly with small bright orange spots with cluster round eye and nostrils; fins generally rose red, often with bright orange reticulated spots. Attains 70 cm. In deepish water down to 120 m. Indo-West Pacific; an important food-fish from Kenya to the Mozambique channel.

185.10 *Lethrinus lentjan*
(Lacepède, 1802)
PLATE 64

Redspot emperor — Rooikol-keiser

Bodianus lentjan Lacepède, 1802: 281, 293 (Java). *Lethrinus lentjan:* Smith, 1959: 291*; Sato, 1978: 42*; Smith, 1981: 180; Sato, 1984: Leth 4*.

See genus *Lethrinus,* key to species and illustration. Six scales from LL to 6th D spine.

Preserved: uniform, with traces of white spots over much of body. Attains 40 cm. A common fish in the tropical Indo-West Pacific, south to Sodwana Bay.

185.11 *Lethrinus mahsena*
(Forsskål, 1775)
PLATE 64

Sky emperor — Hemel-keiser

Sciaena mahsena Forsskål, 1775: xii, 52 (Red Sea). *Lethrinus caeruleus:* Smith, 1959: 288*; Smith, 1981: 180. *Lethrinus mahsena:* Sato, 1978: 25*; 1984: Leth 12*.

See genus *Lethrinus,* key to species and illustration. Five scales between LL and 6th D spine.

Easily recognised when fresh by red blotch on forehead and red or orange streak back and down over corner of mouth. Attains 38 cm. Indo-West Pacific, south to Sodwana Bay. Flesh excellent.

185.12 *Lethrinus mahsenoides*
Valenciennes, 1830
PLATE 64

Snubnose emperor — Stompneus-keiser

Lethrinus mahsenoides Valenciennes, *in* Cuv. & Val., 1830: 286 (Red Sea); Sato, 1978: 38*; 1984: Leth 13*. *Lethrinus borbonicus:* Smith, **SFSA No. 700*;** 1959: 290*; Sanches, 1963: 94*.

See genus *Lethrinus,* key to species and illustration. Six scales from LL to 6th D spine.

Preserved: uniform, head except opercle somewhat darker. Attains about 20 cm. Red Sea and Indo-West Pacific to Sodwana Bay. Sometimes with rank nauseating "chemical" flavour.

185.13 *Lethrinus nebulosus*
(Forsskål, 1775)
PLATE 65

Blue emperor — Blou keiser

Sciaena nebulosa Forsskål, 1775: xii, 52 (Red Sea). *Lethrinus scoparius* Gilchrist & Thompson, 1908: 168 (Natal). *Lethrinus genivittatus:* Smith, **SFSA No. 699.** *Lethrinus nebulosus:* Smith, **SFSA No. 702*;** 1959: 290*; Sanches, 1963: 95*; Sato, 1978; 30*; van der Elst, 1981: 200*; Sato, 1984: Leth 15*. *Lethrinus harak* (*non* Forsskål): Sousa & Dias, 1981: 60*.

See genus *Lethrinus,* key to species and illustration. Six scales from LL to 6th D spine.

Preserved: almost uniform, sometimes with lines on cheek and along body; attains more than 75 cm. Indo-West Pacific, plentiful in Natal and reaches Algoa Bay. Caught by traps among coral reefs but often on lines above rocky reefs down to 60 m.

185.14 *Lethrinus ramak*
(Forsskål, 1775)
PLATE 65

Orange-striped emperor — Oranjestreep-keiser

Sciaena obsoleta Forsskål, 1775: xii, 52 (Arabic common name *ramak;* Red Sea). *Lethrinus obsoletus:* Smith, 1961: 568, **No. 700a;** 1959: 289*. *Lethrinus ramak:* Sato, 1978: 35*; 1984: Leth 16*.

See genus *Lethrinus,* key to species and illustration. Although Forsskål used "*obsoleta*" as the scientific name, "*ramak*" (Forsskål's common name) has come to be used for this species. Six scales from LL to 6th D spine.

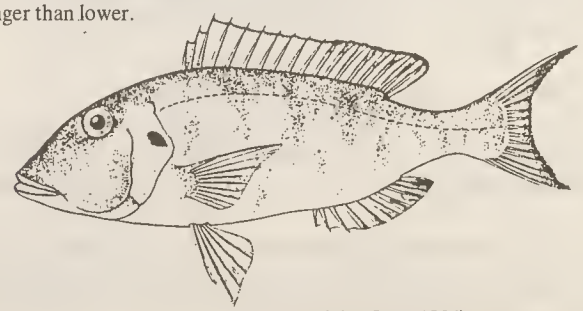
Easily recognised fresh by orange stripes along body which fade slowly after death. Preserved: uniform, but shape always characteristic. Attains 60 cm. Indo-West Pacific to Natal; one of the commonest lethrinids along the east coast of Africa; prefers shallow, weedy areas.

185.15 *Lethrinus rubrioperculatus*
Sato, 1978
PLATE 66

Spotcheek emperor — Kolwang-keiser

Lethrinus rubrioperculatus Sato, 1978: 58, Fig. 34, Pl. 12A (Okinawa Id.); 1984: Leth 17*. *Lethrinella variegatus* (*non* Valenciennes): Smith, 1959: 291* (in part).

See genus *Lethrinus* and key to species. Five scales from LL to 6th D spine; hind teeth conical, never molariform. C lunate, upper lobe usually longer than lower.



185.15 *Lethrinus rubrioperculatus:* 24 cm (after Sato, 1984).

Body greyish green to purple, paler below. Head often darker; a conspicuous bright red spot on margin of opercle above angle; fins red to orange with brighter margins, sometimes mottled with brighter red (Sato). Attains 50 cm. Indo-West Pacific south to Natal.

185.16 *Lethrinus sanguineus*
Smith, 1955
PLATES 65 & 66

Cutthroat emperor — Bloednek-keiser

Lethrinus sanguineus Smith, 1955: 12, Pl. 3, Fig. 14 (Mozambique); 1959: 289*; 1961: 568, **No. 703a***; Sato, 1978: 19*.

See genus *Lethrinus,* key to species and illustration. Six scales from LL to 6th D spine.

Easily recognised fresh by the red or "bleeding" area on body behind gill opening and the dark horizontal blotch between the LL and rear D spines. Juveniles with less steep snout and are less vividly coloured. Preserved: dark, with darker areas about gill cover and spots on body. Attains at least 50 cm. Western Indian Ocean, south to Sodwana Bay; usually in deep water about reefs.

185.17 *Lethrinus variegatus*
Ehrenberg, 1830
PLATE 65

Variegated emperor — Bont keiser

Lethrinus variegatus Ehrenberg, *in* Cuv. & Val., 1830: 287 (Suez); Smith, **SFSA No. 703;** 1961: 568, **No. 703;** Sato, 1978: 49*; 1984: Leth 19*. *Lethrinus miniatus* (*non* Forster): van der Elst, 1981: 199*.

See genus *Lethrinus,* key to species and illustration. Profile of head of 30 cm specimen rounded, being straight in *L. miniatus* of similar size. Five scales from LL to 6th D spine.

Variably mottled, especially large specimens from deep water. Preserved: adults uniform, juveniles variably mottled or reticulated. Attains 60 cm, Indo-West Pacific, south to Natal, juveniles sometimes abundant in shallow weedy areas, adults more solitary down to 150 m. Flesh, especially of large fishes, esteemed.

185.18 *Lethrinus xanthochilus*
Klunzinger, 1870
PLATE 65

Yellowlip emperor — Geellip-keiser

Lethrinus xanthochilus Klunzinger, 1870: 753 and 1884: 39, Pl. 6, Fig. 3 (Red Sea); Sato, 1978: 52*; 1984: Leth 20*. *Lethrinus xanthocheilus:* Smith, 1959: 292*.

See genus *Lethrinus,* key to species and illustration. Five scales from LL to 6th D spine. Hind teeth conical, never rounded or molariform.

Small black spots often present especially on cheeks. Attains 80 cm. Indo-Pacific coral reefs down to about 22°S along Mozambique coast.

Genus ***Monotaxis*** Bennett, 1830

Lateral surface of maxilla with longitudinal serrate ridge; 5-6 rows of scales on preopercle and opercle. Monotypic.

185.19 *Monotaxis grandoculis*
(Forsskål, 1775)
PLATES 65 & 66

Bigeye barenose — Grootoog-kaalneus

Sciaena grandoculis Forsskål, 1775: xii, 53 (Djedda, Red Sea). *Monotaxis grandoculis:* Smith, **SFSA No. 650*.**

D X,10; A III,9; P 14; GR 5+(4-6); LL 45-47; 6 canines in upper jaw, 4-6 in lower, with 6-7 molars on each side of jaws; head heavy, snout blunt, becoming more so with age.

Adults bluish grey above, paler below with centres of scales silvery and a few brownish scales generally present on sides; juveniles lose bars on preservation. Attains at least 60 cm. Indo-Pacific from Hawaii to Natal around coral reefs down to 60 m; an important food-fish in the tropics, quite abundant in some areas, but progressively rarer in our region.

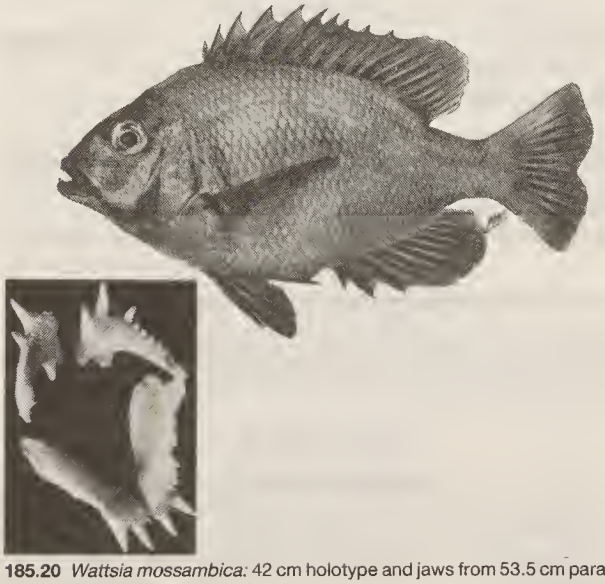
Genus ***Wattsia*** Chan & Chivers, 1974

Maxilla with longitudinal serrated ridge; teeth at side of jaws conical, lower canines flare outwards; no molars. Monotypic.

185.20 *Wattsia mossambica*
(Smith, 1957)

Mozambique large-eye bream — Mosambiekse grootoog-bras

Gnathodentex mossambicus Smith, 1957: 122, (Pinda, Mozambique). *Wattsia mossambica:* Chan & Chivers, 1974: 85*; Sato, 1984: Watt 1*.



185.20 *Wattsia mossambica:* 42 cm holotype and jaws from 53.5 cm paratype (both N. Mozambique).

D X,10; A III,10; P 14 inner base scaleless; GR (6-7)+(5-7); LL 41-47(42-43 pored). C slightly forked with rounded lobes. Body depth 1.9-2.2 in SL. Six canines in front of upper jaw, 4 in lower jaw with teeth in narrow villiform inner band. Nostrils close-set, hind one slit-like, ending close to eye.

Body silvery yellowish grey above, lighter below, scale margins darker; indistinct crossbars on body; single fins olive-to yellow-orange. Attains 55 cm. Indo-West Pacific to about 22°S on Mozambique coast (and probably will be found in Natal) on outer edge of continental shelf from 140 to 180 m.

Family No. 186: NEMIPTERIDAE

by B.C. Russell

Butterfly breams, spinecheeks — **Vlinderbrasse, stekelwange**

Body oblong or elongate. Dorsal fin continuous, with 10 spines and 9 or 10 soft-rays; dorsal and anal fins in a shallow basal groove. Jaw teeth small, villiform, in narrow bands; enlarged anterior canines present or absent; no teeth on palate. Scales ctenoid, covering body and most of head. Caudal fin forked or emarginate; upper lobe sometimes with filament. Branchiostegals 6; vertebrae 10°14.

Nemipterids are common in shallow tropical reef areas and offshore waters to 100 m. Feed on benthic invertebrates. Good eating; species of *Nemipterus* taken in commercial trawls. Widespread in tropical Indo-West Pacific. Four genera (*Pentapodus* Quoy & Gaimard, 1824 has yet to be found in our area); at least 40 species, 6 in our area. Family classification treated by Johnson, 1980.

KEY TO GENERA

1a Suborbital with distinct backwardly directed spine below eye; no canines in jaws ..... *Scolopsis*
1b Suborbital spine weak or absent; canines present or absent 2

2a Suborbital spine weak; canines absent; 4-6 transverse scale rows on preopercle ..... *Parascolopsis*
2b Suborbital spine absent; small canines anteriorly, at least in upper jaw; 3 transverse scale rows on preopercle ..... *Nemipterus*

Genus *Nemipterus* Swainson, 1839

Numerous species, not easy to distinguish; 2 species (1 probably in error) reported from our area.

KEY TO SPECIES

1a V reaching to or beyond vent; D membrane not incised between the spines; body pinkish, silvery below; 4-5 narrow, oblique yellowish bands beneath LL; A bluish, with 3 irregular yellow bands ..... *N. bipunctatus*
1b V not reaching vent; D membrane distinctly incised between the spines; body pinkish, silvery below; 7-8 pink saddles on dorsal part of body; diffuse pale reddish spot below origin of LL ..... *N. peronii*

186.1 *Nemipterus bipunctatus*
(Ehrenberg, 1830)
PLATE 67

Butterfly bream — Vlinderbras

Dentex bipunctatus Ehrenberg, *in* Cuv. & Val., 1830: 247 (Djedda, Red Sea). *Synagris bleekeri* Day, 1875: 92, Pl. 24, Fig. 1 (Madras, India). *Nemipterus mulloides* Smith, 1939: 219, Fig. 2 (Delagoa Bay; name preoccupied by *Dentex mulloides* Bleeker). *Nemipterus delagoae* Smith, 1941: 450 (replacement name for *N. mulloides* Smith); Smith, **SFSA No. 672*.**

D X,9; A III,7; P 16; LL 48-50; 4 scale rows between LL and 1st D spine; GR 5+10. Depth 3.3-3.5. D spines 3-10 subequal to soft D rays. C forked.

Attains 25 cm. Widespread in tropical Indian Ocean and Persian Gulf, south to Delagoa Bay.

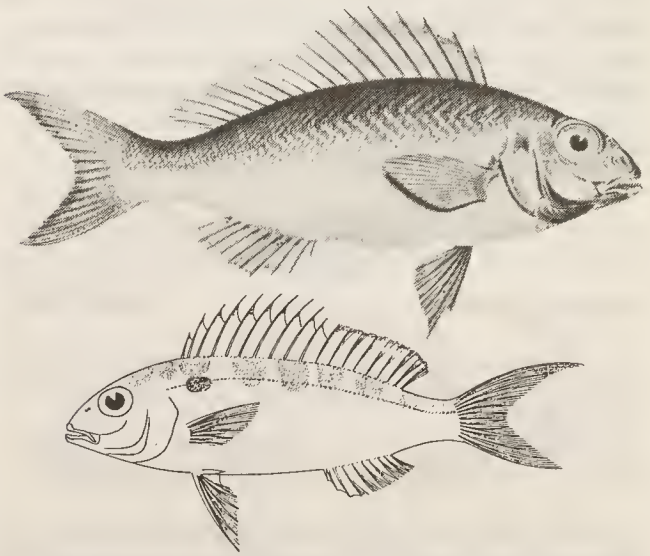
186.2 *Nemipterus peronii*
(Valenciennes, 1830)

Notched butterfly bream — Gekerfde vlinderbras

Dentex peronii Valenciennes, *in* Cuv. & Val., 1830: 245, Pl. 154 (locality not given). *Dentex (Heterognathodon) smithii* Steindachner, 1868: 978, Pl. 3, Fig. 1 ("Cape of Good Hope"). *Nemipterus smithii:* Smith, **SFSA No. 673.**

D X,9; A III,7; P 16-17; LL 46-50; 3 scale rows between LL and 1st D spine. Depth 3.2-4.1; middle D spines longer than others; 6th spine about twice length of 1st spine and distinctly longer than soft D rays. C forked.

Attains 25 cm. Red Sea, Persian Gulf and Sri Lanka to Taiwan and Australia; not yet recorded from east coast of



186.2 *Nemipterus peronii*: top: length not given, holotype of *N. smithii* (after Steindachner, 1868); bottom: 15.5 cm (after Russell & Allen, 1984).

Africa. The type-locality of *Dentex smithii* is probably erroneous, as this species has never again been found in our waters and species of *Nemipterus* generally occur only in tropical waters.

Genus ***Parascolopsis*** Boulenger, 1901

Rao and Rao (1981) recently synonymised this genus with *Scolopsis,* but preliminary examination of specimens from both genera indicate a number of osteological differences. About 10 species, one in our area.

186.3 *Parascolopsis eriomma*
(Jordan & Richardson, 1909)
PLATE 67

Shimmering spinecheek — Glansende stekelwang

Scolopsis eriomma Jordan & Richardson, 1909: 188, Pl. 70 (Takao, Taiwan). *Parascolopsis eriomma:* Smith, **SFSA No. 686*.**

D X,9; A III,7; P 17; GR 6+(11-12); LL 35-36; 3 scale rows between LL and 1st D spine; 4 or 5 on cheek. Depth 2.7-2.9. Suborbital with feeble spine, rear margin smooth, depth 4.3 in eye.

Attains 25 cm. Widespread in tropical Indo-West Pacific and Red Sea, south to Delagoa Bay.

Genus ***Scolopsis*** Cuvier, 1816

About 20 species; 3 in our area.

KEY TO SPECIES

1a Body depth 2.1-2.5 in SL; LL 38-41 ..... *S. vosmeri*
1b Body depth 2.6-3.1 in SL; LL 43-47 2

2a Body greyish, with elongate blackish blotch extending posteriorly across LL ..... *S. bimaculatus*
2b Body silvery grey, with numerous dark brown or black spots forming 2 or 3 narrow longitudinal bands on back; pearly white band from below eye to upper base of P ..... *S. ghanam*

186.4 *Scolopsis bimaculatus*
Rüppell, 1828
PLATE 67

Doubleblotch spinecheek — Dubbelvlek-stekelwang

Scolopsis bimaculatus Rüppell, 1828: 8, Pl. 2, Fig. 2 (Massowah, Red Sea); Smith, **SFSA No. 684*.**

D X,9; A III,6-7; P 18; GR 4+5, rudimentary; LL 43-47; 4 scale rows between LL and 1st D spine. Depth 2.6-3.0; dorsal profile convex, snout pointed.

Colour greyish with elongate blackish patch on upper part of body beginning below 7th or 8th D spine and extending posteriorly through LL. Attains 30 cm. Western Indian Ocean, Red Sea and Persian Gulf, south to Delagoa Bay.

186.5 *Scolopsis ghanam*
(Forsskål, 1775)
PLATE 67

Paleband spinecheek — Bleekband-stekelwang

Sciaena ghanam Forsskål, 1775: 50 (Djedda and Lohaja, Red Sea). *Scolopsis ghanam:* Smith, **SFSA No. 685*.**

D X,9-10; A III,7; P 16; GR short, 5+5; LL 44-47; 3 scale rows between LL and 1st D spine. Depth 2.9-3.1.

Body silvery grey, with numerous black or dark brown spots on sides; spots above LL often forming 2 or 3 longitudinal stripes; pearly white band from below eye to upper base of P; fins bluish grey. Attains 25 cm. Western Indian Ocean, Red Sea and Persian Gulf; rarely south to Delagoa Bay.

186.6 *Scolopsis vosmeri*
(Bloch, 1792)
PLATE 67

Silverflash spinecheek — Silwerflits-stekelwang

Anthias vosmeri Bloch, 1792: 120, Pl. 321 (Japan Sea). *Scolopsis vosmeri:* Smith, **SFSA No. 683*.**

D X,9; A III,7; P 18; GR 5+6, rudimentary; LL 38-41; 4 scale rows between LL and 1st D spine. Depth 2.1-2.5.

Body colour variable, usually dark grey or reddish-brown; broad, vertical white bar from nape extending onto opercle; sometimes a horizontal white band below LL from gill cover to below middle of D; body scales with dark spots; upper margin of opercle black-edged, lower margin tinged blood-red; black spot on upper base of P. Attains 25 cm. Widespread in tropical Indo-West Pacific and Persian Gulf, south to Durban.

Family No. 187: CORACINIDAE

by M.M. Smith

Galjoens — **Galjoene**

Body deep; small, firmly adherent, ctenoid scales covering whole fish including fins; front of snout without scales; interorbital width greater than eye diameter; lips thick; jaws with outer row of strong curved incisors and smaller teeth within; pharyngeal teeth molariform; gill membranes fused with isthmus.

Galjoens generally shoal in small groups in turbulent water along rocky shores. One genus, *Coracinus* Gronow, 1763; 2 species known only from southern Africa and Madagascar.

KEY TO SPECIES

1a Depth more than 2 in SL; D soft-rays 18-19; sometimes 7-9 vague broad bars on body especially underwater ..... *C. capensis*
1b Depth less than 2 in SL; D soft-rays 21-23; body with 7 broad and 7 narrow bars ..... *C. multifasciatus*

187.1 *Coracinus capensis*
(Cuvier, 1831)
PLATE 67

Galjoen Galjoen

Dipterodon capensis Cuvier, 1831: 276 (Cape of Good Hope). *Dichistius falcatus* Smith, 1935: 272, Pls 14 & 17 (Great Fish Point, South Africa). *Coracinus capensis:* Smith, **SFSA No. 644*;** Smith & Smith, 1966: 46*; van der Elst, 1981: 161*.

D X,18-19; A III,13-14; P 16-17; GR (7-8)+(13-15); LL 60-64.

Almost black among rocks, can change to silvery in 1-2 seconds over white sand; sometimes mottled or with 7-9 crossbars. Attains 80 cm; S.A. angling record 6.5 kg. South Africa's "national fish"; occurs from southern Angola to Sodwana Bay. A powerful swimmer able to turn in a breaking wave, quite often seen in surges over rocks, has in that way taken a bait cast in error on to an exposed rock. Feeds on mussels, ascidians, barnacles and other crustacea but also seaweeds as indicated by the long intestine (in winter with much fat around it). Taken mostly on redbait or musselworms, it fights gamely. In days gone by, if an angler could get a piece of redbait he could catch a galjoen, even at high tide. Today these fishes are scarce especially in much fished localities. Protection of this species is essential, and marine reserves should help in this. On the Cape south coast the fish spawns in deeper water over the summer months, hence winter fish are fat and in good condition. Little else is known of its life history as small juveniles are difficult to come by. Van der Elst (1981) states that these fishes only start breeding at a length of about 34 cm. Flesh almost transparent, white when cooked, with fine dark threads, greatly esteemed by some, not by others, improved by bleeding.

187.1 *Coracinus capensis:* 2.5 cm and (bottom) 6 cm juveniles (near Plettenberg Bay).

187.2 *Coracinus multifasciatus*
(Pellegrin, 1914)
PLATE 68

Banded galjoen Band-galjoen

Dipterodon multifasciatus Pellegrin, 1914: 231 (Fort-Dauphin, Madagascar). *Drepanoscorpis gilchristi* Fowler, 1934: 476, Fig. 42 (Durban). *Coracinus multifasciatus:* Smith, **SFSA No. 645*;** Smith & Smith, 1966: 47*; van der Elst, 1981: 162*.

D X,21-23; A III,13-14; P 17-18; GR (8-9)+(14-16); LL 65-74.

A smaller, more tropical species than *C. capensis,* attaining 32 cm or 1.7 kg. Occurs mainly from Transkei coast to Madagascar but known as far south as Still Bay (west of Mossel Bay); often found in same area as stonebream. Spawns at about a length of 22 cm in winter and early spring off the Natal coast. Feeds on a variety of invertebrates. Flesh good but unlike that of *C. capensis.*

Family No. 188: PARASCORPIDIDAE

by P.C. Heemstra

Jutjaw fish **Kinnebakvis**

Body oval, compressed, covered with small ctenoid scales. Mouth large, lower jaw projecting; upper jaw not protrusile; maxilla exposed, scaly, without supramaxilla; minute teeth in narrow bands on jaws; vomer and palatines with or without a few microscopic teeth. Gill membranes separate, free from isthmus; 7 branchiostegals. Gill-rakers very long and numerous, easily visible within mouth; gills 4, a slit behind the last. Head and lower jaw scaly; preopercle finely serrate; opercle with a bluntly rounded, flat point posteriorly. Soft dorsal and anal fins scaly. Pelvic fins I,5, without a scaly axillary process at the base. Vertebrae 12+15.

This endemic, monotypic family has been included in the Kyphosidae or Scorpididae by some authors, but it is not closely related to these groups and deserves recognition as a separate family

188.1 *Parascorpis typus*
Bleeker, 1875

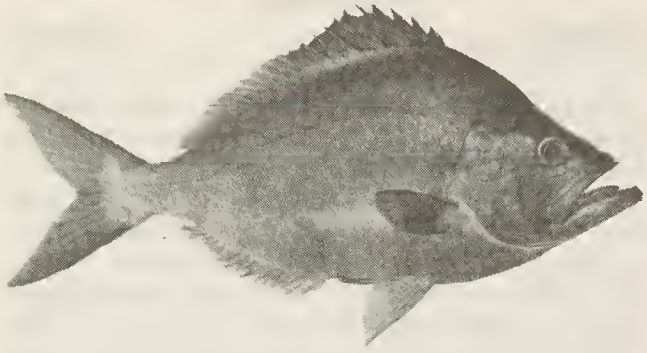
Jutjaw Kinnebak

Parascorpis typus Bleeker, 1875: 381, Pl. 7 (Cape of Good Hope); Smith, **SFSA No. 407*;** Smith & Smith, 1966: 121*. *Atyposoma gurneyi* Boulenger, 1899: 379, Pl. 9 (False Bay).

D XI-XII,15-17; A III,13-15; P 17; LL 60-70 (obscured by overlying scales); GR 18+(36-40). Depth 2.0-2.2, head 2.7-2.8 in SL. Anterior nostril a short tube.

A dull grey-brown fish. Attains 60 cm. As indicated by the feeble dentition and long numerous gill-rakers, the jutjaw feeds on zooplankton which it strains from the water;

consequently it is rarely caught by anglers. Flesh good. Known only from False Bay to Maputo in 20 - 200 m.



188.1 *Parascorpis typus:* 35 cm SL (Port Alfred).

Family No. 189: KYPHOSIDAE

by M.M. Smith

Sea chubs **See-vetsakke**

Body oval, with small, weakly ctenoid scales covering head, body and fins; mouth small; maxilla scaly; outer series of incisors with long roots in jaws and fine teeth within jaws, on palate and sometimes on tongue. Single dorsal fin with 10 or 11 spines and 11-15 soft-rays; anal fin with 3 spines and 11-14 soft-rays. Gasbladder divided behind, extends into tail.

Moderate-sized fishes of shallow water about rocks and reefs; feed mainly on algae and associated small creatures. Flesh not highly esteemed. Three genera, the 2 monotypic genera *Hermosilla* Jordan & Evermann, 1889 and *Sectator* Jordan & Fowler, 1893 from the Pacific differ from *Kyphosus* in the naked interorbital and edentate tongue of the former, and elongate body and small incisiform teeth with inconspicuous roots of the latter.

Genus ***Kyphosus*** Lacepède, 1801

Circumglobal in warm water; contains about 7 species, 3 in our area.

KEY TO SPECIES

1a Anterior D soft-rays longer than D spines ..... *K. cinerascens*
1b No D soft-rays longer than D spines 2

2a D soft-rays 12; lower GR 14-16; soft D base less than spinous D base ..... *K. bigibbus*
2b D soft-rays 13-15 (our area 14); lower GR 20-24; soft D base longer than spinous D base ..... *K. vaigiensis*

189.1 *Kyphosus bigibbus* Lacepède, 1801

Grey chub — Grys vetsak

Kyphosus bigibbus Lacepède, 1801: 115, Pl. 8, Fig. 1 (no locality); Smith, **SFSA No. 639*;** van der Elst, 1981: 185*.

D XI,12; A III,11; P 18-20; GR (6-7)+(14-16) = 20-22; LL 65-75 (pores 51-54).

Colour variable, brown band across interorbital; xanthitic form has body and fins bright yellow, dark edge to C, but brown band from corner of mouth to angle of preopercle always present. Attains 75 cm. South African angling record 6.8 kg, spearfishing record 10.0 kg. Red Sea to Japan and Hawaii; south to Cape of Good Hope, found with floating objects in Agulhas Current.

189.1 *Kyphosus bigibbus:* 60 cm (Kenya).

189.2 *Kyphosus cinerascens* (Forsskål, 1775)

PLATE 68

Blue chub — Blou vetsak

Sciaena cinerascens Forsskål, 1775: xii, 53 (Arabia). *Kyphosus cinerascens:* Smith, **SFSA No. 638*.**

D XI,12; A III,11; P 18-19; LL 65-72 (1 specimen has 78); (55-58 pores); GR (8-10)+(18-20) = 26-30. Soft D base shorter than spinous D base.

Silvery-blue, darker above; silver band below eye and yellow lines along body scale rows; fins dark. Attains over 50 cm. Red Sea, Indo-West Pacific south to East London. Reported that *K. cinerascens* swims in groups high in water column during the day, but at night it swims alone near the bottom.

189.3 *Kyphosus vaigiensis* (Quoy & Gaimard, 1825)

Brassy chub — Brons vetsak

Pimelepterus vaigiensis Quoy & Gaimard, 1825: 386, Pl. 61, Fig. 4 (Waigeo, Indonesia). *Kyphosus vaigiensis:* Smith, **SFSA No. 638a*.**

189.3 *Kyphosus vaigiensis:* 65 cm (Inhaca Id.).

D X-XI,14; A III,12-14; P 19-20; GR (9-10)+(20-24) = 30-34; LL 77-80 (58-61 pores).

Colour slate blue with brilliant bronzy lines along head and scale rows of body; P orange. Attains 60 cm. Indo-Pacific south to Algoa Bay.

Family No. 190: SCORPIDIDAE

by M.M. Smith

Stonebreams **Stinkvisse**

Body compressed, ovate, covered with small, firmly adherent, ctenoid scales which extend onto head and soft parts of vertical fins. Dorsal fin with 6-8 short spines; anal fin with 3 minute spines covered by skin and scales at front margin of fin; pelvic fins small but distinct, with 1 spine and 5 branched rays. Mouth small; jaws with fine teeth in bands, outer row enlarged, pointed.

At least 7 genera with 9 species, mostly in the Pacific and around Australia; anti-tropical distribution. (*Parascorpis* is, in this work, placed in its own family, Parascorpididae.) One genus in our area.

Genus ***Neoscorpis*** Smith, 1931

Preopercle not serrated; gasbladder posteriorly divided. A single endemic species.

190.1 *Neoscorpis lithophilus*
(Gilchrist & Thompson, 1908)
PLATE 68

Stonebream Stinkvis

Scorpis lithophilus Gilchrist & Thompson, 1908: 162 (Natal). *Neoscorpis lithophilus* Smith, **SFSA No. 646***; Smith & Smith, 1966: 129*; van der Elst, 1981: 282*.

D VI-VIII+20-25; A III,23-26; P 16-18; GR (6-8)+(12-15) = 20-23; LL 72-76; LS 90-97.

Eats red and green algae; it has been suggested that the black lining of the coelomic cavity stops photosynthesis of the algae in the gut. Similar habitat to banded galjoen. Sexually mature at 35 cm; spawns spring to summer off Natal; uses tidepools as nursery areas. Attains 50 cm, angling record 2.5 kg; takes shrimp and redbait readily and affords good sport on light tackle. Good eating despite unpleasant odour from intestine. False Bay to southern Mozambique in shallow rocky areas.

Family No. 191: SCATOPHAGIDAE

by P.C. Heemstra

Scatties **Skatties**

Body compressed, covered with minute, ctenoid scales; lateral line complete. Head scaly; no spines or serrae on head bones. Postlarvae with bony shields on the head and a large spine at the shoulder, all vanishing with growth. Jaws not protrusile, with bands of minute, slender, tricuspid, movable teeth; vomer and palatines edentate. Maxilla covered by preorbital bone. Fins with strong spines that can produce a painful wound; anal fin spines 4; pelvic fins with 1 spine and 5 branched rays; caudal fin branched rays 14. Gasbladder simple. Branchiostegal membranes united, forming a narrow fold across isthmus; branchiostegals 6; gill-rakers short and slender.

Two genera and 3 or 4 species; 1 species in our area.

191.1 *Scatophagus tetracanthus*
(Lacepède, 1801)
PLATE 68

Scatty Skattie

Chaetodon tetracanthus Lacepède, 1801: Pl. 25, Fig. 2 (no locality); 1802: 726. *Scatophagus tetracanthus*: Smith, **SFSA No. 582***.

D X/I,15-18; A IV,14-15; P 16; GR 9-11. Depth 1.4-1.6, head 3.1-3.3 in SL; eye 1.9-2.1 in interorbital.

A shoaling species, common in harbours and estuaries; feeds on algae and sewage. Attains 18 cm. Widespread in Indo-West Pacific region, common in Delagoa Bay, reaches Durban.

191.1 *Scatophagus tetracanthus*. 15 cm (Mozambique).

Family No. 192: EPHIPPIDAE

by M.M. Smith

Batfishes **Vlermuisvisse**

Deep compressed body with moderate to small ctenoid scales. Head short, parabolic profile; no scales in front of eye. Mouth small, terminal with tricuspid teeth; 6 branchiostegals, gasbladder present; vertebrae 10+14.

In this family is included the Platacidae but not the Drepanidae. Five genera: 2 in our area plus *Chaetodipterus* Lacepède, 1802 (synonym *Ephippus* Cuvier, 1816) from the Pacific and Atlantic, *Parapsettus* Steindachner, 1876 from the East Pacific and *Zabidius* Whitley, 1930 from Australia.

KEY TO GENERA

1a D spines not easily seen, graduated up and confluent with soft fin; LL 50 or more ..... *Platax*
1b D spines strong, distinct, 3-5th longest, longer than soft-rays; LL 43-45 ..... *Tripterodon*

Genus *Platax* Cuvier, 1816

Easily recognised by the smooth dorsal profile sweeping uninterruptedly to the long soft dorsal anterior rays. Lower GR 8-10; preopercle margin smooth in adults; teeth slender but dilated and tricuspid apically, a few teeth on vomer in some species. Scales small and adherent; nearly the whole interorbital naked. Considerable changes occur in shape with growth; juveniles with very elongate D and A. Generally caught by nets; flesh not esteemed. Difficulty in distinguishing between the species caused the genus at one time to be considered monotypic. Now, however, 4 species are recognised, 3 from our area; *P. batavianus* Cuvier, 1831 from Australia and the Pacific has D VI-VII,28-32 and A III,19-21.

KEY TO SPECIES

1a All 3 cusps on teeth subequal; mouth profile rounded; anterior dorsal profile of head smoothly convex; scales small: 40-45 from LL origin to 1st D spine; soft D and A greatly elongated; 28-34 D rays ..... *P. teira*
1b Middle tooth cusp longer and stronger than lateral cusps, mouth profile pointed; 25-30 scales from LL origin to 1st D spine; 35-37 D rays 2

2a Snout convex; chin with 5 mandibular pores each side ..... *P. orbicularis*
2b Snout concave before eyes; chin with 3-4 mandibular pores each side; colour generally dark most of life ..... *P. pinnatus*

192.1 *Platax orbicularis*

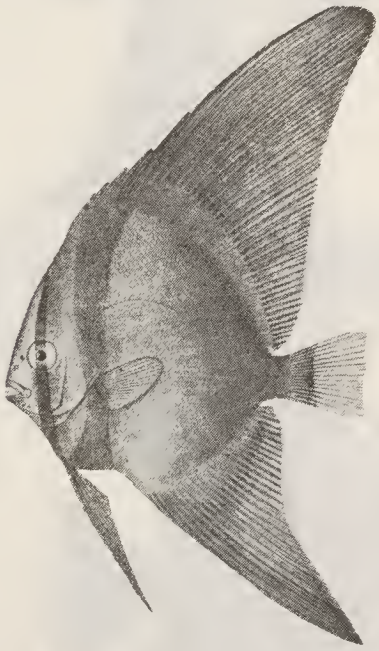
(Forsskål, 1775)

Orbicular batfish Ronde vlermuisvis

Chaetodon orbicularis Forsskål, 1775: 59 (Djedda, Red Sea). *Platax vespertilio:* Barnard, 1927: 606. *Platax pinnatus* (*non* Linnaeus): Smith, **SFSA No. 577*.**

D V,36-37; A III,26-27; P 17-19; LL 48-56.

Young have yellow or orange background, but colour and intensity of black bars fade with growth; in adults the vertical band through the eye is not solid but a series of dark vermiculations. Attains 30 cm. The young when startled wrinkle up the long fins, lie inert and sink slowly, looking much like a dead leaf. The commonest species in our area; Indo-West Pacific south to Knysna.



192.1 *Platax orbicularis*: 6 cm SL (after Taylor, 1964).

192.2 *Platax pinnatus*

(Linnaeus, 1758)

Dusky batfish Donker vlermuisvis

Chaetodon pinnatus Linnaeus, 1758: 272 (East Indies). *Platax pinnatus:* Smith, 1980: 178.

D V,35-37; A III,26-28; P 18-20; LL 48-53.

Juveniles less than 12 cm SL are blackish brown with bright orange border along D, A and V and from lips to D origin; C with upper and lower edges orange, also fine orange bar before colourless hind part of fin. Adults with P black basally, yellow distally; V black; body silvery grey with 2 broad solid black bars anteriorly and the 3rd posteriorly on body. Attains 30 cm. Indo-West Pacific south to Sodwana Bay and possibly Durban.

192.2 *Platax pinnatus:* 14 cm SL (after Randall & Emery, 1971).

192.3 *Platax teira*
(Forsskål, 1775)
PLATE 68

Longfin batfish — Langvin-vlermuisvis

Chaetodon teira Forsskål, 1775: 60 (Lohaja, Red Sea). *Platax teira:* Smith, 1980: 178.

D V-VI,28-34; A III,22-28; P 16-18; LL 48-53; 5 pores each side of mandible.

Juveniles with exceptionally long soft D and A edged bright orange. The ocular band of adults is uniformly dark (not striated). A graceful fish with D and A more pointed than those of other species. Attains 50 cm. Indo-West Pacific south to Durban.

Genus ***Tripterodon*** Playfair, 1866

Differentiated from *Chaetodipterus* Lacepède by tricuspid (not setiform), apically brown teeth. Monotypic.

192.4 *Tripterodon orbis*
Playfair, 1866

Spadefish — Graafvis

Tripterodon orbis Playfair, *in* Playfair & Günther, 1866: 42, Pl. 7, Fig. 1 (Zanzibar); Smith, 1936: 303* (revision); **SFSA No. 578*** (previous S.A. records confused this species with *Chaetodipterus orbis* (Bloch, 1787) and *C. goreensis* (Cuvier, 1831)).

D IX,19-21; A III,15-17; P 17-19; GR (11-13)+(9-11); upper GR packed close together; LL 43-45. D spines less produced in large specimens; 1st V ray elongate. Mouth small, lips thick, teeth movable, com-

192.3 *Platax teira:* top: 48 cm (Inhaca Id.); bottom: 8 cm SL (after Taylor, 1964).

192.4 *Tripterodon orbis:* top: 16 cm stained and cleared specimen; bottom: 21.5 cm specimen dissected to show gasbladder.

pressed, in about 4 rows; outer row with 18-20 teeth in each jaw; inner teeth embedded in fleshy pads; palate and tongue edentate. Juveniles orbicular, body depth decreases with growth.

Silvery brown; dark crossbars, generally narrower than interspaces, disappear with growth. Attains 50 cm. Kenya south to Algoa Bay; not uncommon about reefs in Mozambique, where large specimens have been seen to jerk the head up and allow cleaner wrasses to enter and clean the mouth. Young taken in nets, larger specimens fight quite gamely when hooked. Flesh palatable.

Family No. 193: MONODACTYLIDAE

by P.C. Heemstra

Moonies **Maanskynvisse**

Body deep, compressed, covered with small deciduous scales extending onto median fins and head. Dorsal and anal fin spines reduced, mostly covered by skin and scales at front margin of these fins. Pelvic fins present in juveniles, rudimentary or absent in adults. Jaws with bands of tiny flattened or conical teeth; maxilla exposed; upper jaw slightly protrusile.

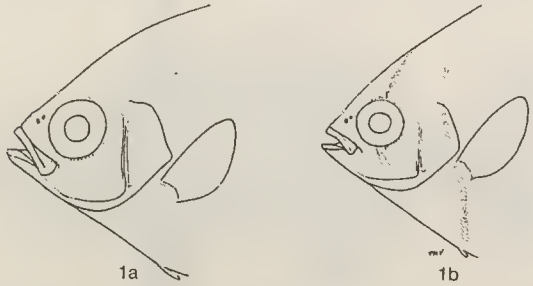
Two genera; *Psettus* is monotypic (*P. sebae* Cuvier, 1831 occurs in tropical west Africa and has the body depth greater than its length).

Genus ***Monodactylus*** Lacepède, 1800

Body depth 1.2-2.0 in SL; villiform or granular teeth on vomer, palatines, endopterygoids and tongue. Two species, both represented in our area. Moonies occur in large shoals in estuaries and over shallow reefs; they are at home in fresh or saltwater. Readily take a fly; eat almost anything. Flesh soft and spoils rapidly.

KEY TO SPECIES

1a Body depth 1.2-1.6 in SL; GR 8 + (18-22); maxilla width 3.4-5.0 in eye diameter; juveniles with only 2 dark vertical stripes ..... *M. argenteus*



1b Body depth 1.5-2.0 in SL; GR 9 + (22-24); maxilla width 2.7-3.7 in eye diameter; juveniles with 11-12 dark vertical stripes ..... *M. falciformis*

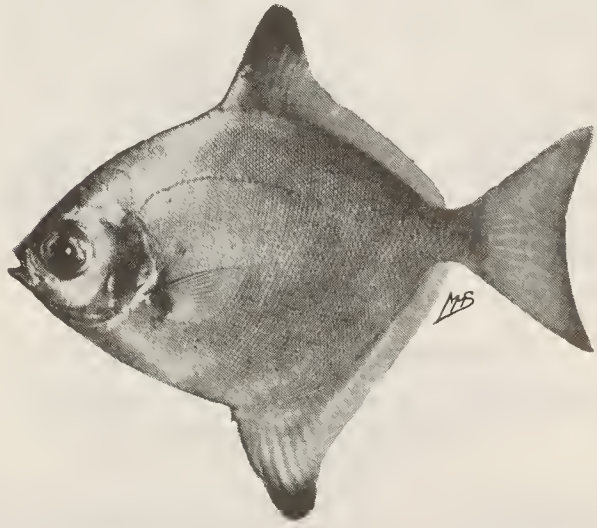
193.1 *Monodactylus argenteus*
(Linnaeus, 1758)

Natal moony — Natalse maanskynvis

Chaetodon argenteus Linnaeus, 1758: 272 (Indies). *Monodactylus argenteus*: Smith, **SFSA No. 581***; Penrith, 1969: 225.

D VIII,27-30; A III,27-30; P 16-18; GR 8+(18-22); LL 52-58. Upper jaw length less than eye diameter; maxilla width subequal to least preorbital depth; A base 1.7-1.9 in SL. Teeth in jaws flattened, tricuspid, the middle cusp much longer than the other two.

Adults silvery with anterior lobes of D and A dusky; juveniles dusky silver with 2 curved dark stripes across head. Attains 25 cm. Red Sea and Indo-West Pacific including Japan and Australia; extends south to the Breede River (Cape Infante).



193.1 *Monodactylus argenteus*: 12 cm (Inhaca Id.).

193.2 *Monodactylus falciformis*
Lacepède, 1800
PLATE 68

Cape moony — Kaapse maanskynvis

Monodactylus falciformis Lacepède, 1800: Pl. 5, Fig. 4 (no locality); 1801: 132; Smith, 1961: **No. 580***; Smith & Smith, 1966: 89*. *Stromatoidea layardi* Castelnau, 1861: 44 (Algoa Bay).

D VIII,25-30; A III,25-29; P 17-18; GR 9+(22-24); LL 51-58. Upper jaw length subequal to or more than eye diameter; maxilla width distinctly greater than least preorbital depth; A base 1.8-2.4 in SL. Teeth in jaws slender, slightly curved, needle-like.

Adults silvery with D and A lobes dusky; juveniles dusky, with 11-12 dark vertical bars. Attains 31 cm. Red Sea and Indian Ocean south to False Bay.

Family No. 194: GERREIDAE

by D.J. Woodland

Pursemouths **Plooibekke**

Body compressed, slender or deep. Scales large, deciduous. Dorsal fin more or less notched; with 9 or 10 spines and 9-11 rays. Anal fin III,7 (for species in our area). First dorsal and first anal spines very short; bases of dorsal and anal fins sheathed by a row of scales. Mouth very protrusible, arching downward when protracted; teeth minute.

Live in schools about sandy shallows of tidal creeks, lagoons, coral reefs and beaches subject to moderate wave action; enter freshwater. Feed by picking at bottom invertebrates or by taking in mouthfuls of sand which they sieve through the gill-rakers. Overall coloration brilliant silver. Some species with upper sides variously marked with dusky spots, bars or stripes; juveniles of most species have dusky bars on their sides; dead specimens often develop a dusky stripe along each scale row. Seldom exceed 15 cm, a few species attain 30 cm. Flesh excellent, but spoils very rapidly. For these reasons of little interest to anglers, except that they may be netted in large numbers in tidal creeks to provide an excellent bait. Occurring in all warm seas; a few species prefer more temperate waters. Perhaps as many as 40 species; 5 or 6 genera, but only 1 in our area.

Genus ***Gerres*** Quoy & Gaimard, 1824

Perhaps as many as 30 species, but only 5 in our area.

KEY TO SPECIES

1a Second D spine much longer than head (in specimens 4-6 cm SL, 2nd D spine not longer than head, but its tip reaches past base of last D spine); 3rd D spine equal to or longer than distance from tip of snout to rear edge of preopercle ..... *G. filamentosus*

1b Second D spine shorter than head (in specimens 4-6 cm SL, 2nd D spine not reaching last D spine) 2

2a Last two D spines longer than eye diameter ..... *G. rappi*

2b Last two D spines not longer than eye diameter 3

3a Body depth 2.5-2.9 in SL ..... *G. acinaces*

3b Body depth 3.0-3.4 in SL 4

4a 3½ scale rows between LL and base of 5th D spine; LL 35-39 (+ 3-4 on C) ..... *G. oyena*

4b 4½-5½ scale rows between LL and base of 5th D spine; LL 44-45 (+ 4-5 on C) ..... *G. oblongus*

194.1 *Gerres acinaces*

Bleeker, 1854

PLATE 68

Smallscale pursemouth **Kleinskub-plooibek**

Gerres acinaces Bleeker, 1854: 194 (Jakarta, Java); Smith, **SFSA No. 631;** Blaber, 1978: 33. *Gerres lineolatus:* Regan, 1908: 245. *Gerres oyena* Smith, SFSA **No. 629*** (figure only).

D IX-X,9-11; A III,7; LL 42-44 (+ 3-5 on C); 4½-5½ scale rows between LL and base of 5th D spine. Depth 2.5-2.9. Longest C rays longer than either P or head. Second A spine longer than eye diameter.

Sides olive above to silvery below; in young, 7 or 8 dusky bars on sides of body; in older fish, several vertical series of ovoid spots below LL and rows of dark spots following scale rows above LL. Trailing margin of C black. Attains 25 cm. Tropical Indo-Pacific, south to Algoa Bay.

194.1 *Gerres acinaces:* 23 cm (Inhaca Id.).

194.2 *Gerres filamentosus*

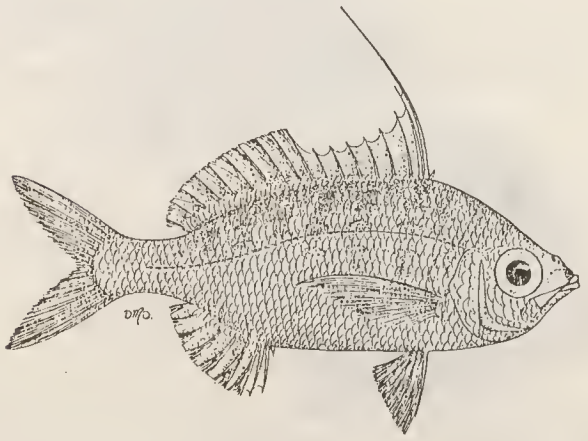
Cuvier, 1829

Threadfin pursemouth **Sweepvin-plooibek**

Gerres filamentosus Cuvier, 1829: 188 (Vizagapatam, India). *Gerres punctatus:* Smith, **SFSA No. 628***; Blaber, 1978: 33.

D IX,10; A III,7; LL 43-47 (+ 2-3 on C); 4½-5 scale rows between LL and base of 5th D spine. Depth 2.0-2.5 in fish longer than 9 cm SL, 2.5-3.0 in smaller fish.

Silvery, with 8-10 vertical series of ovoid bluish spots on sides, coalesced as bars in juveniles. Attains 25 cm. Indo-Pacific, common in northern part of our area; strays as far south as Algoa Bay; to 50 m.



194.2 *Gerres filamentosus:* 15 cm (Durban).

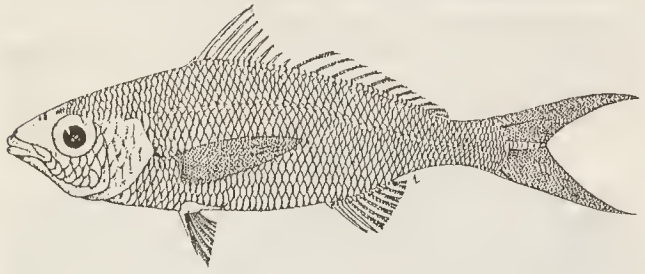
194.3 *Gerres oblongus*
Cuvier, 1830

Oblong pursemouth — Langwerpige plooibek

Gerres oblongus Cuvier, *in* Cuv. & Val. 1830: 479 (Sri Lanka); Smith, **SFSA No. 633;** Blaber, 1978: 40.

D IX,10; A III,7; LL 44-45 (+ 4-5 on C); 4½-5½ scale rows between LL and base of 5th D spine. Depth 3.1-3.4. P reaching to just above anus, subequal to head. Profile from tip of snout to D origin almost straight.

Sides silvery, faint lilac-brown dorsally, with 6 or 7 indistinct dusky bars on upper half of body. Attains 30 cm. Tropical Indo-Pacific, south to Kosi Bay.



194.3 *Gerres oblongus*: 16.5 cm (Natal).

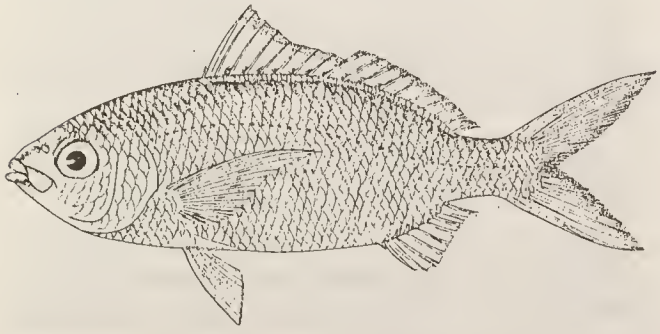
194.4 *Gerres oyena*
(Forsskål, 1775)

Slenderspine pursemouth — Slankstekel-plooibek

Labrus oyena Forsskål, 1775: 35 (but not variety *b*) (Suez or Jeddah, Red Sea). *Gerres oyena:* Smith, **SFSA No. 629** (figure not *oyena*, but *G. acinaces*); Blaber, 1978: 40. *?Gerres poeti* (*non G. poieti* Cuvier): Smith, **SFSA No. 630.**

D IX,10; A III,7; LL 35-39 (+ 3-4 on C); 3½ scale rows between LL and base of 5th D spine. Depth 3.0-3.3. Longest C rays subequal to either P or head. Second A spine slender, not longer than eye diameter. P reaching to just above anus.

Body olive above to silvery below; 7 or 8 dusky bars on sides, more pronounced in young; C uniformly dusky. Attains 25 cm. Tropical Indo-Pacific, south to Kosi Bay.



194.4 *Gerres oyena*: ca. 15 cm (after Woodland, 1984).

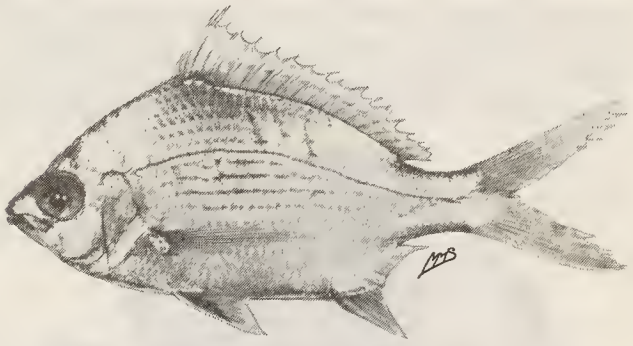
194.5 *Gerres rappi*
(Barnard, 1927)

Evenfin pursemouth — Gelykvin-plooibek

Xystaema rappi Barnard, 1927: 630, Fig. 21 (Cape Province). *Gerres longirostris* (*non* Lacepède): Rapp, *in* Günther, 1861: 142*. *Gerres rappi:* Smith, **SFSA No. 632;** Blaber, 1978: 33.

D IX,10-11; A III,7; LL 41-45 (+ 3-4 on C); 5-5½ scale rows between LL and base of 5th D spine. Depth 2.1-2.3. Longest C rays subequal to P and much longer than head.

Body silvery, olive-brown on upper half; prominent brown stripes following scale rows above LL and the 4 rows immediately below it; margin of spinous D black; tips of D rays and trailing margin of C dusky. Attains 30 cm. Apparently a temperate species ranging from Algoa Bay into southern Mozambique; also reported from Madagascar.



194.5 *Gerres rappi*: 18 cm (Algoa Bay).

Family No. 195: DREPANIDAE

by M.M. Smith

Sicklefishes — **Sekelvisse**

Body oval, strongly compressed, covered with cycloid scales which extend onto top of head and bases of median fins. Mouth very protrusile. Dorsal fin with 8 or 9 spines and 19-22 soft-rays; anal fin with 3 spines and 17-19 soft-rays; pelvic fins well developed, with a spine and 5 branched rays.

Placed by some authors in the Ephippidae but differs externally in the cycloid scales, sickle-shaped pectoral fins longer than head, and the downward-protrusible mouth. This last character is similar to the Gerreidae, but the more slender *Gerres* (depth at least 2 in SL) has about half the number of dorsal soft-rays. A single genus.

Genus ***Drepane*** Cuvier, 1831

Two or 3 species. The only difference between *D. punctatus* (Linnaeus, 1758) and *D. longimanus* is apparently that of colour: *D. punctatus* has been described and figured with vertical lines of dark spots on the side where *D. longimanus* has dark bars. If the genus is not monotypic it is possible that both species may occur here. As all the

specimens in our collection have bars or are uniformly coloured, we use the name *Drepane longimanus* for those fishes in our area.

195.1 *Drepane longimanus*
(Bloch & Schneider, 1801)

Concertina-fish Konsertinavis

Chaetodon longimanus Bloch & Schneider, 1801: 229 (Tranquebar, India). *Drepane punctata* (*non* Linnaeus): Smith, **SFSA No. 576*;** van der Elst, 1981: 168*.

D VIII-IX,19-22; A III,17-19; P 16-18 reaches beyond A base; GR (6-8)+(10-12); LL 45-55.

Silvery with purple and yellow reflections, uniform or with 4-9 vertical bars dorsally, some reach midline of body, others stop at LL. Attains 40 cm. Eats small invertebrates extracted from the mud. Breeds close inshore during spring. Often enters estuaries in Natal. Tropical Indo-West Pacific south to East London. Taken in nets, stated that the flesh is of good quality but not generally esteemed as food.

195.1 *Drepane longimanus:* 34 cm (Algoa Bay).

Family No. 196: MULLIDAE

by A. Ben-Tuvia

Goatfishes **Bokvisse**

Body oblong, moderately compressed. Two long unbranched barbels on chin. Teeth in jaws in one or several series, villiform or conical. Scales large, slightly ctenoid. Mouth rather small, protractile; no supplementary maxillary bone. Usually a small, flat spine on opercle. Spiny and soft dorsal fins well separated. Anal fin similar in shape to second dorsal. Pectoral fins short, with 15-18 rays (our species generally 16-17, of no systematic significance), ending about the level of tips of ventrals. Ventral fins with 1 spinous and 5 soft-rays; scaly axillary process present at base of ventral fins. Caudal fin forked. Vertebrae 24.

Bottom fishes of moderate size inhabiting continental shelf of tropical and subtropical seas. Feed on zoobenthos while stirring bottom with barbels. Important commercial fishes renowned for their delicious flesh. Five or 6 genera worldwide and about 30 species; 3 genera and 14 species known from our area.

The keys used here are based on specimens mostly larger than 10 cm SL.

KEY TO GENERA

1a Villiform teeth in several series on jaws, vomer and palatines; 2nd D and A scaly ..... *Upeneus*
1b Teeth villiform or conical on jaws only, none on vomer or palatines; 2nd D and A not scaly 2

2a Teeth villiform in 1-3 rows; 4 or 5 scales between 1st and 2nd D ..... *Mulloides*
2b Teeth conical, strong, in 1 row only; 2 or 3 scales between 1st and 2nd D ..... *Parupeneus*

Genus ***Mulloides*** Bleeker, 1849

The genus *Mulloidichthys* Whitley, 1929, was substituted for *Mulloides*, but the latter proved not to be preoccupied, as Richardson in 1843 used it only in synonymy. Teeth in jaws villiform, in 2-3 rows anteriorly, decreasing to 1 or 2 rows on sides; no teeth on vomer and palatines; 11-12 scale series between 2nd D and C. Body mostly yellow without dark marks on fins. Often in large schools near bottom or in water column. Four species, 1 in our area.

KEY TO SPECIES

1a Rear edge of maxilla not closer to vertical line from front edge of orbit than to vertical at front nostril; lower GR 18-20; barbels slightly less than snout plus eye diameter ..... *M. flavolineatus*
1b Rear edge of maxilla much closer to vertical line from front edge of orbit than to vertical at front nostril; lower GR 22-24; barbels longer than snout plus eye diameter ..... *M. vanicolensis*

196.1 *Mulloides flavolineatus*
(Lacepède, 1801)
PLATE 69

Yellowstripe goatfish Geelstreep-bokvis

Mullus flavolineatus Lacepède, 1801 : 384, 406 (Hawaiian Ids.). *Mulloidichthys samoensis:* Smith, **SFSA No. 573*;** Thomas, 1969: 71*. *Mulloidichthys auriflamma* (*non* Forsskål): Smith, **SFSA No. 572** (in part). *Mulloides flavolineatus:* Smith, 1975: 43.

D VII+I,8; A I,6; LL 33-35; GR (7-8)+(22-25). Depth 4.0-4.5, head 3.1-3.4 in SL; snout 2.0-2.5, eye 3.3-3.9, interorbital 3.5-4.0, barbels 1.5-1.8, peduncle depth 3.3-3.5, peduncle length 1.1-1.3 in head.

Body grey to olive on back, whitish on sides and belly; 1 or 2 longitudinal yellow bands; small dark blotch often present below 1st D. Attains 30 cm. Indo-West Pacific and Red Sea; extending to Knysna.

196.2 *Mulloides vanicolensis*
(Valenciennes, 1831)
PLATE 69

Flame goatfish — Vlam-bokvis

Upeneus vanicolensis Valenciennes, *in* Cuv. & Val., 1831, 7: 521 (Vanicolo). *Mulloidichthys auriflamma* (*non* Forsskål): Smith, **SFSA No. 572*** (in part). *Mulloidichthys flavolineatus* (*non* Lacepède): Thomas, 1969: 73*.

D VII+1,8; A I,6; LL 32-35; GR (7-8)+(22-24). Depth 3.8-4.0, head 3.2-3.4 in SL; snout 2.5-2.8, eye 3.1-3.5, interorbital 3.3-3.6, barbels 1.3-1.4, peduncle depth 3.0-3.4, peduncle length 1.2-1.4 in head.

Body red-orange to olive on back and whitish on sides and belly; yellow longitudinal band often present; no dark blotch on sides under middle of 1st D. Attains 33 cm. Indo-West Pacific, Red Sea and southward probably to Delagoa Bay.

Genus ***Parupeneus*** Bleeker, 1863

Teeth in jaws conical, stout, in 1 row only; none on vomer and palatines; 8-9 scale series between 2nd D and C. Closely related to *Pseudupeneus* Bleeker, 1862 (of the Atlantic and East Pacific); in adult males of *Pseudupeneus* the teeth are in 2 rows with a few in outer row enlarged and curved. Often swim in pairs or in groups, disturbing the bottom with their barbels, followed occasionally by labrids like *Gomphosus* and *Macropharyngodon* species to feed on any disturbed benthic invertebrates. About 14 species, 8 in our area.

KEY TO SPECIES

1a Dark longitudinal band from snout or eye to below 2nd D; dark round blotch on C peduncle centred on LL, diameter no more than 2½ scales 2
1b No dark longitudinal band; dark blotch on C peduncle absent, or more than ½ of blotch above LL, extending over 3 or more scales 3

2a Barbels much longer than snout plus eye; dark blotch at midpoint of C peduncle ..... *P. macronema*
2b Barbels shorter than or equal to snout plus eye; dark blotch close to end of C peduncle ..... *P. barberinus*

3a Large oval dark blotch about twice eye diameter on side of C peduncle; yellow or whitish oblong blotch from below mid 1st D to front of 2nd D, almost completely above LL; lower GR 19-21 ..... *P. indicus*
3b No dark oval blotch on side of C peduncle; no light blotch on side of body; lower GR more than 20 (except *P. cinnabarinus*) 4

4a Black vertical bar below each D; body depth greater than head length; barbels almost reach rear edge of preopercle ..... *P. bifasciatus*
4b No vertical bars, body depth not greater than head length; barbels extend well past preopercle 5

5a Barbels reach base of V; their length less than 1.2 in head ..... *P. cyclostomus*
5b Barbels reach slightly beyond rear edge of preopercle; their length more than 1.2 in head 6

6a Large dark blotch on LL below interdorsal space; body depth more than 3.4 in SL ..... *P. pleurostigma*
6b No dark blotch on LL below interdorsal space; body depth less than 3.4 in SL 7

7a Dark blotch usually present, in form of saddle over rear ½ of C peduncle, preceded by a light patch; lower GR 23-26; upper lip slightly wider posteriorly ..... *P. rubescens*
7b No dark saddle on C peduncle; lower GR 19-22; upper lip narrow posteriorly ..... *P. cinnabarinus*

196.3 *Parupeneus barberinus*
(Lacepède, 1801)
PLATE 69

Dash-dot goatfish — Streepkol-bokvis

Mullus barberinus Lacepède, 1801: 383, 406, Pl. 13, Fig. 2 (Indo-Pacific). *Pseudupeneus barberinus:* Smith, **SFSA No. 566*;** Thomas, 1969: 39*.

D VIII+I,8; A I,6; LL 27-29; GR (6-7)+(19-23). Depth 3.1-3.5, head 2.9-3.2 in SL; snout 1.8-2.1, eye 4.9-5.6, interorbital 3.4-4.4, barbels 1.2-1.5 in head. Peduncle depth 2.8-3.0, peduncle length 1.2-1.4 in head. Last ray of 2nd D not elongated and far from reaching C peduncle blotch.

Attains 40 cm. Indo-West Pacific south to Mossel Bay; replaced in the Red Sea by closely related *P. forsskali* (Fourmanoir & Guézé, 1976).

196.4 *Parupeneus bifasciatus*
(Lacepède, 1801)
PLATE 69

Two-saddle goatfish — Tweesaal-bokvis

Mullus bifasciatus Lacepède, 1801: 383, 404, Pl. 14, Fig. 2 (Indo-Pacific). *Pseudupeneus bifasciatus:* Smith, 1961: 568, **No. 571a;** Thomas, 1969: 53*.

D VIII+I,8; A I,6; LL 27-28; GR (7-8)+(27-30); depth 2.9-3.1, head 3.3-3.4 in SL; snout 1.8-1.9, eye 5.2.6.8, interorbital 3.1-3.3, barbels 1.7-1.8, peduncle depth 2.2-2.4, peduncle length 1.1-1.2 in head.

Attains 30 cm. Indo-West Pacific south to Sodwana Bay.

196.5 *Parupeneus cinnabarinus*
(Cuvier, 1829)
PLATE 69

Redspot goatfish — Rooikol-bokvis

Upeneus cinnabarinus Cuvier, *in* Cuv. & Val., 1829: 475 (Ceylon). *Pseudupeneus pleurospilos:* Smith, **SFSA No. 569***. *Pseudupeneus seychellensis* Smith & Smith, 1963: 22, Pl. 88, Fig. B (Seychelles). *Parupeneus pleurospilus:* Thomas, 1969: 61. *Pseudupeneus heptacanthus* (*non* Lacepède): Smith, 1975: 43. *Parupeneus heptacanthus* (*non* Lacepède): Smith, 1980: 178.

D VIII+1,8; A I,6; LL 27-28; GR (6-7)+(19-21). Depth 3.0-3.3, head 2.9-3.2 in SL; snout 1.8-2.0, eye 4.5-5.4, interorbital 3.8-4.2, barbels 1.1-1.4, peduncle depth 3.1-3.5, peduncle length 1.2-1.5 in head. Third D spine longest.

A small dark rectangular blotch below and behind 1st D often visible on fresh specimens; colour variable, usually

golden on sides with faint longitudinal yellow band and lines of dots on scales. Attains 28 cm; Indo-West Pacific, Red Sea, south to the Transkei.

196.6 *Parupeneus cyclostomus*
(Lacepède, 1801)
PLATE 69

Goldsaddle goatfish — Goudsaal-bokvis

Mullus cyclostomus Lacepède, 1801: 383, 404, Pl. 14, Fig. 3 (Indo-Pacific). *Pseudupeneus cyclostomus:* Smith, **SFSA No. 570*.** *Pseudupeneus luteus:* Smith, 1961: 568, **No. 569a.** *Parupeneus cyclostomus:* Thomas, 1969: 65*. *Parupeneus luteus:* Thomas, 1969: 69*.

D VIII+I,8; A I,6; LL 27-28; GR (6-7)+(21-24). Depth 3.3-3.5, head 2.9-3.1 in SL; snout 1.8-2.0, eye 6.2-6.9, interorbital 3.9-4.1, barbels 1.1-1.2, peduncle depth 2.6-2.9, peduncle length 1.4-1.5 in head.

Red, red-bluish or blue with a yellow saddle behind 2nd D and often with blue streaks on head; occasionally uniformly yellow. Attains 48 cm. Indo-West Pacific, Red Sea, southwards to Durban.

196.7 *Parupeneus indicus*
(Shaw, 1803)
PLATE 69

Indian goatfish — Indiese bokvis

Mullus indicus Shaw, 1803: 614 (India). *Pseudupeneus indicus:* Smith, **SFSA No. 567*;** Thomas, 1969: 55*.

D VIII+1,8; A I,6; LL 26-29; GR 6+(19-21). Depth 3.3-3.5, head 3.1-3.3 in SL; snout 1.9-2.2, eye 4.7-5.1, interorbital 3.7-4.0, barbels 1.3-1.5, peduncle depth 2.6-2.8, peduncle length 1.2-1.4 in head. In adults head subequal to body depth. Barbels extend beyond preopercle.

Attains 32 cm. Indo-West Pacific to Port Alfred.

196.8 *Parupeneus macronema*
(Lacepède, 1801)
PLATE 69

Band-dot goatfish — Bandkol-bokvis

Mullus macronema Lacepède, 1801: 383, 404, Pl. 13, Fig. 2 (Indo-Pacific). *Pseudupeneus macronema:* Smith, **SFSA No. 565*.** *Parupeneus macronemus:* Thomas, 1969: 51*.

D VIII+I,8; A I,6; LL 27-28; GR (8-9)+(26-29). Depth 2.9-3.2, head 2.9-3.2 in SL; snout 1.7-2.0, eye 4.8-5.3, interorbital 3.6-4.1, barbels 1.1-1.4, peduncle depth 2.5-3.0, peduncle length 1.3-1.5 in head. Last ray of 2nd dorsal extending beyond C peduncle blotch in adults.

Attains 35 cm. Indian Ocean and Red Sea; south to Sodwana Bay.

196.9 *Parupeneus pleurostigma*
(Bennett, 1831)
PLATE 69

Blackspot goatfish — Swartkol-bokvis

Upeneus pleurostigma Bennett, 1831: 59 (Mauritius). *Pseudupeneus pleurostigma:* Smith, **SFSA No. 568*.**

D VIII+1,8; A I,6; LL 27-29; GR (6-7)+ (22-23). Depth 3.5-3.7, head 2.9-3.2 in SL; snout 1.9-2.1, eye 4.8-5.1, interorbital 3.3-3.6, barbels 1.5-1.7, peduncle depth 3.0-3.3, peduncle length 1.2-1.4 in head. Third and last A rays longest, subequal to depth of C peduncle.

Attains 25 cm. Indo-West Pacific, south to Delagoa Bay.

196.10 *Parupeneus rubescens*
(Lacepède, 1801)
PLATE 70

Blacksaddle goatfish — Swartsaal-bokvis

Mullus rubescens Lacepède, 1801: 384; 408 (Mauritius). *Pseudupeneus fraterculus:* Smith, **SFSA No. 564*.** *Pseudupeneus pleurotaenia:* Smith, **SFSA No. 571*.** *Parupeneus pleurotaenia:* Thomas, 1969: 50*. *Parupeneus fraterculus:* Thomas, 1969: 61*.

D VIII+1,8; A I,6; LL 27-29; GR (6-7)+(23-26). Depth 3.0-3.4, head 3.0-3.3 in SL; snout 1.9-2.1, eye 4.6-5.6, interorbital 3.2-3.6, barbels 1.5-1.7, peduncle depth 2.4-2.8, peduncle length 1.2-1.4 in head; 3rd A ray much longer than last one.

Colour variable, black saddle on C peduncle present or absent. Attains 42 cm. Indo-West Pacific, Red Sea, south to Mossel Bay. Most common species in our area.

Genus ***Upeneus*** Cuvier, 1829

Band of villiform teeth on jaws, vomer and palatines. Maxilla reaches slightly beyond front margin of eye. Small scales present on lower half of soft D and A; 3-6 scale series between 1st and 2nd D, 11-12 between 2nd D and C. First D spines 8, with 1st spine minute, or 7 with 1st spine almost as long as the 2nd. Usually dark oblique bands on C lobes and dark markings on 1st D. Smaller than other mullids. Often in large shoals. About 13 species, 3 in our area.

KEY TO SPECIES

1a Lower GR 16-17; interdorsal scales 3-4; body with dark brown longitudinal stripe, or dark blotches with a dark saddle behind 2nd D ..... *U. tragula*
1b Lower GR 19-21; interdorsal scales 5-6; no dark longitudinal stripe or blotches on body 2

2a Barbels extend beyond rear edge of opercle; no oblique bars on C ..... *U. sulphureus*
2b Barbels do not reach rear edge of opercle; oblique bars on both lobes of C ..... *U. vittatus*

196.11 *Upeneus sulphureus*
Cuvier, 1829
PLATE 70

Sunrise goatfish — Dagbreek-bokvis

Upeneus sulphureus Cuvier, *in* Cuv. & Val., 1829: 450 (Sunda, Indonesia); Smith, **SFSA No. 563*;** Thomas, 1969: 17*.

D VIII+I,8 1st spine minute; A I,7; LL 33-35; GR 8+(20-21). Depth 3.4-3.5, head 3.1-3.3 in SL, snout 2.3-2.6, eye 3.6-3.7, interorbital 3.8-4.0, barbels 1.3-1.5, peduncle depth 2.6-2.7, peduncle length 1.4 in head.

Attains 20 cm. Indo-West Pacific, south to Delagoa Bay.

196.12 *Upeneus tragula*
Richardson, 1846
PLATE 70

Blackstriped goatfish — Swartstreep-bokvis

Upeneus tragula Richardson, 1846: 220 (Canton, India); Smith, **SFSA No. 560*;** Thomas, 1969: 23. *Upeneus bensasi* (*non* Schlegel): Smith, **SFSA No. 562*.**

D VIII+I,8 1st spine minute; A I,6; LL 29-30; GR (6-7)+(16-17). Depth 3.7-4.0, head 3.4-3.6 in SL; snout 2.3-2.5, eye 4.2-4.7, interorbital 3.6-3.8, barbels 1.7-1.8, peduncle depth 2.6-2.9, peduncle length 1.1-1.2 in head. Barbels not reaching preopercle margin.

Usually brown-blackish horizontal stripe from snout to C; irregular dots and blotches on body. Attains 20 cm. Indo-West Pacific, south to Durban.

196.13 *Upeneus vittatus*
(Forsskål, 1775)
PLATE 70

Yellowbanded goatfish — Geelband-bokvis

Mullus vittatus Forsskål, 1775: 31 (Djedda, Red Sea). *Upeneus vittatus:* Smith, **SFSA No. 561*;** Thomas, 1969: 23*.

D VIII+I,8 1st spine minute; A I,7; LL 34-35; GR (8-9)+(20-21). Depth 3.6-3.8, head 3.3-3.4 in SL; snout 2.6-2.9, eye 3.8-4.2, interorbital 3.5-3.9, barbels 1.7-1.9, peduncle depth 2.6-2.9, peduncle length 1.2-1.4 in head.

Attains 28 cm. Indo-West Pacific, Red Sea and southward to East London.

Family No. 197: MALACANTHIDAE

by P.C. Heemstra

Tilefishes — **Teëlvisse**

Body oblong, somewhat compressed or elongate and subcylindrical. Gill membranes free from isthmus; branchiostegals 6; gills 4, a slit behind last. Pelvic fins I,5; no scaly axillary process at base. Caudal fin with 15 branched rays. Nostrils paired. Villiform teeth and a few canines on jaws; no teeth on vomer or palatines. Opercle with 1 spine posteriorly; preopercle serrate or smooth.

The postlarval stages are remarkable for the elongated serrate spines on the head. The postlarvae are rather large (5-7 cm SL) before transforming to the juvenile stage, and were easily mistaken for distinct species. Recently revised by Dooley (1978), who recognises 2 families: Branchiostegidae (with 3 genera and 21 species) and Malacanthidae (with 2 genera and 8 species). Malacanthidae (Günther, 1861) is the oldest family name for these fishes. Three genera and 5 species in our area.

KEY TO GENERA

1a D spines + rays 46-63; A I,37-53 ..... *Malacanthus*
1b D spines + rays 21-23; A II,11-12 2

2a C truncate or emarginate; D VI-VII,14-16 ..... *Branchiostegus*
2b C forked; D X,13 ..... *Hoplolatilus*

Genus *Branchiostegus* Rafinesque, 1815

A low fleshy median ridge before D; preopercle serrate; LL scales 47-51; vertebrae 10+14. Dooley (1978) recognises 8 species in this genus; 2 occur in our area. *B. semifasciatus* (Norman, 1931) is included in the key, as it is known from southern Angola and may turn up in our area.

KEY TO SPECIES

1a Body with 5-7 rows of dark spots along middle of sides; dark spot at base of inter-radial membranes of D ..... *B. sawakinensis*
1b Body with 16-20 dark vertical bars dorsally; inter-radial membranes of D not dark at base of fin 2

2a No dark blotch on operculum; 19-20 dark bars on body; predorsal ridge dark; dark blotch at upper end of P base ..... *B. semifasciatus*
2b Dark blotch on operculum; 16-18 dark bars on body; predorsal ridge not dark; no dark blotch at upper end of P base ..... *B. doliatus*

197.1 *Branchiostegus doliatus*
(Cuvier, 1830)
PLATE 71

Ribbed tilefish — Geribde teëlvis

Latilus doliatus Cuvier, *in* Cuv. & Val., 1830: 371, Pl. 130 (Mauritius). *Branchiostegus doliatus:* Smith, **SFSA No. 416*;** Dooley, 1978: 42*.

D VII,16; A II,12; P 18; GR 7+(12-13). Body depth 3.7-4.0, head length 3.7-4.1 in SL; eye 3.1-3.9 in head. C emarginate, upper and lowermost rays slightly prolonged.

Body pink, suffused with yellow dorsally between the black bars; vertical fins yellowish. Attains 40 cm. Occurs in 9 - 600 m. Known from Maputo to Durban, Mauritius and Réunion.

197.2 *Branchiostegus sawakinensis*
Amirthalingam, 1969
PLATE 71

Spotted tilefish — Gespikkelde teëlvis

Branchiostegus japonicus (*non* Houttuyn): Smith, **SFSA No. 415***. *Branchiostegus sawakinensis* Amirthalingam, 1969: 129, Pl. 1 (Sawakin, Sudan); Dooley, 1978: 37*.

D VII,15; A II,12; P 18-19; GR 7+13. Body depth 3.3-4.0, head length 3.2-3.9 in SL; eye 4.0-4.8 in head. C margin convex.

Body pinkish brown dorsally, white ventrally; 2 horizontal yellow stripes across middle of C; lower C rays dusky; red spot on outer base of P and black spot in axil; predorsal ridge dark brown. Attains 60 cm. In our area known only from off Durban in 45 - 150 m; also recorded from Red Sea.

Genus ***Hoplolatilus*** Günther, 1887

No fleshy median ridge before D; preopercle serrate; vertebrae 10 or 11+14. Species of *Hoplolatilus* feed on zooplankton and build burrows into which they retreat at the approach of predators. In their revision of the genus, Dooley & Randall (1974) recognised 5 species; subsequently 3 more species of *Hoplolatilus* were described. One species in our area.

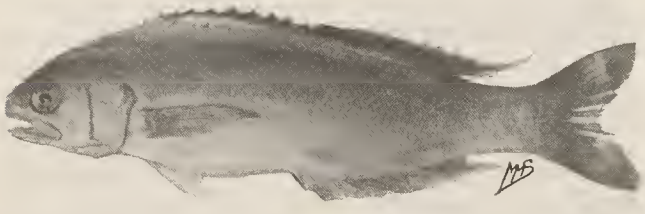
197.3 *Hoplolatilus fronticinctus*
(Günther, 1887)

Forktail tilefish — Vurkstert-teëlvis

Latilus fronticinctus Günther, 1887: 550, Pl. 48 (Mauritius). *Hoplolatilus fronticinctus*: Smith, 1963: 74*; Randall & Dooley, 1974: 462*; Dooley, 1978: 64*.

D X,13; A II,12; P 17; GR 25-28; LL 85-92. Body depth 3.3-4.0, head length 3.8-4.0 in SL; eye 3.9-4.4 in head. Preopercle with spine at angle enlarged. Skinny protuberance on rear margin of gill cavity. Penultimate D ray prolonged.

Body pale olive-grey, darker dorsally; belly pale blue; dark bluish violet band joining eyes across front of snout; lips and cheeks also blue; upper ⅓ of P bluish white, remainder pale yellow. Attains 21 cm. In our area, known only from postlarvae collected off the Cape Peninsula; also reported from India and the western Pacific.



197.3 *Hoplolatilus fronticinctus*. 21 cm (Mauritius).

Genus ***Malacanthus*** Cuvier, 1829

Body elongate, subcylindrical; body depth 5-8 in SL. No fleshy median ridge before D; preopercle edge smooth; opercular spine well developed; GR short; vertebrae 10+14. All 3 species of *Malacanthus* build burrows to which they retreat at the approach of danger; 2 species in our area.

KEY TO SPECIES

1a Body uniformly pale; C with 2 black stripes; A I,46-53 ..... *M. brevirostris*
1b Broad dark band from head to end of C; A 1,37-40 ..... *M. latovittatus*

197.4 *Malacanthus brevirostris*
Guichenot, 1848
PLATE 70

Stripetail tilefish — Streepstert-teëlvis

Malacanthus brevirostris Guichenot, 1848: 14 (Madagascar & Réunion); Dooley, 1978: 58*. *Malacanthus hoedtii*: Smith, 1955: 6*; 1961: 567, **No. 384a***. *Dikellorhynchus incredibilis* Smith, 1956: 54, Pl. 1 (between East London and Port Alfred); Hubbs, 1958: 282 (= *M. hoedtii* Bleeker); Smith, 1961: 567, **No. 384b***.

D I-IV,52-60; A 1,46-53; P 15-17; GR 9-20; LL 146-181. Body depth 6.2-8.3, head length 4.1-5.3 in SL; snout length 2.7-3.4 in head. Maxilla reaches past front edge of eye.

Attains 30 cm. A tropical Indo-Pacific species occurring from Red Sea to eastern Pacific; adults extend south to Sodwana Bay and postlarvae drift to near Port Alfred.

197.4 *Malacanthus brevirostris*: top: 7 cm juvenile and dorsal view of head of holotype of *Dikellorhynchus incredibilis* (E. Cape); bottom: 8 cm (N. Mozambique).

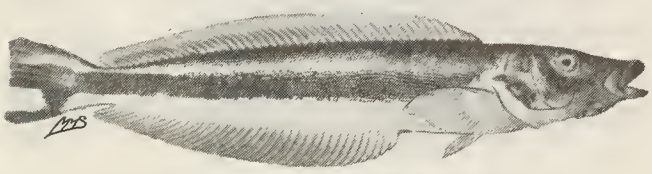
197.5 *Malacanthus latovittatus*
(Lacepède, 1801)
PLATE 70

Sand tilefish — Sand-teëlvis

Labrus latovittatus Lacepède, 1801: 455, 517, 526, Pl. 28 ("Great Equatorial Ocean" = Pacific). *Malacanthus latovittatus*: Smith, **SFSA No. 384***; Dooley, 1978: 60*.

D III-IV,43-47; A I,37-40; P 16-17; total GR 6-14; LL 116-132. Body depth 5.0-6.2, head length 3.0-4.0 in SL; snout length 2.1-2.7 in head. Maxilla not reaching past front edge of eye.

Head and body bluish; lower C rays black. In juveniles, the black midlateral band covers nearly the entire body and C and extends across head to tip of snout. Attains 35 cm. Indo-West Pacific from Red Sea to Hawaii; in our area, south to Maputo.



197.5 *Malacanthus latovittatus:* 45 cm (Kenya).

Family No. 198: SILLAGINIDAE

by R.J. McKay

Sillagos **Sillagos**

Rather elongate cylindrical body with fairly small scales, mostly easily shed. Small mouth with fine teeth in bands in jaws and on vomer; none on palatines. Two dorsal fins, first of 10-12 spines; 2 anal fin spines. Airbladder simple or elaborate.

Shallow-water fishes of the tropical Indo-West Pacific; often found in or near estuaries, the young burrow into the sand when alarmed. Flesh white and much esteemed. Three genera and about 25 species; only *Sillago* Cuvier, 1816 (with about 20 species) represented in our area.

KEY TO SPECIES

1a 1st V ray thick, bony and curved ..... *S. chondropus*
1b 1st V soft-ray normal, not as above 2

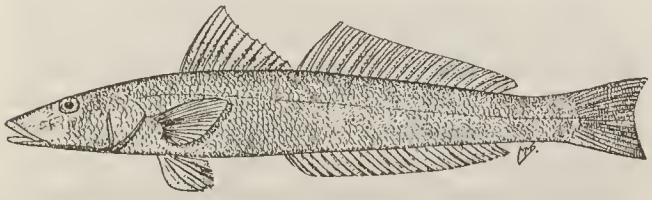
2a Body uniform pearly; A II,21-23 ..... *S. sihama*
2b Body silvery with dark blotches; A II,17-20 ..... *S. maculata*

198.1 *Sillago chondropus*

Bleeker, 1849

Clubfoot sillago Horrelvoet-sillago

Sillago chondropus Bleeker, 1849: 61 (Djakarta, Indonesia); Smith, **SFSA No. 469*;** McKay, 1980: 382.



198.1 *Sillago chondropus:* 25 cm (Natal).

D XI-XII+I,20-22; A II,22-28; P 15-17; LL 66-73; lower GR 7-8. Cheek scales ctenoid, in 3-4 rows. Airbladder flattened and abruptly tapered to terminate on 9th vertebra, without a blind duct-like process to vent. V spine minute, adnate to 1st ray, which is thick, bony and recurved.

Attains at least 35 cm. A widespread Indo-West Pacific species, extends south to Durban.

198.2 *Sillago maculata*

Quoy & Gaimard, 1824

Blotchy sillago Gevlekte sillago

Sillago maculata Quoy & Gaimard, 1824: 261, Pl. 5, Fig. 2 (Sydney, Australia); Smith, **SFSA No. 468;** McKay, 1980: 383.

D XI+I,18-21; A II,17-20; P 15-17; LL 66-73; lower GR 9-10. Cheek scales cycloid, in 2-3 rows. Airbladder with single median extension anteriorly, one posterior tapering extension and a blind duct-like process to vent.

Attains 30 cm. Separated into 3 subspecies: *maculata* (eastern Australia), *burrus* Richardson, 1842 (northern and western Australia), and *aeolus* Jordan & Evermann, 1902 (China to South Africa). Has been found in Delagoa Bay, rare in our area; specimens wanted.

198.2 *Sillago maculata:* 14 cm (after Bleeker, 1877).

198.3 *Sillago sihama*

(Forsskål, 1775)

Silver sillago Silwer sillago

Atherina sihama Forsskål, 1775: 70 (Lohajae, Red Sea). *Sillago sihama:* Smith, **SFSA No. 467*;** McKay, 1980: 381.

D XI+I,20-23; A II,21-23; P 16-17; LL 62-72; lower GR 8-10. Cheek scales cycloid, in 2 rows. Airbladder with anterior and anterolateral extensions, 2 posterior extensions and à blind duct-like process to vent.

Attains 30 cm. Widespread in the Indo-Pacific, reaches as far south as Knysna, quite abundant in Natal estuaries.

198.3 *Sillago sihama:* 18 cm (Inhaca Id.).

Taken in sandy areas by net and on small hooks. Swims in schools; sometimes skips along the surface when disturbed.

Family No. 199: SCIAENIDAE

by P.C. Heemstra

Kobs **Kobs**

Body oblong to slightly elongate, somewhat compressed. Dorsal fin margin deeply notched before last spine; anterior part with 9-11 slender spines; rear part with 1 spine and 23-31 soft-rays. Anal fin with 2 spines and 6-9 soft-rays. Pectoral fin rays 16-22; ventral fins I,5. Caudal fin truncate, rounded or rhomboid; branched rays 15. Scales cycloid or ctenoid, covering head and extending onto soft dorsal, anal and caudal fins. Lateral line extends to end of caudal fin. Maxilla mostly concealed when mouth is closed. Two nostrils on each side of snout. Opercle with 2 flat points posteriorly. Jaws with rows of small, sharp, conical teeth; canines present in some species; no teeth on vomer, palatines or tongue. Branchiostegals 6 or 7; gill membranes separate, free from isthmus; gills 4, a slit behind the last. Gasbladder well developed, carrot-shaped, hammer-shaped, or anchor-shaped, and with various diverticula. Vertebrae 23-30.

These fishes are also called "croakers" or "drums" because they are able to produce a variety of sounds by means of muscles attached to the gasbladder. Sciaenids are common in warm coastal waters and estuaries of the world. Some species attain a large size and are of considerable economic importance. Many genera and well over 100 species are recognised in this family; we have 9 species in our waters. Trewavas (1977) has revised the species of the Indo-West Pacific region. *Johnius soldado* (Lacepède), **SFSA No. 551,** and *Johnius belangerii* (Cuvier), **SFSA No. 549**, were reported from Natal by Fowler (1925 and 1935), but these records were probably based on misidentifications, as neither species occurs in our area.

KEY TO GENERA

1a C emarginate (upper and lower rays distinctly longer than middle ones); no pores on chin; A II,8-9 ..... *Atractoscion*
1b C truncate, rounded or sinuous (upper and lower rays not longer than middle rays); A II,6-8 2

2a 1 or 2 very large canines at front of both jaws; no pores or barbel on chin ..... *Otolithes*
2b No single pair of very prominent canines in jaws; chin pores present 3

3a Chin with a short thick barbel, with a pore at its tip; broad band of villiform teeth on lower jaw; no gasbladder appendages ..... *Umbrina*
3b Chin barbel absent, or if present, with a pore at front of its base .. 4

4a Mouth terminal, oblique; body depth subequal to head length, 3.2-3.6 in SL; 6 distinct pores on chin; gasbladder carrot-shaped, without cephalic appendages 5
4b Mouth subterminal, horizontal; chin pores in a "false five" pattern (with a median U-shaped groove or dimple containing 2 tiny hidden pores); gasbladder hammer-shaped, with first appendage of each side reaching the head where a lateral branch extends to the lateral face of the pectoral arch at the junction of cleithrum and supracleithrum (visible under operculum) (See *J. dussumieri*, p. 618.) ..... *Johnius*

5a P length 27-30% SL and about ¾ distance from V origins to A ..... *Atrobucca*
5b P 19-22% SL, 0.5-0.7 of distance from V to A origins . *Argyrosomus*

Genus ***Argyrosomus*** Pylaie, 1835

Body depth 25-30% SL. Vertebrae 11+14. Gasbladder carrot-shaped, with 25-35 paired appendages. Trewavas (1977) erected a separate genus for *A. thorpei,* but Smith's (1977) decision to include *A. thorpei* in *Argyrosomus* is followed here. Six species; 2 in our area.

KEY TO SPECIES

1a Skin at upper end of P base scaly; C truncate; fins yellow in life ..... *A. thorpei*
1b Skin at upper end of P base not scaly; C rounded or sinuate; fins grey or brown in life ..... *A. hololepidotus*

199.1 *Argyrosomus hololepidotus*

(Lacepède, 1801)

PLATE 71

Kob **Kob**

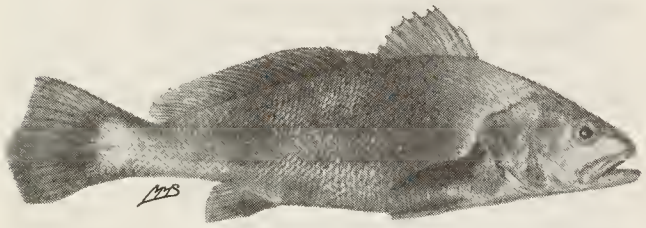
Labrus hololepidotus Lacepède, 1801: 518, Pl. 21, Fig. 2 ("grand Océan equatorial"; based on figure from manuscript of Commerson, who, according to Cuvier, obtained the specimen from Madagascar). *Johnius hololepidotus:* Smith, **SFSA No. 552*;** Smith & Smith, 1966: 43*. *Argyrosomus hololepidotus:* Smith, 1977: 566*; Trewavas, 1977: 327*; van der Elst, 1981: 261*.

D X+I,26-29; A II,7; P 17; LL 48-54; developed GR (3-5)+(9-11); 25-35 pairs of gasbladder appendages. Depth 2.9-4.0, head 3.0-3.6 in SL; eye 5-6, interorbital 4-6 in head. P & V subequal, about 1.5 in head. About 18 enlarged teeth on each side of upper jaw. Longest GR shorter than longest gill filament. *A. regius* Asso, 1801 of the northeast Atlantic and Mediterranean, has only 7 or 8 lower limb GR and 36-42 pairs of gasbladder appendages.

Body silvery; fins grey or brown; black blotch at upper end of P base more or less distinct. Attains 70 kg and a length of 2 m. West coast of Africa (south of equator) to the Cape and along our coast to at least Maputo. Also reported from Madagascar, Mauritius, India and Australia.

The kob is one of our most important food-fishes; it is common down to 100 m and frequently enters estuaries;

those fresh in from the sea can be recognised by the yellow colour inside the mouth. Takes almost any bait, also spoons and plugs. Has been observed to taste a bait, spit it out and then return to swallow it. Flesh esteemed, but some kobs have worm parasites in their flesh; a heavy infestation looks unpleasant, but these parasites will not infect humans.



199.1 *Argyrosomus hololepidotus*: 38 cm (Natal).

199.2 *Argyrosomus thorpei*
Smith, 1977
PLATE 71

Squaretail kob — Stompstert-kob

Argyrosomus thorpei Smith, 1977: 562, Pl. 1, Figs. B & C (just south of Tugela River, Natal). *Afroscion thorpei*: Trewavas, 1977: 337; van der Elst, 1981: 262*.

D X+I,26-28; A II,6-7; P 17; LL 51-52; developed GR (4-5)+(10-11). Depth 3.2-3.8, head 3.1-3.6 in SL; eye 5-6, interorbital 5 in head. P & V subequal, 20-22% SL. Longest GR not shorter than longest gill filament.

Body silvery, fins orange-brown or yellowish. Attains 71 cm. Known only from Port Elizabeth to the Tugela river; often caught in Natal and for many years confused with *A. hololepidotus*; apparently does not enter estuaries.

199.2 *Argyrosomus thorpei*: 37.5 cm (Natal).

Genus ***Atractoscion*** Gill, 1862

Scales small, 70-90 in LL; swimbladder with a pair of tapering, unbranched diverticula produced forwards on right and left sides of anterior end of the bladder and not extending through transverse septum. Several species in eastern Pacific and western Atlantic, but only 1 in the Indo-Pacific region.

199.3 *Atractoscion aequidens*
(Cuvier, 1830)
PLATE 71

Geelbek — Geelbek

Otolithus aequidens Cuvier, 1830: 66 (Cape of Good Hope). *Atractoscion aequidens*: Smith, **SFSA No. 554***; Smith & Smith, 1966: 44*; Trewavas, 1977: 283*; van der Elst, 1981: 263*.

D X/I,27-31; A II,8-9; P 17-18; LL 70-80; GR (3-5)+(7-9) short, becoming rudimentary with age. Depth 3.8-4.3, head 3.1-3.6 in SL; eye 5-7, interorbital 4.1-4.8 in head. P & V subequal, 16-20% SL.

Body silvery; scaly flap at upper end of P base black; inside of mouth and gill cavity yellow. Attains 130 cm and 25 kg. All along our coast; common in Angolan waters and has been reported off northwest Africa and Australia. Adults usually in deeper water (to 30 m), but sometimes taken by shore anglers. Flesh highly esteemed, cures easily. Whole fish are easily distinguished from the more common kob, but headless fishes are identifiable only by their tails. Sometimes dishonest vendors will trim the kob's tail to resemble that of the more costly geelbek.

Genus ***Atrobucca*** Chu, Lo and Wu, 1963

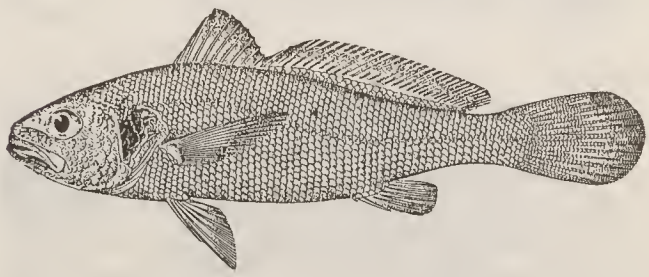
Swimbladder appendages with distinct dorsal and ventral limbs, with branches directed respectively posteriorly and anteriorly, at least some of them enveloping the bladder. P subequal to head length. Jaws with band of curved conical teeth, a few much larger than others. Vertebrae 11+14. Three species; 1 in our area.

199.4 *Atrobucca nibe*
(Jordan & Thompson, 1911)

Longfin kob — Langvin-kob

Pseudotolithus brunneolus Jordan & Richardson, 1909: 191, Pl. 71 (Formosa). *Sciaena nibe* Jordan & Thompson, 1911: 258, Fig. 4 (Wakanoura, Japan). *Sciaena marleyi* Norman, 1922: 319 (off Durban in 40 - 50 fms). *Johnius sina* (*non* Cuvier): Smith, **SFSA No. 550.** *Atrobucca nibe*: Trewavas, 1977: 340*. *Atrobucca marleyi*: Trewavas, 1977: 342*.

D X/I,27-31; A II,7; P 18; LL 50-51; developed GR (5-7)+(9-11). Depth 3.0-3.7, head 3.0-3.3 in SL; eye 3.8-4.5, interorbital 3.8-4.3 in



199.4 *Atrobucca nibe*: holotype of *Pseudotolithus brunneolis* (after Jordan & Richardson, 1909).

head. Body scales ctenoid, those on head cycloid. Three pairs of pores on lower jaw, the 1st on front of chin minute. Lower jaw not projecting; maxilla reaches vertical at rear edge of eye. Jaws with 7 or 8 distinctly enlarged teeth on each side of jaws; first 3 on each side of upper jaw exposed when mouth is closed. Data taken from Trewavas (1977) and 227 mm SL fish (RUSI 8271) recently collected off the Tugela river in Natal.

Body dusky silver; gill cavity, inside of mouth and lining of abdominal cavity dusky to black. Attains 30 cm. Natal, India, Taiwan, China and Japan in 45 - 100 m.

Genus ***Johnius*** Bloch, 1793

Soft D and A scaly. Fourth vertebra with inferior apophyses united below haemal canal to form an arch to which the hammer-shaped gasbladder is attached. Other characters of this genus are given at 4b in the key to genera above. About 18 species, 2 in our area.

KEY TO SPECIES

1a Short barbel on chin; outer (enlarged) teeth of upper jaw not widely spaced; GR (3-5)+(7-10) including rudiments ..... *J. amblycephalus*

1b No chin barbel; outer (enlarged) teeth of upper jaw widely spaced; GR (4-7)+(14-17) including rudiments ..... *J. dussumieri*

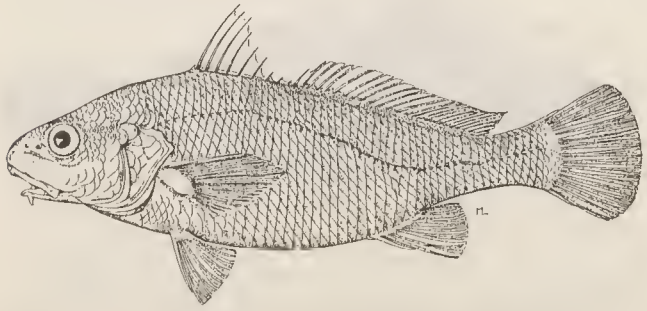
199.5 *Johnius amblycephalus*
(Bleeker, 1855)

Bellfish — Belvis

Umbrina dussumieri Valenciennes, 1833: 481 (Coromandel, India). *Umbrina amblycephala* Bleeker, 1855: 412 (Amboina, Moluccas). *Umbrina fuscolineata* von Bonde, 1923: 15, Pl. 4 (Natal). *Sciaena dussumieri:* Smith, **SFSA No. 555.** *Johnius amblycephalus:* Trewavas, 1977: 426*.

D IX-XI/I,23-27; A II,7; P 18-19; LL 48-53; GR (3-5)+(7-10) including rudiments; length of longest GR is less than diameter of rear nostril. Depth 3.3-3.7, head 3.1-3.4 in SL; eye 4.5-5.1, longest D spine 1.9-2.4 in head. Snout short, bluntly rounded; mouth inferior, small (upper jaw length 2.8-3.0 in head). Band of cardiform teeth in jaws; outer teeth of upper jaw enlarged. South African specimens seem to have shorter D spines than those from India and the Indo-West Pacific region; but as this is the only difference that is apparent, we follow Trewavas in considering *U. fuscolineata* von Bonde a synonym of the widely distributed *J. amblycephalus*.

Attains 23 cm. Indo-West Pacific region; in our area from Algoa Bay northwards from shore to 50 m.



199.5 *Johnius amblycephalus:* 13 cm SL (off Natal).

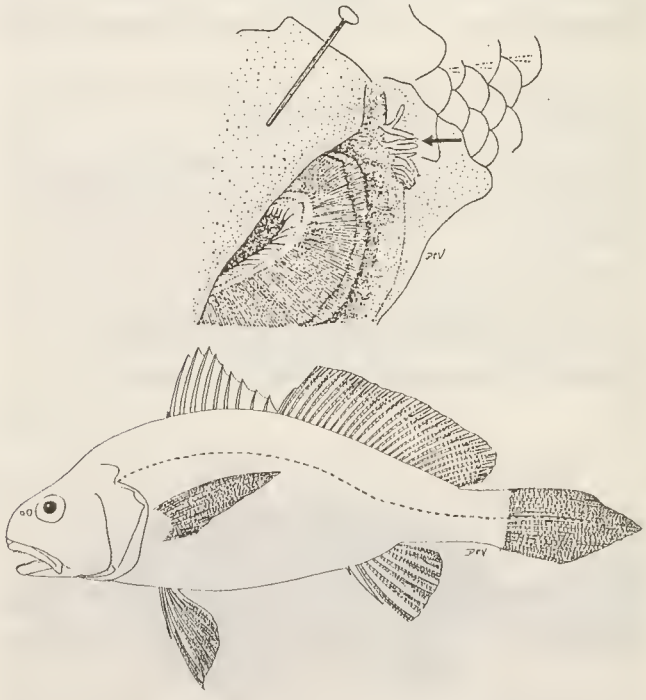
199.6 *Johnius dussumieri*
(Cuvier, 1830)

Small kob — Kleinkob

Corvina dussumieri Cuvier, 1830: 119 (Malabar, India). *Corvina dorsalis* Peters, 1855: 242 (Mozambique). *Sciaena parva* Gilchrist & Thompson, 1908: 183 (Natal). *Umbrina macroptera* (*non* Bleeker): Barnard, 1927: 581. *Johnius (Johnieops) dussumieri:* Trewavas, 1977: 437*. *Sciaena macroptera* (*non* Bleeker): Smith, **SFSA No. 559.**

D IX-X/I,27-30; A II,7-8; P 19; LL 47-49; GR (4-7)+(14-17). Depth 2.8-3.5, head 3.1-3.5 in SL; eye 4.2-5.1, interorbital 3.2-3.5 in head. Body scales ctenoid; maxilla ends below rear part of eye; upper jaw 40-45% head length; P much longer than V. First D dusky. Trewavas (1977) recognises *J. (Johnieops) sina* and *J. (Johnieops) dussumieri* as separate species, based on the configuration of the snout: "snout decurved, but not inflated" in the latter species and "inflated" in *J. sina*. But she also describes the snout of *J. dussumieri* as "swollen". As we have specimens that are intermediate between the two types illustrated by Trewavas, we are forced to conclude that *J. sina* is not a valid species.

Attains 23 cm. From East London, South Africa to Singapore.



199.6 *Johnius dussumieri:* 16 cm SL (Great Fish River estuary); gill cover turned back to show how gasbladder appendages are visible.

Genus ***Otolithes*** Oken, 1817

Lower jaw projecting; a pair of very large canines at front of both jaws. No cephalic appendage of gasbladder. Two species; 1 in our area. *O. cuvieri* Trewavas, 1974, from India and Pakistan may reach our area; it has 12-17 lower GR and moderate canines.

199.7 *Otolithes ruber*
(Schneider, 1801)
PLATE 71

Snapper kob — Snapperkob

Johnius ruber Schneider, *in* Bloch & Schneider, 1801: 75, Pl. 17 (Tranquebar, India). *Otolithes ruber:* Smith, **SFSA No. 553*;** Trewavas, 1977: 349*; van der Elst, 1981: 265*.

D IX-X/I,27-30; A II,7-8; P 17; LL 48-50; GR (4-5)+(8-11). Depth 4.2-5.1, head 3.1-3.7 in SL; eye 4.3-7.4, interorbital width 4.0-4.9 in head.

Attains 80 cm. Indo-West Pacific extending south to at least Durban.

Genus ***Umbrina*** Cuvier, 1816

Ctenoid scales on body and head; P distinctly shorter than V; other characters given at 3a in generic key above. Several species along both coasts of Americas, in the Mediterranean, eastern Atlantic and western Indian Ocean. At least 2 species occur in our area, and they are difficult to distinguish. *Umbrina capensis* Pappe, 1853 is a doubtful name (*nomen dubium*) as it cannot be assigned with certainty to either of our species.

KEY TO SPECIES

1a D X+I, 25-29; body depth 2.4-3.3 in SL; P 3.8-5.8 in SL ..... *U. canariensis*
1b D X+I, 23-26; body depth 2.9-3.5 in SL; P 5.6-6.4 in SL ..... *U. ronchus*

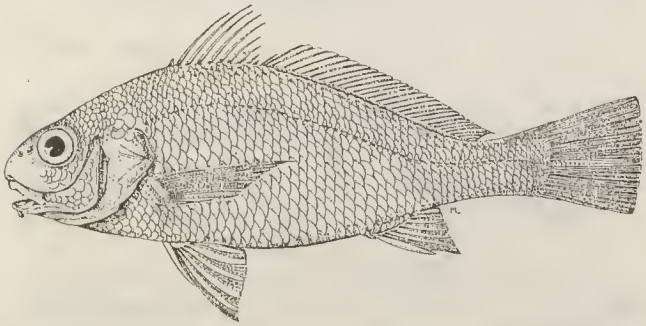
199.8 *Umbrina canariensis*
Valenciennes, 1843
PLATE 71

Baardman — Baardman

Umbrina canariensis Valenciennes, 1843: 24 (Canary Ids.); Trewavas, 1977: 279*. *Sciaena capensis:* Smith, **SFSA No. 556*;** Smith & Smith, 1966: 45*. *Sciaena sinuata:* Smith, **SFSA No. 558.**

D X+I,25-29; A II,7; P 18; LL 49-51; GR (6-8)+(10-13). Depth 2.4-3.1, head 2.9-3.6, P 3.8-5.8 in SL; eye 3.2-4.9 in head.

Body of juveniles with narrow oblique dark and light stripes, becoming obscure with age. Attains 55 cm. West African coast from Morocco to the Cape, and in the western Indian Ocean from False Bay to Pakistan. This species is the common baardman of the eastern Cape Province.



199.8 *Umbrina canariensis:* 25.5 cm SL (Algoa Bay).

199.9 *Umbrina ronchus*
Valenciennes, 1843
PLATE 71

Slender baardman — Slank baardman

Umbrina ronchus Valenciennes, 1843: 24 (Canary Ids.); Trewavas, 1977: 281. *Umbrina robinsoni* Gilchrist & Thompson, 1908: 182 (Natal); Trewavas, 1977: 281. *Umbrina angustilineata* Gilchrist & Thompson, 1911: 38 (Natal). *Sciaena robinsoni:* Smith, **SFSA No. 557*** (in part; figure appears to be *U. canariensis*, description compiled from both species).

D X+I, 23-26; A II,7; P 18; LL 49-51; GR (5-6)+(9-11). Depth 2.9-3.5, head 3.2-4.2, P 5.6-6.4 in SL; eye 4.4-5.3 in head.

Body of juveniles brown, with narrow oblique wavy stripes, becoming obscure with age. Attains 70 cm. Known from Canary Ids. and northwest coast of Africa to the Cape and along east coast of Africa to the Persian Gulf. This species appears to be rare in the Cape Province; all of our specimens are from Natal.

Family No. 200: MENIDAE

by M.M. Smith

Moonfish — **Maanvis**

Body extremely compressed, disc-like; breast sharp; scales minute, deciduous, barely visible; mouth protrusible; jaws with bands of villiform teeth, none on vomer or palatines. One dorsal fin, the spines rudimentary or absent; caudal fin forked; anal fin base very long, the rays very short, embedded, with only their widely branched tips visible; 1st 2 pelvic fin rays elongated.

A single genus, *Mene* Lacepède, 1803 with 1 species.

200.1 *Mene maculata*
(Bloch & Schneider, 1801)

Moonfish — Maanvis

Zeus maculatus Bloch & Schneider 1801: 95, Pl. 22 (Tranquebar, India). *Mene maculata:* Smith, **SFSA No. 623*.**

D III-IV,40-45 (spines lost with age); A 30-33; V I,5 spine small, 1st 2 rays fused and elongated; P 15; GR (6-7)+(23-24). Body depth 1.3-1.5 in SL.

Dark blue above, silvery white below; 2 or 3 rows of dark spots immediately above and below LL. Attains at least 20 cm. Tropical Indo-Pacific; south to Durban. Generally in shoals, nowhere abundant, frequents coastal waters but

sometimes enters estuaries. Readily dries in air without salt; used in India and other Asian countries for food.

200.1 *Mene maculata:* 15 cm (Maputo Bay).

Family No. 201: LEIOGNATHIDAE

by M.M. Smith

Soapies **Glipvisse, slymvisse**

Compressed slimy body exuding mucus when caught; small scales not easily visible; upper surface of head with bony ridges. Single dorsal fin with 7-9 spines and 15-17 soft-rays; anal fin with 3 spines and 13-15 soft-rays. Branchiostegal membranes united with isthmus. Mouth very protractile, the long premaxillary pedicels in a groove formed by bifurcation of occipital crest. No teeth on palate. Series of small spines each side at base of dorsal and anal fins. Vertebrae 10+14, first 3 without parapophyses.

An Indo-Pacific family; one species has entered the Mediterranean through Suez. All leiognathids in our area enter estuaries freely, and school near the bottom where they feed; those with minute teeth suck in invertebrate organisms, and the toothed *Gazza* adds small fish to its diet. Gerreidae are similar in having a protrusible mouth, but are easily recognised by the clearly visible scales which also cover the head. Soapies are easily dried without salt, so that although small, they are important protein food for inland populations in the tropics; they also make excellent bait. Four genera and about 20 species, 3 genera and 5 species in our area.

KEY TO GENERA

1a Distinct teeth in jaws; mouth protrudes forward ..... *Gazza*
1b Teeth minute 2

2a Mouth horizontal when closed, points forwards or downwards when protruded ..... *Leiognathus*
2b Mouth oblique when closed, points upwards when protruded ..... *Secutor*

Genus *Gazza* Rüppell, 1835

Distinct canines in jaws; nostrils level with top of orbit; 2 species, 1 in our area.

201.1 *Gazza minuta*
(Bloch, 1797)
PLATE 71

Toothed soapy Getande glipvis

Scomber minutus Bloch, 1797: 10, Pl. 429 (Malabar, India). *Gazza minuta:* Smith, **SFSA No. 627***; van der Elst, 1981: 195*.

D VII-VIII,15-17; A III,13-14; P 16-17; GR (4-6)+(16-17); LL 58-60; forehead with short spines; body depth 2.0-2.5.

Attains 18 cm. Uses estuaries for nurseries and breeds offshore in tropics. Indo-Pacific (excluding Hawaii); south to Port Alfred, down to 40 m.

Genus *Leiognathus* Lacepède, 1802

Nostrils below top edge of orbit; numerous species, 2 in our area.

KEY TO SPECIES

1a Body elongate, depth 3.3-5.0 in SL; scales on cheek ..... *L. elongatus*
1b Body deep, depth 1.6-2.0 in SL; cheek naked ..... *L. equula*

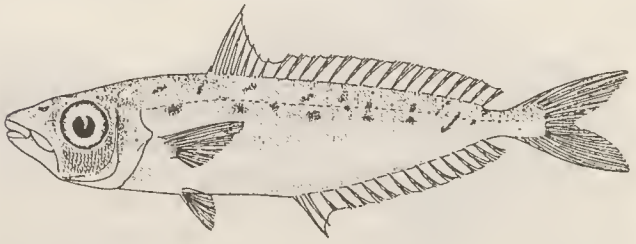
201.2 *Leiognathus elongatus*
(Günther, 1874)

Elongate slimy Spits slymvis

Equula elongata Günther, 1874: 369 (North Celebes). *Leiognathus elongatus:* Smith, 1953: 518, **No. 626a.**

D VIII,16; A III,14; P 16; GR 5+(14-16); LL about 42 tubular pores, scales difficult to see; small scales on cheek and chest.

Silvery, back irregularly mottled green and dark; D with yellow band anteriorly, merging into orange margin posteriorly; membrane between 2nd and 3rd A spines yellow to margin of front rays; P axil dusky or with minute dark spots; males reported to have bluish line along lower side of body behind P. Attains 12 cm. Indo-West Pacific excluding Australia; south to Delagoa Bay, down to 20 m.



201.2 *Leiognathus elongatus:* ca. 6 cm (after James & Woodland, 1984).

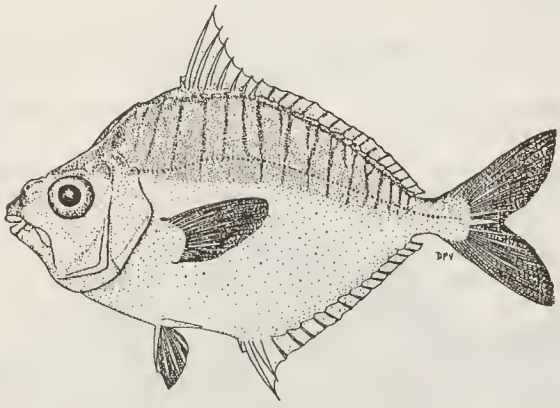
201.3 *Leiognathus equula*
(Forsskål, 1775)

Slimy — Slymvis

Scomber equula Forsskål, 1775: 58 (Red Sea). *Leiognathus equula:* Smith, **SFSA No. 626*.** *Leiognathus equulus:* van der Elst, 1981: 196*.

D VIII,15-16; A III,14-15; P 18-20; GR (5-6)+(15-16); LL 54-63 difficult to count, scales almost invisible especially on breast which appears naked; lower edge of preopercle serrate; mouth protrudes downwards. D spines 2, 3 and 4 and A spines 2 and 3 can lock in upright position.

Silvery, sometimes with faint narrow bars on back and dark saddle on C peduncle; D transparent; P axil dusky; A yellowish. The largest leiognathid, attains 25 cm. Indo-Pacific; common in Natal, reaches East London, down to 40 m. Important food-fish in the tropics.



201.3 *Leiognathus equula:* 16.5 cm (Durban).

Genus ***Secutor*** Gistel, 1848

Nostrils above orbit; mouth very oblique. Two species in our area.

KEY TO SPECIES

1a Body depth 2.0-3.0 in SL; 2 minute spines above each eye ..... *S. insidiator*
1b Body depth 1.5-1.9 in SL; 1 minute spine above each eye ..... *S. ruconis*

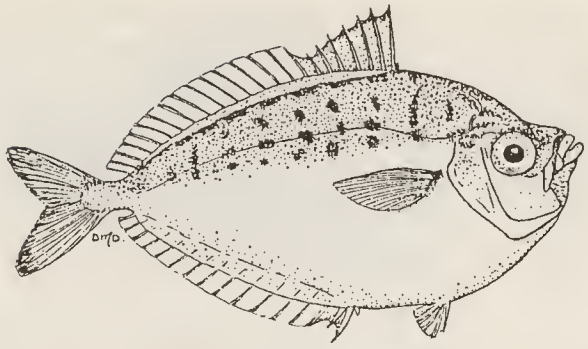
201.4 *Secutor insidiator*
(Bloch, 1787)

Slender soapy — Slank glipvis

Zeus insidiator Bloch, 1787: 41, Pl. 192, Figs. 2 & 3 (India, freshwater). *Secutor insidiator:* Smith, **SFSA No. 625*;** van der Elst, 1981: 197*.

D VIII-IX,15-17; A III, 14; P 17-18; GR (6-7)+(17-21) (ours (6-7)+(19-21)); LS about 50; LL ending slightly before end of D, scales barely visible, easily shed. V reaches ⅓ distance to A origin.

Spots sometimes blue and lower flanks with minute dark spots. Attains 10 cm. Indo-West Pacific except Australia; south to East London, down to 150 m (van der Elst, 1981).



201.4 *Secutor insidiator:* 12 cm (Durban).

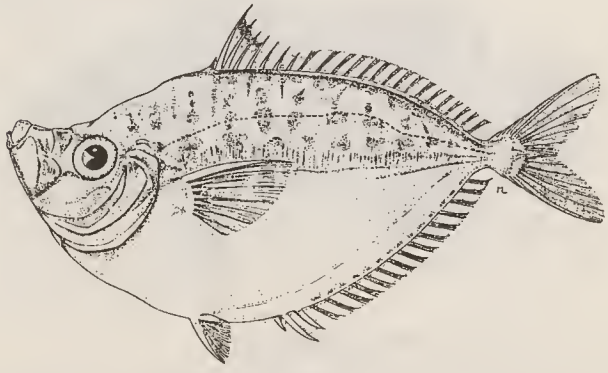
201.5 *Secutor ruconius*
(Hamilton-Buchanan, 1822)

Pugnose soapy — Mopneus-glipvis

Chanda ruconius Hamilton-Buchanan, 1822: 106, 371, Pl. 12, Fig. 35 (Ganges River, India). *Secutor ruconius:* Smith, **SFSA No. 624.**

D VIII-IX,16-17; A III,14; P 17-18; GR 6+(19-22); LL 30- 35, ends below about middle of soft D. V reach halfway to A origin. Similar to, but body deeper than, *S. insidiator.*

Silvery with pink and blue iridescence, back darker with dark transverse bars becoming series of spots with growth; dark line from angle of mouth to chin and dark spot on opercle; fins bluish, tip of D black with yellow band below; P axil black. Attains 8 cm. Indo-West Pacific, south to Transkei in shallow water. Frequently caught by seine nets and prawn trawlers.



201.5 *Secutor ruconius:* 12 cm specimen with mouth extended (Durban).

Family No. 202: LOBOTIDAE

by P.C. Heemstra

Tripletails — **Driesterte**

Body oval to oblong, somewhat compressed. Dorsal fin with 11 or 12 strong spines; soft dorsal and anal fins high, rounded posteriorly, reaching well past base of caudal fin; caudal fin rounded, with 15 branched rays; pelvic fins I,5. Scales moderate, ctenoid, covering head except preorbital

region and jaws. Upper jaw slightly protrusible; no supramaxilla. Jaws with outer row of short, closely-set canines and an inner band of much smaller teeth; vomer, palatines and tongue toothless. Preopercle coarsely serrate in young, the serrae decreasing in size but increasing in number with age. Nostrils round, close together. Branchiostegal rays 6; membranes narrowly united, free from isthmus. Vertebrae 12 + 12.

One genus, *Lobotes* Cuvier, 1829, with only 1 species.

202.1 *Lobotes surinamensis*
(Bloch, 1790)

Tripletail — Driestert

Holocentrus surinamensis Bloch, 1790: 98, Pl. 243 (Surinam). *Lobotes surinamensis:* Smith, **SFSA No. 414***.

D XI-XII,15-16; A III,11-12; P 17; LL 43-45 (+ 5 on C); GR (6-7)+(13-15) including rudiments. Depth 2.0-2.5, head 2.6-3.0 in SL; eye 1.0-2.5 in interorbital width. Soft D, A and C covered with scales.

Adults dark brown or greenish yellow dorsally, silvery grey below; P pale yellow; other fins darker than body; C with yellow margin. Attains 15 kg and 100 cm. Found in tropical and subtropical waters of all oceans, in our area from Kromme River (Cape St. Francis) northwards. Enters estuaries and also found well offshore near floating objects. Juveniles lie on their sides and look remarkably like dead mangrove leaves. Flesh excellent.

202.1 *Lobotes surinamensis:* 42 cm (Algoa Bay).

Family No. 203: PENTACEROTIDAE

by P.C. Heemstra

Armourheads — **Pantserkoppe**

Body oblong-oval, compressed. Bones of head mostly exposed, rugose, covered with small spines and knobs in small juveniles. Scales ctenoid, small to moderate; lateral line complete. Mouth small; maxilla not reaching past front edge of orbit; bands of small teeth on jaws; vomer with or without teeth; palatines toothless.

Recently revised by Hardy (1983), who recognises 12 species in 7 genera; 3 genera in our area. Recorded from rather deep (to 600 m) water in all oceans.

KEY TO GENERA

1a D IV,25-27, the soft-rayed part much longer than spinous part of fin ..... *Histiopterus*
1b D XII-XV,8-12, the spinous part much longer than soft-rayed part of fin 2

2a D XII-XIII,12-13; LL about 50 ..... *Pentaceros*
2b D XIV-XV,8-10; LL 74-86 ..... *Pseudopentaceros*

Genus ***Histiopterus*** Temminck & Schlegel, 1844

Body depth much greater than head length; D high, sail-like, with 4 spines; A with 3 spines. Vertebrae 24 or 25. Monotypic.

203.1 *Histiopterus typus*
Temminck & Schlegel, 1844

Sailfin armourhead — Seilvin-pantserkop

Histiopterus typus Temminck & Schlegel, 1844: 86, Pl. 45 (Nagasaki, Japan); Hardy, 1983: 179*. *Histiopterus spinifer* Gilchrist, 1904: 3, Pl. 21 (Mossel Bay, South Africa); Smith, **SFSA No. 620*;** 1964: 569*.

D IV,25-27; A III,8-10; P 16-17; LL 60-65; GR (5-7)+(14-17). Body depth 1.3-1.7 in SL. First 2 D spines short, 3rd and 4th much enlarged, longer than head, subequal to 1st soft-ray. Second A spine longer and stronger than 3rd.

Small juveniles pale, with prominent dark blotches on body, D, A and V; dark blotches enlarge and coalesce with age, the body then dark, with more or less distinct narrow, pale, vertical bands. Attains 35 cm. Cape Agulhas to Natal in 40 - 400 m; also known from Red Sea, Oman, Japan and Philippines.

203.1 *Histiopterus typus:* top: 7.5 cm (off Knysna); bottom: 31 cm (off South Africa).

Genus ***Pentaceros*** Cuvier, 1829

D XI-XIII,12-14; soft D rays much shorter than head; a trigger mechanism locking front D spines in some species; A spines 4-6. Vertebrae 24 or 25. Three species; 1 in our area.

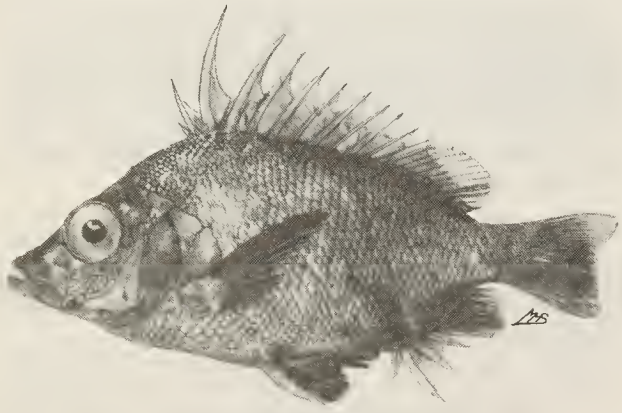
203.2 *Pentaceros capensis*
Cuvier, 1829

Cape armourhead — Kaapse pantserkop

Pentaceros capensis Cuvier, *in* Cuv. & Val., 1829: 30, Pl. 43 (Cape of Good Hope); Smith, 1964: 575*; Hardy, 1983: 197*. *Quinquarius capensis:* Smith, **SFSA No. 621*.**

D XII-XIII,12-13; A IV-VI,7-9; GR (5-6)+(15-17); P 16-18; LL about 50; 7 or 8 scale rows from D origin to LL. Body depth 1.7-2.3 in SL.

Uniformly brownish. Attains 35 cm. From Point Nolloth (western Cape Province) to southern Mozambique in 70 - 300 m.



203.2 *Pentaceros capensis:* 32 cm (off South Africa).

Genus ***Pseudopentaceros*** Bleeker, 1876

D XIII-XV,8-10; soft D rays much shorter than head; A III-V,6-8; vertebrae 24-26. Three species, 1 in our area.

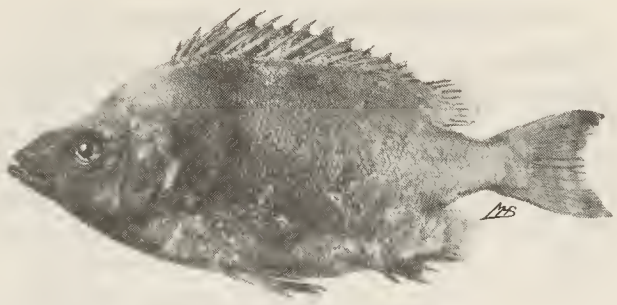
203.3 *Pseudopentaceros richardsoni*
(Smith, 1844)

Pelagic armourhead — Pelagiese pantserkop

Pentaceros richardsoni Smith, 1844: 51 (pages not numbered), Pl. 21 (Cape of Good Hope); Smith, **SFSA No. 622*;** 1964: 572*; Penrith, 1967: 533; Hardy, 1983: 206*.

D XIV-XV,8-10; A IV-V,7-8; P 17-18; LL 74-86; 12-15 scale rows from D origin to LL; GR 6+17.

Head and body bluish dorsally, pale ventrally. Attains 56 cm. Cape Town to Natal in 50 - 600 m; Australia, New Zealand, Cape Horn, Tristan da Cunha.



203.3 *Pseudopentaceros richardsoni:* 55.5 cm (Table Bay).

Family No. 204: POMACANTHIDAE

by M.M. Smith & P.C. Heemstra

Angelfishes — **Engelvisse**

Body compressed, ovoid to subrhomboid; mouth small with bristle-like, generally tricuspid, teeth. Similar to the Chaetodontidae but differentiated by the strong spine at angle of serrated preopercle; no well-developed ventral fin axillary process; and larva without tholichthys stage. Scales moderate to small, exposed portion with longitudinal striae ending in sharp points and smaller auxiliary scales present at base of some body scales of adults; lateral line inconspicuous, runs parallel to dorsal profile and generally reaches caudal base. Vertebrae 10+14.

Widespread and frequenting reefs, angelfishes are among the most beautifully adorned and graceful of all creatures; some undergo extraordinary changes in pattern with growth; dark markings remain on preservation, but red, orange and yellow fade. Most species feed on algae, sponges and various encrusting invertebrates. Family reviewed by Steene (1978) and Allen (1980). Flesh excellent. Seven genera with nearly 80 species; 4 genera and 11 species known from our area.

KEY TO GENERA

1a Scales moderate, LS 27-57; D XIII-XV,15-19 2
1b Scales small, LS 70-90; D XI-XIV,17-25 ..... *Pomacanthus*

2a C lunate ..... *Genicanthus*
2b C truncate to rounded 3

3a Supracleithrum ovate, conspicuous; subopercle smooth ..... *Apolemichthys*
3b Supracleithrum elongate, well hidden by scales; subopercle with spines 4

4a Interopercle spiny; no naked band of skin below and behind eye ..... *Centropyge*
4b Interopercle smooth; a naked band of skin from rear margin of orbit extending down and forward below eye ..... *Pygoplites*

Genus ***Apolemichthys*** Fraser-Brunner, 1933

Preorbital convex without strong spines; no groove in spine at preopercle angle. Confined to Indo-West Pacific: 9 species, 2 in our area. *A. armitagei* Smith, 1955 is known only from the Seychelles; it is similar to *A. trimaculatus* but it has a large black blotch on soft D and lacks the distinct black spots on the nape and supracleithrum of *A. trimaculatus*.

KEY TO SPECIES

1a D spines 15; body bicoloured, top part including C and peduncle dark with light vertical ripples, lower part pale ..... *A. kingi*
1b D spines 14; body mainly yellow with 3 round black blotches: small median 1 on nape and 1 on each side at upper end of gill opening ..... *A. trimaculatus*

204.1 *Apolemichthys kingi*
Heemstra, 1984
PLATE 73

Tiger angelfish — Tier-engelvis

Apolemichthys kingi Heemstra, 1984: 6, Figs. 1-4 (off Durban, Natal).

D XV,16-17; A III-IV,17-18; P 16-17; GR (4-5)+14; LL 31-33; LS 44-45.

Colour as shown. Attains at least 21 cm. Known only from off Natal: Durban, Tongaat and Aliwal Shoal.

204.2 *Apolemichthys trimaculatus*
(Lacepède, 1831)
PLATE 72

Threespot angelfish — Driekol-engelvis

Holacanthus trimaculatus Lacepède, *in* Cuv. & Val., 1831: 196, Pl. 182 (Molucca); Smith, **SFSA No. 586*;** 1955: 380*; Steene, 1978: 92*; Heemstra, 1984: 9.

D XIV,16-18; A III,17-19; P 17; GR (5-6)+(13-14); LS ca. 45-50.

Colour as illustrated. Small juveniles (< 5 cm SL) with black spot at base of D soft-rays and vertical black band through eye and joined to black spot on nape. Attains 25 cm. Widely distributed in Indo-West Pacific in 15 - 30 m around coral; reaches Natal.

Genus ***Centropyge*** Kaup, 1860

Lateral line terminates below end of D. Some (perhaps all) species are protogynous hermaphrodites. Twenty-eight species, 3 in our area.

KEY TO SPECIES

1a Front of snout with a U-shaped notch over upper jaw; body brownish (generally dark) with black blotch just behind upper end of gill opening ..... *C. multispinis*
1b Front of snout more or less straight over upper jaw; no black blotch behind upper end of gill opening 2

2a Head, chest, top of body and D yellow-orange, rest of body and A dark blue; body depth 2.1-2.3 in SL ..... *C. acanthops*
2b Body marginally, including vertical fins, violet to dark brown or black; central part of body orange to orange-brown with irregular, narrow, subvertical dark bars; body depth 1.8-2.0 in SL ..... *C. bispinosus*

204.3 *Centropyge acanthops*
(Norman, 1922)
PLATE 73

Jumping bean — Springboontjie

Holacanthus acanthops Norman, 1922: 318 (Durban). *Centropyge fisheri* (*non* Snyder): Smith, **SFSA No. 588*.** *Xiphipops fisheri:* Smith, 1955: 379. *Xiphipops flavicauda* (*non* Fraser-Brunner): Smith, 1955: 380; 1961: 568, **No. 588a.** *Xiphipops acanthops:* Smith, 1975: 45. *Centropyge acanthops:* Smith, 1980: 178; Allen, 1980: 259*; Heemstra, 1984: 9.

D XIV,16-17; A III,16-18; P 16; GR (5-6)+(15-16); LL ca. 33-37; LS 27-30. Lower rear edge of preorbital with 1-4 large spines.

Colour as illustrated. Attains 8 cm. Somalia to Algoa Bay among coral rubble from 8 to 40 m; a popular aquarium fish in Natal. Once confused with Hawaiian endemic *C. fisheri* (Snyder, 1904) from which it differs in colour.

204.4 *Centropyge bispinosus*
(Günther, 1860)
PLATES 72 & 73

Coral beauty — Koraalmooie

Holacanthus bispinosus Günther, 1860: 48 (on *Holacanthus diacanthus* (*non* Boddaert): Bleeker, 1857: 57 (Amboina)). *Centropyge bispinosus:* Smith, 1955: 379*; Allen, 1979: 328; Heemstra, 1984: 10*.

D XIV,16-18; A III,17-19; P 16; GR (6-8)+(16-17); LS 42-45.

Median fins with narrow blue margin; P yellow; V reddish orange. Attains 10 cm. Tropical Indo-West Pacific, south to Sodwana Bay; rare in our area.

204.5 *Centropyge multispinis*
(Playfair, 1867)

Dusky cherub — Donker engeltjie

Holacanthus multispinis Playfair, *in* Playfair & Günther, 1867: 37, Pl. 6, Fig. 4 (Zanzibar). *Centropyge bispinosus* (*non* Günther): Smith, **SFSA No. 587*.** *Centropyge multispinis:* Smith, 1955: 378*; 1961: 568, **No. 587;** Steene, 1978: 106*; Heemstra, 1984: 11*.

D XIV,15-17; A III,16-17; P 17; GR (4-5)+(12-13); LL 38; LS 45-48.

Preorbital edge with small, subequal spines. Preopercle spine, lips and edges of fins brilliant blue. Attains 14 cm. Indo-West Pacific, Seychelles south to Natal. Common on coral reefs.

204.5 *Centropyge multispinis:* 10 cm (Inhaca Id.).

Genus ***Genicanthus*** Swainson, 1839

Male and female coloured differently. Revised by Randall (1975). Nine species, 1 species known from Pinda (14°S), probably occurs in our area.

204.6 *Genicanthus caudovittatus*
(Günther, 1860)
PLATE 72

Swallowtail angelfish — Swaelstert-engelvis

Holacanthus caudovittatus Günther, 1860: 44 (Mauritius). *Genicanthus melanospilus* (*non* Bleeker): Smith, 1955: 381*. *Genicanthus caudovittatus:* Smith, 1955: 382*; Randall, 1975: 409*; Heemstra, 1984: 11.

D XV,15-17; A 1II,17-19; P 16; GR (3-5)+(11-13); LS 45-47.

Colour pattern as shown in Plate. Attains 15 cm. Mauritius, Red Sea and east African coast to Pinda, Mozambique.

Genus ***Pomacanthus*** Lacepède, 1803

Preorbital mostly without spines, its lower rear edge not free; interopercle and subopercle smooth; anterior nostril the larger; supracleithrum elongated, inconspicuous. Two predorsal bones. Juveniles blue or black with lighter narrow and wide bands, mostly completely different in colour from adults. *Pomacanthops* Smith, 1955 is a synonym. About 22 species, 5 reach our area. *P. maculosus* (Forsskål, 1775) is known from Porto Amelia and probably also occurs in our area.

KEY TO SPECIES

1a D spines 11-12 2
1b D spines 13-14 3

2a D XII,21; in adults, soft D & A angular or produced into filaments ..... *P. maculosus*
2b D XI-XII,22-25; soft D & A rounded, even in adults ..... *P. striatus*

3a Adults with oblique stripes on body 4
3b Adults without oblique stripes on body 5

4a Adult with 20-22 yellow oblique bands on body and dark area from isthmus to origin of LL; bands and stripes of juveniles mostly concentric especially posteriorly ..... *P. imperator*
4b Adult with 7-9 blue oblique bands on body and a blue ring at origin of LL; juveniles with light bands and stripes not in concentric circles ..... *P. annularis*

5a Adult with vertical white bars on dark brown body; C abruptly yellow; juveniles with curved white bands on body and yellow C ..... *P. chrysurus*
5b Adult with no vertical white bars on body; C dark with small blue spots and blue margin; juveniles with semicircular white or pale blue bands on dark body and C ..... *P. semicirculatus*

204.7 *Pomacanthus annularis*
(Bloch, 1787)
PLATE 73

Bluering angelfish — Blouring-engelvis

Chaetodon annularis Bloch, 1787: 114, Pl. 215, Fig. 2 (East Indies). *Pomacanthus annularis:* Fraser-Brunner, 1933: 559*; Steene, 1978: 132*; Heemstra, 1984: 12. *Pomacanthodes annularis:* Smith, 1955: 383; 1961: 568, **No. 583c.**

D XIII,20-21; A III;20; LL complete, LS ca. 70; GR 4+12; spine at angle of preopercle grooved.

Body yellowish brown, with brilliant blue markings. Attains about 35 cm. Tropical Indo-West Pacific Ocean, south to Delagoa Bay, rare.

204.8 *Pomacanthus chrysurus*
Cuvier, 1831
PLATES 72 & 77

Goldtail angelfish — Goudstert-engelvis

Holacanthus chrysurus Cuvier, *in* Cuv. & Val., 1831: 188 (East Indies). *Pomacanthodes chrysurus:* Smith, 1955: 382; 1961: 568, **No. 583b.** *Pomacanthus chrysurus:* Allen, 1980: 304*; Heemstra, 1984: 13.

D XIII-XIV,17-19; A III,18-19; P 18-19; C rounded; GR (5-6)+(11-14); LL complete, about 80; scales on head minute; preopercle spine not grooved; interopercle large, entire.

Colour as illustrated; juveniles similar but head stripes like *P. imperator*. Attains about 33 cm. Indo-West Pacific, Aden south to Aliwal Shoal (30°12'S). Not common.

204.9 *Pomacanthus imperator*
(Bloch, 1787)
PLATE 73

Emperor angelfish — Keiser-engelvis

Chaetodon imperator Bloch, 1787: 51, Pl. 194 (Japan). *Pomacanthus imperator:* Smith, **SFSA No. 585*;** Steene, 1978: 134*; van der Elst, 1981: 240*; Heemstra, 1984: 13.

D XIV,19-21; A III,19-20; P 19-20; GR (6-7)+(13-14); LL ca. 77-79; LS ca. 90. Soft D develops a point with growth.

Juveniles immediately recognisable by concentric circles on body. Attains about 40 cm. Outer reefs of live coral in 1 - 25 m. Indo-West Pacific south to Natal, juveniles occasionally reach East London.

204.10 *Pomacathus maculosus*
(Forsskål, 1775)
PLATE 72

Yellow-blotch angelfish — Geelvlek-engelvis

Chaetodon maculosus Forsskål, 1775: 62 (Red Sea). *Pomacanthops filamentosus* Smith, 1955: 383, Pl. 4, Fig. A (Tekomazi Id., Mozambique). *Pomacanthus maculosus:* Allen, 1979: 306*; Heemstra, 1984: 13.

D XII,21; A III,21; P 19-20; GR (5-6)+(13-14); LL ca. 70.

Juveniles dark brown, with curved pale blue or white stripes; C mostly pale. Adults brownish; scales on nape and upper front part of body margined in black; elongate yellow blotch as shown; C yellowish. Attains 40 cm. Red Sea and Persian Gulf to 13°S, probably in our area.

204.11 *Pomacanthus semicirculatus*
(Cuvier, 1831)
PLATES 72 & 74

Semicircle angelfish — Halfsirkel-engelvis

Holacanthus semicirculatus Cuvier, *in* Cuv. & Val., 1831: 191 (Timor, Buru, Waigui, Port Praslin, New Ireland). *Pomacanthus semicirculatus:* Smith, **SFSA No. 584*** (not figure of juvenile); Steene, 1978: 136*; van der Elst, 1981: 241*; Heemstra, 1984: 13.

D XIII,21-23; A III,20-22; P 19-21; GR (4-5)+13; LS ca. 75; LL 65-70 complete, or rarely not quite reaching C base; C rounded.

Juveniles with wide and narrow semicircular bands. Attains over 40 cm. Indo-West Pacific, juveniles reach Algoa Bay. Adults solitary in 1 - 25 m among coral.

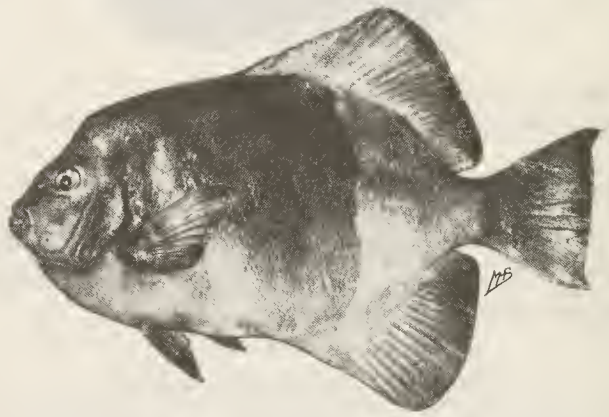
204.12 *Pomacanthus striatus*
(Rüppell, 1836)
PLATES 73 & 74

Old woman — Ou vrou

Holacanthus striatus Rüppell, 1836: 32, Pl. 10, Fig. 2 (Red Sea). *Holacanthus rhomboides* Gilchrist & Thompson, 1908: 161 (Natal). *Pomacanthus striatus:* Smith, **SFSA No. 583*;** Allen, 1980: 310*; van der Elst, 1981: 242*; Heemstra, 1984: 14. *Pomacanthus semicirculatus* (*non* Cuvier): Smith, **SFSA** (only figure of juvenile on Pl. 30, No. 584). *Pomacanthops striatus:* Smith, 1955: 383.

D XI-X11,22-25; A III,21-23; P 19-21; GR (5-6)+(12-13); LL ca. 46; LS ca. 80; C truncate or lobes slightly produced.

Large adults drab, rear ⅓ of body pale bluish grey; fins dusky. Attains at least 46 cm. Western Indian Ocean from southern Red Sea southwards; plentiful in Natal with occasional juveniles reaching Knysna. Adults are coral-haunting down to 12 m or more; usually seen feeding on plankton in midwater. Good eating.



204.12 *Pomacanthus striatus:* 38 cm (Inhaca Id.).

Genus ***Pygoplites*** Fraser-Brunner, 1933

Lateral line terminates below end of D; interopercle small; about 8 rows of scales on opercle. Monotypic.

204.13 *Pygoplites diacanthus*
(Boddaert, 1772)
PLATE 72

Royal angelfish — Koninklike engelvis

Chaetodon diacanthus Boddaert, 1772: Pl. 9 (Amboina; Moluccas). *Pygoplites diacanthus:* Smith, 1955: 378; 1961: 568; **No. 582a;** Steene, 1978: 138*; Smith, 1980: 179; Heemstra, 1984: 14.

D XIV,18-19; A III,18-19; P 16-17; GR (5-6)+(12-13); LL ca. 50; LS ca. 50.

The striking colours of the adult, reminiscent of a football jersey, do not fade rapidly after death. Juveniles have fewer bands and a black ocellus on soft D. Attains 25 cm. Widespread in tropical Indo-West Pacific south to Sodwana Bay; usually seen swimming from one coral crevice to another in depths of 1 - 20 m.

Family No. 205: CHAETODONTIDAE

by P.C. Heemstra

Butterflyfishes **Vlindervisse**

Body ovate, strongly compressed. Dorsal fin continuous, more or less covered with scales; anal fin also scaly. Pelvic fins well developed, with a spine and five rays. Caudal fin truncate or rounded, usually with 15 branched rays. Scales ctenoid, covering head and body. Preopercle without a large spine at the angle; no spines on head. Vertebrae 11+13. Mouth small; teeth long and slender, none on vomer and palatines. "*Chaetodon*" means bristle tooth and aptly describes the dentition of butterflyfishes. Branchiostegal membranes separate, with 6 or 7 rays. Gill-rakers short, not numerous.

Butterflyfishes occur in tropical/subtropical waters of all oceans. They live in depths of 1 - 200 m, and are not found far from shore except as post-larvae in the peculiar "tholichthys" stage. Most species are associated with coral reefs, and coral polyps are a common item in their diet. They also feed on a variety of small invertebrates (including benthic and planktonic forms) and algae. Juveniles of several species are facultative "cleaners" (i.e. they pick small parasites from the skin of other fishes), and even adults are occasionally observed picking parasites.

This family was recently revised by Burgess (1978). Ten genera with about 120 species; 4 genera and 24 species in our area. The species are most readily identified by looking at the illustrations, but keys to species are provided to aid in determination of small juveniles.

KEY TO GENERA

1a Snout greatly prolonged, tubular, its length 1.1-2.1 in body depth; P reaching past A origin ..... *Forcipiger*
1b Snout not greatly prolonged or tubular, its length 3-5 in body depth; P not reaching past A origin 2

2a 4th D spine elongated, filamentous ..... *Heniochus*
2b 4th D spine not elongated 3

3a LL complete, extending to C, with 68-73 scales ..... *Hemitaurichthys*
3b LL incomplete, ending below D rays, with 22-25 scales ..... *Chaetodon*

Genus *Chaetodon* Linnaeus, 1758

D spines 10-17; snout short or moderately produced. The largest genus, with more than 90 species; 20 species in our area. *C. hoefleri* Steindachner, 1882 occurs from the Mediterranean to southern Angola, and is closely related to *C. marleyi*.

KEY TO SPECIES

1a D spines 16 or 17 ..... *C. blackburnii*
1b D spines 11-14 2

2a D spines 11 3
2b D spines 12-14 4

3a D XI,21-23; A III,16-18; LL 39-44; snout 3.8-4.1 in head; juveniles without ocellus at front of soft D ..... *C. hoefleri*
3b D XI,22-25; A III,18-19; LL 36-42; snout 3.2-3.5 in head; juveniles with prominent, white-ringed ocellus at front of soft D ..... *C. marleyi*

4a A IV,14-15; D XIII-XIV,14-16 ..... *C. trifascialis*
4b A III,15-23; D XII-XIV,15-28 5

5a D soft-rays 15-18; black blotch or ocellus on LL below posterior D spines 6
5b D soft-rays 18-28 7

6a Two blue lines curving down and back from origin of LL; white-ringed black ocellus on sides ..... *C. bennetti*
6b No blue lines on body; black blotch on body not white-ringed ..... *C. zanzibarensis*

7a Large round black spot on LL below rear D spines; black stripe along rear margin of D across peduncle and along rear edge of A ..... *C. unimaculatus*
7b No black spot on LL below rear D spines 8

8a D XII,18-20; body with lines of dark spots ascending posteriorly ..... *C. melannotus*
8b D XII-XIV,20-28; colour pattern not as above 9

9a A III,16-18 10
9b A III,18-23; (A III,17-19 in *C. lunula*) 11

10a Body with subvertical dark chevrons; soft D, C, rear part of body and A yellow; dark eye band not continuous dorsally; no black bar on C ..... *C. madagaskariensis*
10b Body with black spots; black bar on C ..... *C. guttatissimus*

11a Snout length (minus upper jaw) greater than eye diameter ..... *C. falcula*
11b Colour pattern not as in *C. falcula* 12

12a Anterior D rays of adults prolonged into a filament; dark eye band much wider below eye than above; snout length (minus upper jaw) subequal to eye diameter; body pale grey or white, with series of oblique dark lines ..... *C. auriga*
12b No D rays prolonged into a filament; colour pattern not as above 13

13a D XII,23-28; snout length (minus upper jaw) distinctly greater than eye diameter 14
13b XII-XIV,20-26; snout length subequal to or less than eye diameter 15

14a Body with narrow vertical black lines; LL 28-32 ..... *C. lineolatus*
14b Body with curving black lines; LL 38-45 ..... *C. meyeri*

15a D XIII-XIV,20-22; A III,18-20; body with several dark subhorizontal lines ..... *C. trifasciatus*
15b D XII-XIV,20-26; A III,18-23; colour not as in *C. trifasciatus* 16

16a A III,19-23 17
16b A III,17-19 18

17a D spines usually 13 ..... *C. vagabundus*
17b D spines usually 14 ..... *C. xanthocephalus*

18a D XII-XIII,23-25; P 15-17 ..... *C. lunula*
18b D XII-XIII,20-23; P 14-15 19

19a Median fins and rear part of body mostly yellow; dark eye band reaches V ..... *C. kleinii*
19b D and A dark posteriorly; with narrow pale border; rear part of body dark, C abruptly pale; dark eye band not extending to V ..... *C. dolosus*

205.1 *Chaetodon auriga*
Forsskål, 1775
PLATE 75

Threadfin butterflyfish — Draadvin-vlindervis

Chaetodon auriga Forsskål, 1775: 60 (Djedda, Red Sea); Smith, **SFSA No. 592*;** Wallace et al., 1972: 5; Blaber, 1978: 39; Burgess, 1978: 581*; van der Elst, 1981: 139*.

D XIII,23-24; A III,20-21; P 15-16; LL 27-32. Snout length equals eye diameter. Adults with anterior D rays prolonged into a filament.

Black spot usually present in D at base of filament. Attains 20 cm. Tropical Indo-Pacific from South Africa and Red Sea to Hawaiian Ids. and Australia; extends south on our coast to Mossel Bay.

205.2 *Chaetodon bennetti*
Cuvier, 1831
PLATE 75

Archer butterflyfish — Boogskutter-vlindervis

Chaetodon bennetti Cuvier, *in* Cuv. & Val., 1831: 84 (Sumatra); Smith, **SFSA No. 605a;** Burgess, 1978: 467*.

D XIV,16-18; A III,15-17; P 14-16; LL 30-38.

Body mostly yellow; 2 blue lines, 1 above and 1 below P base, from LL origin to base of A; black blotch or white-ringed ocellus on LL below rear D spines; blue-edged dark bar through eye; C margin transparent. Attains 20 cm. Tropical Indo-Pacific from Delagoa Bay to Japan and central Pacific.

205.3 *Chaetodon blackburnii*
Desjardins, 1836
PLATE 74

Brownburnie — Bruinburnie

Chaetodon blackburnii Desjardins, 1836: 58 (Mauritius); Smith, **SFSA No. 606*;** Burgess, 1978: 706*; van der Elst, 1981: 140*.

D XVI-XVII,21-23; A III,16-18; P 14-15; LL 34-36.

Body mostly dark brown, with about 7 black stripes; head and anterior part of body yellow; black band from D origin through eye to isthmus; C and V yellow. Attains 12 cm. Mozambique, south to Bashee River; Mauritius.

205.4 *Chaetodon dolosus*
Ahl, 1923
PLATE 74

Blackedged butterflyfish — Swartrand-vlindervis

Chaetodon dolosus Ahl, 1923: 99 (Mauritius); Burgess, 1978: 687*; Smith, 1980: 179. *Chaetodon guntheri* (*non* Ahl): Smith, 1946: 800; **SFSA No. 604*.** *Chaetodon miliaris* (*non* Quoy & Gaimard): Smith, **SFSA No. 595.** *Chaetodon mendoncae* Smith, 1953: 9 (Mozambique Channel, 60 fms); 1953: **No. 604*;** 1966: 88*.

D XII-XIII,21-22; A III,18-19; P 14-15; LL 36-44.

Rear part of body and D and A blackish; C yellow; edge of D and A white; dark eyeband connected at nape; juveniles pale olive green with vertical rows of small brownish spots; black blotch on middle of soft D rays. Attains 15 cm. Known only from east African coast and Mauritius; south to Xora River.

205.5 *Chaetodon falcula*
Bloch, 1793
PLATE 75

Saddled butterflyfish — Saal-vlindervis

Chaetodon falcula Bloch, 1793: 102, Pl. 426, Fig. 2 (no locality); Smith, **SFSA No. 597*;** Burgess, 1978: 609*.

D XII,24-26; A III,20-22; P 15-16; LL 24-30. Snout longer than eye.

Body pale, with 2 triangular black blotches dorsally and several vertical black lines; black band around peduncle and from nape through eye to isthmus. Attains 20 cm. Indian Ocean from Africa to Indonesia; south to Delagoa Bay. Replaced in the Pacific by the similarly coloured *C. ulietensis* Cuvier.

205.6 *Chaetodon guttatissimus*
Bennett, 1823
PLATE 75

Gorgeous gussy — Mooigussie

Chaetodon guttatissimus Bennett, 1832: 183 (Ceylon); Smith, **SFSA No. 602*;** 1965: 30; Burgess, 1978: 722*; Allen, 1980: 189*; van der Elst, 1981: 141*.

D XIII,21-23; A III,16-18; P 14-15; LL 27-39.

Body pale, with numerous small dark spots extending onto D and A and forming a dark band around peduncle; black vertical bar at middle of C; D and A with pale margin. Attains 12 cm. Indian Ocean and Red Sea; south to Durban.

205.7 *Chaetodon kleinii*
Bloch, 1790
PLATE 75

Whitespotted butterflyfish — Klein vlindervis

Chaetodon kleinii Bloch, 1790: 7, Pl. 218, Fig. 2 (East Indies); Smith, **SFSA No. 600*;** Burgess, 1978: 699*; van der Elst, 1981: 143*. *Chaetodon cingulatus* Fowler, 1934: 480, Fig. 45 (Durban).

D XIII,20-23; A III,18-19; P 14-15; LL 30-38.

Body yellowish, with large pale spot at centre of each scale; wide black band from D origin through eye to chest; jaws black; soft D and A yellow, with narrow white edge and submarginal black line; rear margin of C transparent. Attains 15 cm. Red Sea and Indian Ocean to central Pacific; south to Coffee Bay.

205.8 *Chaetodon lineolatus*
Quoy & Gaimard, 1831
PLATE 75

Lined butterfish — Gestreepte vlindervis

Chaetodon lineolatus Quoy & Gaimard, *in* Cuv. & Val., 1831: 40 (Mauritius); Smith, **SFSA No. 601*;** Burgess, 1978: 612*.

D XII,25-28; A III,20-22; P 16; LL 27-33. Snout longer than eye diameter.

Body yellowish, with about 16 vertical black lines; broad black band along base of soft D to base of posterior A rays. Attains 30 cm. Red Sea and Indian Ocean to Hawaii and Australia; south to Durban.

205.9 *Chaetodon lunula*
(Lacepède, 1803)
PLATE 75

Halfmoon butterflyfish — Halfmaan-vlindervis

Pomacentrus lunula Lacepède, 1803: 507, 511, 513 (no locality). *Chaetodon lunula:* Smith, **SFSA No.598*;** Blaber, 1978: 39; Burgess, 1978: 566*; van der Elst, 1981: 144*.

D XII-XIII,23-25; A III,17-19; P 15-17; LL 35-43. Snout subequal to eye.

Juveniles with black ocellus on soft D and another on peduncle. Attains 19 cm. South Africa to Hawaii, Japan and Australia; south to East London.

205.10 *Chaetodon madagaskariensis*
Ahl, 1923
PLATE 75

Pearly butterflyfish — Pêrel-vlindervis

Chaetodon chrysurus madagaskariensis Ahl, 1923: 163 (Madagascar). *Chaetodon chrysurus* (*non* Schneider): Smith, **SFSA No. 603*.** *Chaetodon madagascariensis:* Burgess, 1978: 398*; Allen, 1980: 196*; Smith, 1980: 179; van der Elst, 1981: 145*.

D XIII-XIV,20-21; A III,16-17; P 14-15; LL 33-38. Snout subequal to eye. In large adults, the A is distinctly angular. This species is replaced by the similarly coloured *C. paucifasciatus* Ahl, 1923 in the Red Sea, and by *C. mertensii* Cuvier, 1831 in the Pacific Ocean.

Body pearly white, with 5-7 ragged black chevron marks on sides; broad orange bar covering soft D, extending across body to posterior A rays; black eyeband not joined above or below to that of opposite side; horseshoe-shaped black mark on nape. Attains 13 cm. Indian Ocean from east coast of Africa to Christmas Island, also Madagascar, Mauritius; south to Port Elizabeth.

205.11 *Chaetodon marleyi*
Regan, 1921
PLATE 76

Doublesash butterflyfish — Dubbelband-vlindervis

Chaetodon marleyi Regan, 1921: 1 (East London); Smith, **SFSA No. 591*;** Smith & Smith, 1966: 90*; Burgess, 1978: 667*; Allen, 1980: 199*. *Chaetodon notophthalmus* Ahl, 1923: 81, Pl. 2, Fig. 10 (locality unknown). *Chaetodon hoefleri* (*non* Steindachner, 1882): Penrith, 1978: 186; van der Elst, 1981: 142*.

D XI,22-25; A III,18-19; P 15-16; LL 36-42. Closely related to *C. hoefleri* of the west African coast to southern Angola (see Key); also in *C. hoefleri,* the second dark body bar is not close to the dark bar on the C peduncle. Since these 2 species are very closely related and of allopatric distributions, it would probably be better to recognise them as subspecies.

Attains 15 cm. Endemic to southern Africa from Lamberts Bay (western Cape Province) to Delagoa Bay.

205.12 *Chaetodon melannotus*
Bloch & Schneider, 1801
PLATE 76

Blackback butterflyfish — Swartrug-vlindervis

Chaetodon melannotus Bloch & Schneider, 1801: 224 (Tranquebar, India); Burgess, 1978: 674*. *Chaetodon melanotus:* Smith, **SFSA No. 596*.**

D XII,18-20; A III,16-18; P 14-15; LL 29-37.

Attains 15 cm. Easy to keep in aquaria. Indo-Pacific and Red Sea, south to Durban.

205.13 *Chaetodon meyeri*
Bloch & Schneider, 1801
PLATE 76

Maypole butterflyfish — Meiboom-vlindervis

Chaetodon meyeri Bloch & Schneider, 1801: 223 (Moluccas); Smith, 1953: 518, **No. 605c;** 1966: 89*; Burgess, 1978: 502*; van der Elst, 1981: 146*.

D XII,23-24; A III,18-20; P 15-17; LL 41-47.

Body, head and median fins white or yellow, with curving black lines; V yellow. Attains 17 cm. Feeds only on coral

polyps, thus not easy to keep in aquaria. Indo-Pacific; south to Durban.

205.14 *Chaetodon trifascialis*
Quoy & Gaimard, 1825
PLATE 76

Rightangle butterflyfish — Reghoekige vlindervis

Chaetodon trifascialis Quoy & Gaimard, 1825: 379, Pl. 62, Fig. 5 (Guam); Smith, **SFSA No. 605b*;** Burgess, 1978: 418*; van der Elst, 1981: 147.

D XIII-XIV,14-16; A IV,14-15; P 15; LL 21-27. Body depth 1.8-2.2 in SL. This species feeds exclusively on coral polyps; not recommended as an aquarium fish.

Attains 17 cm. Red Sea and Indo-Pacific from Africa to Hawaii; south to the Tugela River.

205.15 *Chaetodon trifasciatus*
Mungo Park, 1797
PLATE 76

Purple butterflyfish — Pers vlindervis

Chaetodon trifasciatus Mungo Park, 1797: 34 (Sumatra); Smith, **SFSA No. 593*;** Burgess, 1978: 478*.

D XIII-XIV,20-22; A III,18-20; P 14-16; LL 28-34. Snout shorter than eye diameter; dorsal head profile convex. Juveniles can be adapted to aquarium life.

Attains 15 cm. Indo-Pacific from South Africa (Kosi Bay) to Hawaii. The Pacific population has been recognised as a distinct subspecies (*C. trifasciatus lunulatus* Quoy & Gaimard, 1825) by Burgess (1978).

205.16 *Chaetodon unimaculatus*
Bloch, 1787
PLATE 76

Limespot butterflyfish — Eenkol-vlindervis

Chaetodon unimaculatus Bloch, 1787: 75, Pl. 201, Fig. 1 (East Indies); Smith, **SFSA No. 594*;** Blaber, 1978: 39; Burgess, 1978: 637*; van der Elst, 1981: 148*.

D XIII,21-23; A III,17-20; P 15-16; LL 35-41. Teeth of outer row enlarged. This species is usually found in pairs; does well in aquaria. Burgess (1978) recognises the Indian Ocean population as a distinct subspecies (*C. unimaculatus interruptus* Ahl, 1923), differing in having a narrower eyeband that does not extend onto the chest, and body completely yellow, except for the black spot below posterior D spines. The Pacific subspecies *(C. u. unimaculatus)* has the eyeband equal in width to the eye, extending onto the chest, and the body mostly white.

Attains 18 cm. Indian Ocean from Africa to Indonesia; south to Port Alfred.

205.17 *Chaetodon vagabundus*
Linnaeus, 1758
PLATE 76

Vagabond butterflyfish — Swerwer-vlindervis

Chaetodon vagabundus Linnaeus, 1758: 276 (East Indies); Smith, **SFSA No. 599*;** Blaber, 1978: 39; Burgess, 587*; van der Elst, 1981: 149*.

D XIII,23-26; A III,19-21; P 15-17; LL 31-38. Does well in aquaria.

Attains 15 cm. Indo-Pacific and Red Sea; south to Durban.

205.18 *Chaetodon xanthocephalus*
Bennett, 1832
PLATE 77

Yellowhead butterflyfish — Geelkop-vlindervis

Chaetodon xanthocephalus Bennett, 1832: 182 (Ceylon); Smith, **SFSA No. 605*;** Burgess, 1978: 602*; Allen, 1980: 235.

D XIII-XIV,23-25; A III,21-23; P 15-17; LL 31-37. Snout plus upper jaw longer than eye; dorsal head profile distinctly concave.

Colour pattern changes considerably with growth; juveniles lose the black eyeband and black spot on the peduncle. Once acclimated, it does well in aquaria. Attains 20 cm. Western Indian Ocean, south to Durban.

205.19 *Chaetodon zanzibarensis*
Playfair, 1867
PLATES 74 & 77

Zanzibar butterflyfish — Zanzibar-vlindervis

Chaetodon zanzibarensis Playfair, *in* Playfair & Günther, 1867: 33, Pl. 6, Fig. 1 (Zanzibar); Burgess, 1978: 462*; Allen, 1980: 237*.

D XIII-XIV,15-17; A III,15-17; P 15-16; LL 32-39. Dorsal head profile straight.

Black spot on side usually edged in white or bluish colour. Attains 15 cm. Zanzibar to Durban plus islands of the western Indian Ocean.

Genus ***Forcipiger*** Jordan & McGregor, 1898

Two species, 1 in our area. *F. longirostris* (Broussonet, 1782) has been reported from the Comores and can be distinguished by its 11 D spines and longer snout (1.1-1.5 in body depth).

205.20 *Forcipiger flavissimus*
Jordan & McGregor, 1898
PLATE 77

Longnose butterflyfish — Langneus-vlindervis

Forcipiger flavissimus Jordan & McGregor, *in* Jordan & Evermann, 1898: 1671 (Clarion Id.); Burgess, 1978: 186; Smith, 1980: 179; van der Elst, 1981: 150. *Forcipiger longirostris* (*non* Broussonet): Smith, **SFSA No. 589*;** 1965: 30.

D XII,22-24; A III,17-18; P 14-16; LL 69-80; GR 12-16. Depth 1.9-2.4, head 2.2-2.4 in SL; snout 1.6-2.1 in body depth. Feeds on tubeworm tentacles and small crustaceans.

Attains 16 cm. The most widely distributed species of butterflyfish, extending from Durban to the Red Sea, across Indian and tropical Pacific Oceans to Easter Island and Baja California.

Genus ***Hemitaurichthys*** Bleeker, 1876

LL complete; no D spines elongate. Four species; only 1 in the Indian Ocean.

205.21 *Hemitaurichthys zoster*
(Bennett, 1831)
PLATE 77

Brushtooth butterflyfish — Borseltand-vlindervis

Chaetodon zoster Bennett, 1831: 61 (Mauritius). *Hemitaurichthys zoster*: Burgess, 1978: 195*; Allen, 1980: 240*; Smith, 1980: 179.

D XI-XII,24-25; A III,20-21; P 17-19; LL 66-73.

Dark brown with broad white area in middle of body; C mostly white; D spines over white area are yellow. Usually seen in large schools; feeds on zooplankton well above the reef, to which it retreats at the approach of danger. Attains 18 cm. Western Indian Ocean; south to Sodwana Bay.

205.21 *Hemitaurichthys zoster*: 16.5 cm (N. Mozambique).

Genus ***Heniochus*** Cuvier, 1816

LL complete; 4th D spine prolonged. Eight species are currently recognised in this genus; 3 species in our area.

KEY TO SPECIES

1a Front of head mostly black; black band from belly to D reaches 5th-7th spines ..... *H. monoceros*
1b Front of head mostly pale, with black interorbital band and front of snout dusky; black band from belly reaches first 3 D spines 2
2a D spines usually XI; snout not shorter than eye diameter; horizontal line through upper jaw symphysis extends through lower edge of eye or well below eye ..... *H. acuminatus*
2b D spines usually XII; snout shorter than eye diameter; horizontal line through upper jaw symphysis extends through middle of eye ..... *H. diphreutes*

205.22 *Heniochus acuminatus*
(Linnaeus, 1758)
PLATE 77

Coachman — Koetsier

Chaetodon acuminatus Linnaeus, 1758: 272 (East Indies). *Heniochus acuminatus*: Smith, **SFSA No. 590*** (in part); Allen & Kuiter, 1978*; Burgess, 1978: 223* (in part); van der Elst, 1981: 151*.

D XI-XII,23-26; A III,17-19; P 17-18; LL 49-56. Large adults with a short stout spine in front of each eye. Usually seen alone or in pairs close to live coral reefs.

Attains 25 cm. Indo-West Pacific, south to Durban.

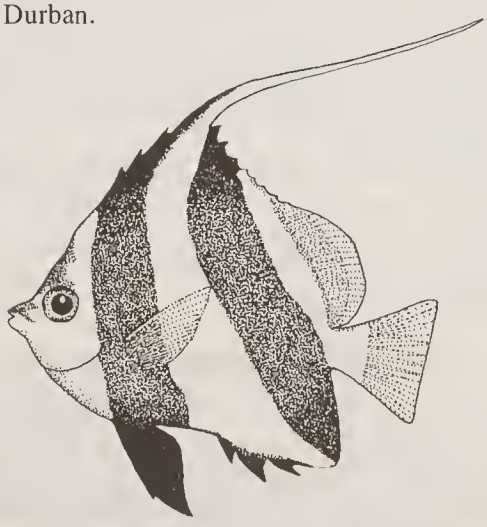
205.23 *Heniochus diphreutes*
Jordan, 1903
PLATE 74

Schooling coachman — Skool-koetsier

Heniochus diphreutes Jordan, 1903: 694, Fig. 3 (Nagasaki, Japan); Allen & Kuiter, 1978*; Smith, 1980: 179. *Heniochus acuminatus*: Burgess, 1978: 223* (in part).

D XII,23-25; A III,17-19; P 16-18; LL 49-57. No spines in front of eyes. Usually occurs in schools feeding on zooplankton well off the bottom; not restricted to coral reefs.

Attains 16 cm. Red Sea and Indo-West Pacific to Hawaii, south to Durban.



205.23 *Heniochus diphreutes*: 10 cm (drawn after Allen & Kuiter, 1978).

205.24 *Heniochus monoceros*
Cuvier, 1831
PLATE 78

Masked coachman — Gemaskerde koetsier

Heniochus monoceros Cuvier, *in* Cuv. & Val., 1831: 100, Pl. 176 (Mauritius); Burgess, 1978: 247*; Smith, 1980: 179.

D XI-XII,24-26; A III,17-19; P 16-18; LL 51-64. Adults with prominent hump on nape and a short "horn" in front of each eye.

Attains 24 cm. Indo-West Pacific, south to Cape Vidal.

205.24 *Heniochus monoceros*: 14 cm (N. Mozambique).

Family No. 206: OPLEGNATHIDAE

by P.C. Heemstra

Knifejaws — **Kraaibekke**

Body oblong, somewhat compressed, covered with minute ctenoid scales. Dorsal fin single, with 11 or 12 spines; anal fin spines 3. Teeth fused to form a strong parrot-like beak similar to that of the parrotfishes, Family Scaridae (but the two families are not at all closely related); prejuveniles with separate incisiform teeth; no teeth on vomer or palatines.

Young coloured very differently from adults. Common in rocky areas from shore out to 100 m; feed on benthic invertebrates. Good eating. Apparently an anti-tropical group occurring at Japan, Australia and on the west coast of South America. One valid genus.

Genus ***Oplegnathus*** Richardson, 1840

Hoplegnathus Richardson, 1849 is an unjustified emendation. *Ostorhinchus* Lacepède, 1802 was considered a senior synonym by Whitley (1959); but we agree with Fraser (1972) that *Ostorhinchus* is a *nomen dubium*. Seven species; our 3 species are endemic to the South African region.

KEY TO SPECIES

1a D XII,11-14; A III,11-13 ..... *O. conwayi*
1b D XI,20-24; A III,14-17 2

2a Body depth 2.5-2.7 in SL; scales begin on top of head behind eye ..... *O. peaolopesi*
2b Depth 1.8-2.1 in SL; scales begin over front of eye ..... *O. robinsoni*

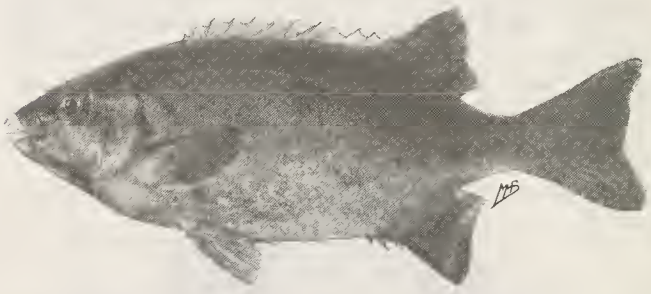
206.1 *Oplegnathus conwayi*
Richardson, 1840
PLATE 78

Cape knifejaw — Kaapse kraaibek

Oplegnathus conwayi Richardson, 1840: 27 (?Australia; Richardson's presumed type-locality is in error, as the species is known only from South Africa); Richardson, 1849: 144, Pl. 7, Fig. 1; Smith, **SFSA No. 461*;** Smith & Smith, 1966: 68*. *Ichthyorhamphus pappei* Castelnau, 1861: 35 (Kalk Bay). *Hoplegnathus algoensis* Gilchrist & Thompson, 1916: 56* (Algoa Bay). *Hoplegnathus conwayi:* Barnard, 1927: 505*.

D XII,11-14; A III,11-13; P 18-20; lower GR 15-17. Body depth 1.8-2.8 in SL, more elongate with age. Top of head naked.

Attains 90 cm. Common from False Bay to Natal. Seldom takes a hook, but easily speared.



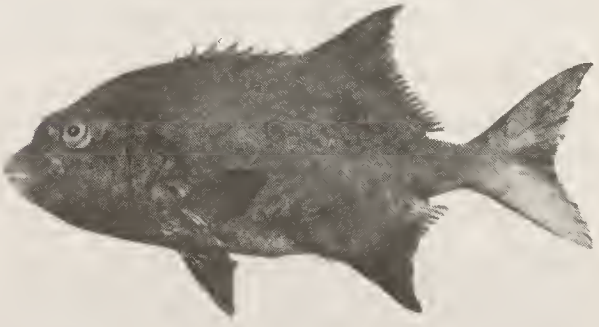
206.1 *Oplegnathus conwayi*: 50 cm (Algoa Bay).

206.2 *Oplegnathus peaolopesi*
Smith, 1946

Mozambique knifejaw — Mosambiekse kraaibek

Oplegnathus peaolopesi Smith, 1946: 798 (Delagoa Bay, Mozambique); Smith, **SFSA No. 463*.**

D XI,20-21; A III,16; P 18-19; lower GR 15.



206.2 *Oplegnathus peaolopesi*: 60 cm holotype (S. Mozambique).

Adults dark bronzy brown; juveniles unknown. Attains 70 cm. Large fishes with a bony bump between the eyes. Delagoa Bay northwards.

206.3 *Oplegnathus robinsoni*
Regan, 1916
PLATE 78

Natal knifejaw — Natalse kraaibek

Hoplegnathus robinsoni Regan, 1916: 168 (Natal); Barnard, 1927: 506; Smith, 1935: 191. *Oplegnathus robinsoni:* Fowler, 1935: 392; Smith, 1946: 797; Smith, **SFSA No. 462*.**

D XI,20-24; A III,14-17; P 18-19; lower GR 16-19.

Adults dark grey; juveniles yellow with black bars, resembling young *Diplodus cervinus hottentotus*. Attains 60 cm. Only stray juveniles south of Natal; adults common from Delagoa Bay northwards; taken on lines about reefs in 20 - 100 m.

206.3 *Oplegnathus robinsoni:* 40 cm (S. Mozambique).

Family No. 207: BRAMIDAE

by M.M. Smith

Pomfrets — **Pomfrette**

Body compressed, deep or elongate. Single dorsal fin; caudal fin in juveniles rounded, becoming forked or lunate in adults; mouth oblique; maxilla scaly; juveniles with serrated preopercle becoming smooth in adults; snout, preopercle flange, margin of gill opening and mandible naked.

A difficult family, with much overlapping of meristics and considerable changes with growth. *Brama* and *Pterycombus* are usually found near land, the other genera are true pelagic fishes. The revision by Mead (1972) in the Dana Report No. 81 is followed here, especially in including 7 genera in this family, 6 in our area. *Eumegistus* Jordan & Jordan, 1922, with 2 species, 1 off Cuba and 1 off Japan and Hawaii, has a distinct naked area above and behind eye.

KEY TO GENERA

1a D & A high, not lobed in front, scaleless, flexible, completely depressible into sheath formed by large thin scales at base of fin ..... (Subfamily PTERACLINAE) 2
1b D & A moderate (lobes in front can be high in adults), scaly, erect and without basal sheath of scales ..... (Subfamily BRAMINAE) 13

2a One of anterior 5 D & A rays notably thicker than others; in adults D origin over snout; scales of D basal sheath not preceded by scales across dorsal midline but continue forward to naked snout ..... *Pteraclis*
2b Anterior D & A rays all similar thickness; in adults D origin above or behind eye; scales preceding D sheath cross dorsal midline in front of fin ..... *Pterycombus*

3a Dorsal profile of head not arched and rounded but flat or only slightly convex between eyes ..... *Taractes*
3b Dorsal profile of head between eyes arched and rounded, the eye more than ½ a diameter away from dorsal profile 4

4a Head strongly compressed; lower edges of mandibles wholly touching behind symphysis; scales on C peduncle not abruptly larger than those on base of mid C rays ..... *Brama*
4b Head moderately compressed; lower edges of mandibles not wholly touching at ventral midline, but with part of isthmus visible between them; scales on C peduncle abruptly larger than those on base of C ..... *Taractichthys*

Genus ***Brama*** Schneider, 1801

Most rays in D and A branched; V short in adults, inserted under rear half of P base; V and P axillary scales prominent; nape, tips of vertical fins and most of paired fins naked; transverse precaudal grooves present but poorly developed. In juveniles, preopercle angle has spines, which disappear with growth; spines on scales lost after 80 mm SL; no enlarged spines (juveniles) or keels (adults) on C peduncle; in adults, hind edges of scales and opercular margins smooth but uneven. Teeth in ragged bands in jaws, none on symphyses. Where plentiful, *Brama* form an important part of the food of oceanic predators like tunas and billfishes, and in turn feed on myctophids and other small creatures. Of 7 species at present recognised, 3 are known from our area. Flesh highly esteemed.

KEY TO SPECIES

1a LS 48-55 ..... *B. orcini*
1b LS 70-80 2

2a In adults (40-50 cm SL) body depth about 2.0 in SL; longest gill filament on 1st arch much longer than distance from front nostril to eye, nearly equals snout; caudal vertebrae 24 ..... *B.* sp
2b In adults (40-50 cm SL) body depth about 2.2 in SL; longest gill filament on 1st arch short, about equals distance from front nostril to eye; caudal vertebrae 25-27 ..... *B. brama*

207.1 *Brama brama*
(Bonnaterre, 1788)
PLATE 50

Pomfret — Pomfret

Sparus brama Bonnaterre, 1788: 104, Pl. 50, Fig. 192 ("seas of England"). *Brama raii:* Smith, **SFSA No. 859***; Davies, 1949: 32; Smith & Smith, 1966: 132*. *Brama brama:* Grindley & Penrith, 1965: 284; Mead, 1972: 29*.

D 35-38; A 29-32; P 20-23; GR (4-7)+(8-12) = 15-18; LS 70-80; vertebrae (16-17)+(25-27); branchiostegal rays 7.

Colour as illustrated; Mead (1972) gives mottled, metallic silvery-black, with naked tips of fins black; P black above, lighter below; lining of mouth black. Preserved: black, with paired fins and tips of central C rays lighter. Attains at least 70 cm. Trawled between Algoa Bay and Walvis Bay, from the surface down to about 1 000 m. Plentiful in north Atlantic, known from Australia, New Zealand, Chile.

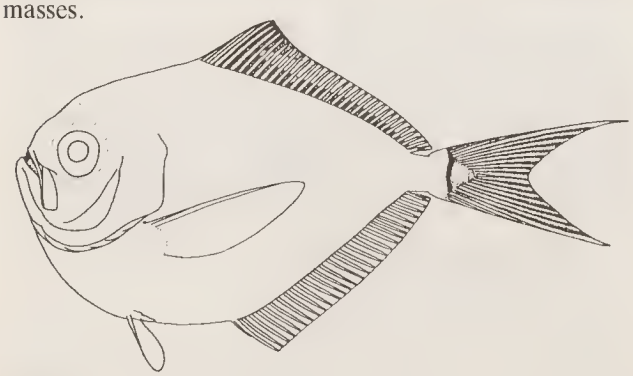
207.2 *Brama orcini*
Cuvier, 1831

Tropical pomfret — Tropiese pomfret

Brama orcini Cuvier, *in* Cuv. & Val., 1831: 295 (no locality); Mead, 1972: 72*; Smith, 1980: 182. *Collybus drachme:* Grindley & Penrith, 1965: 284. Bauchot (1970) placed the holotype of *B. orcini* (from "Equator") in synonymy of *B. raii* (i.e. *B. brama*). There are slight differences that Mead recognises, and while *B. orcini* is considered tropical, *B. brama* is a temperate form.

D 32-36; A 28-30; P 20-22; GR (3-5)+(9-11); vertebrae (15-17)+(21-25) = 37-40; branchiostegal rays 6-8; LS 48-55.

Colour similar to *B. brama.* Attains 35 cm. Off Natal; tropical Indo-Pacific down to 100 m, generally near land masses.



207.2 *Brama orcini:* 6.5 cm SL (after Mead, 1972).

207.3 *Brama* sp.

Southern pomfret — Suidelike pomfret

Brama sp. Mead, 1972: 81* (New Zealand). Two large adults, similar to *B. brama,* one from New Zealand and one from Table Bay do not belong to any of the bramids as known. When a series becomes available, a name will be given to this form.

D 34-35; A 27-28; P 22-23; GR (5-6)+12; LS 70-74; vertebrae (15-16)+24; branchiostegal rays 7; squamation, colour etc. similar to *B. brama.*

Attains probably 55 cm. Probable distribution: New Zealand, Australia, South Africa.

Genus ***Pteraclis*** Gronow, 1772

In adults, D and A sail-like, without anterior lobes; V short, inserted under rear margin of eye; vent far forward at throat; no transverse precaudal grooves. Scales thin with slight ridge; spines on scales do not disappear on large specimens, but LL absent in adults. Two rows of conical recurved teeth on mandible; similar teeth in band on premaxilla, band broader in front; 3-4 teeth generally present on vomer, and 5-6 in a row on each palatine; symphyses of jaws toothless. Mead (1972) gives 3 species, 1 in our area: *P. carolinus* Valenciennes, 1833, well known from the North Atlantic, has 8 branchiostegal rays and A 42-47; *P. aesticola* (Jordan & Snyder, 1901) from the Pacific has A 40-43.

207.4 *Pteraclis velifera*
(Pallas, 1769)

Fanfish — Waaiervis

Coryphaena velifera Pallas, 1769: 19, Pl. 3, Fig. 1 (eastern Indian Ocean). *Pteraclis ocellatus* Valenciennes, *in* Cuv. & Val., 1833: 363 (Mozambique Channel, 30°S). *Pteraclis velifera:* Smith, **SFSA No. 870*;** Mead, 1972: 115*.

D 53-57; A 46-50; P 18-20; V I(3-4); GR (0-1)+7 with spinulose platelets each side; LS 55-59; vertebrae (20-21)+(31-34) = 51-54. Anterior ends of premaxillaries separate from one another; pharyngeals strongly toothed; tongue toothless except for extension of gill arch spinules.

Colour of freshly dead specimen (caught alive in a pool near Durban): shimmering metallic silver, which rubs off to

207.4 *Pteraclis velifera:* 23.5 cm (Durban).

give brownish body. D and A blue-black with silver trimmings, as shown in illustration. On long preservation fins become light buff colour. Attains 50 cm. Off Mozambique, Durban, East London, Port Elizabeth and St. Helena Bay (Cape west coast); also New Zealand and Australia.

Genus ***Pterycombus*** Fries, 1837

No distinct lobes in D and A; most rays unbranched; V short, inserted in advance of P base; transverse precaudal grooves absent; spines on scales persist in large fishes, midlateral scales on C peduncle not modified. Two species: the North Atlantic *P. brama* Fries, 1837 overlaps meristically, but differs from the Indo-Pacific species in D = 51 modally, vertebrae 48-51 and, in juveniles up to 10 cm, with some D and A rays longer than half SL and eye about 3.2 in head length.

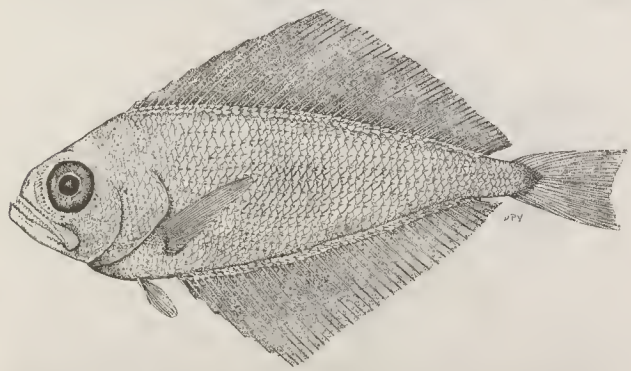
207.5 *Pterycombus petersii*
(Hilgendorf, 1878)

Prickly fanfish — Prikkel-waaiervis

Centropholis petersii Hilgendorf, 1878: 1 (Japan). *Pterycombus falcatus* Barnard, 1927: 599, Pl. 25 (probably Table Bay); Williams, 1966: 377. *Centropholoides falcatus:* Smith, **SFSA No. 871.** *Pterycombus* cf. *petersii:* Hulley, 1972: 230. *Pterycombus petersii:* Mead, 1972: 101*.

D 48-49; A 39-40; P 21-22; GR 1+(6-7) with spinules on both arms; LS 47-50; predorsal scales 10-11; vertebrae 45-58; branchiostegal rays 7; in juveniles up to 10 cm the longest D & A rays are less than half SL, and eye is about 2.7 in head length; LL distinct in adults (not in *P. brama*). Toothed border of massive lower jaw meets upper jaw but is not included when mouth closed; outer row of irregularly spaced, recurved teeth confined to front of lower jaw; inner row evenly spaced but expanding to band, with a few larger retrorse teeth, near symphysis; teeth on premaxilla similar, forming a wider band in front; no teeth on vomer, palatines or tongue.

Uniform cream to yellow; D and A black; V and C lobes dark, middle of C pale; P pale with dark base. Preserved: body brown, fins blackish. Attains 31 cm. From Japan and mid-Pacific to Africa, south to round the Cape into the Atlantic (Table Bay); juveniles probably go to 200 m depth.



207.5 *Pterycombus petersii*: 7.5 cm SL (off Cape Point).

Genus ***Taractes*** Lowe, 1843

D origin behind head; D and A rays mostly branched; V short, inserted before or under front half of P base; P reaches past A origin; transverse precaudal grooves poorly developed. Spines on scales of juveniles disappear with growth; 1 or more naked areas above and behind eye. Two species, 1 in our area; *T. rubescens* (Jordan & Evermann, 1887), from the Pacific and western Atlantic, has a well formed keel on C peduncle of adults and LL in juveniles curves gently to midline of side.

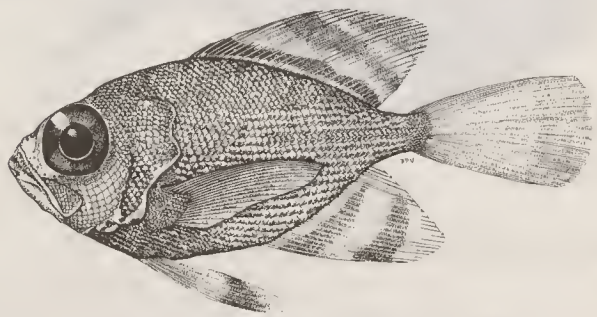
207.6 *Taractes asper*
Lowe, 1843

Rough pomfret — Ruwe pomfret

Taractes asper Lowe, 1843: 83 (Madeira); Grindley & Penrith, 1965: 284; Smith, 1966: 69*; Mead, 1972: 21*.

D 31-35; A 22-26; P 18-20; C 1+17+1; GR (1-2)+(7-8) with 2 spinate platelets above and 3 below; LL 49-53, generally visible in adults, bends beneath anterior D; LS 43-44; vertebrae (17-18)+(23-24) = 41-42. Jaws with ragged bands of fine, sharp, slightly curved teeth, a few in front almost horizontally retrorse; a single, outer (almost exsert) widely spaced series of strongly curved teeth in front and at sides of lower jaw; no teeth at symphysis of upper jaw, on tongue or on vomer; 1-2 sparse rows of small, sharp, slender teeth sometimes present on palatines. Small scaleless area usually present just above operculum; head scales heavily striated, those on body with spines, in juveniles changing to horizontal ridges with growth; 7-8 rows scales on cheek, 5 across maxilla, lower jaw naked with large pores, front covered by about 7 transverse rows of leaf-like scales.

Adult with head, body and lobes of median fins uniform dark brown; P pale, darker inside dorsal part; a pale submarginal band from behind lobe on D and A; V, especially tips and membrane, dark; tongue dusky but inside mouth unpigmented (Mead, 1972). Attains at least 50 cm. North Atlantic, North Pacific, southern Madagascar to Natal and the Cape.



207.6 *Taractes asper:* 5 cm SL (Cape Town harbour).

Genus ***Taractichthys*** Mead & Maul, 1958

D falcate, originates behind head; most D and A rays branched; transverse C peduncle grooves well developed; midlateral series of scales on C peduncle unarmed, bordered by rows of scales bearing spines; spines on scales only

disappear after about 40 cm SL, those on C peduncle antrorse when present, but not enlarged; in adults no LL, but about 5 series of scales along flank are ridged. Small, recurved, caniniform teeth in bands on jaws, teeth become smaller and bands narrow posteriorly to 1-2 series; vomer with 3 similar teeth, narrow bands on palatines. Two species, both in our area.

KEY TO SPECIES

1a LS, from upper end of gill opening to C base, 39-46 (Atlantic) ..... *T. longipinnis*
1b LS, from upper end of gill opening to C base, 34-38 (Indo-Pacific) ..... *T. steindachneri*

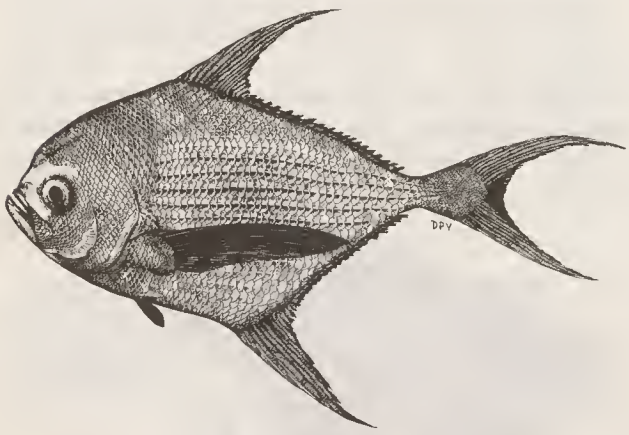
207.7 *Taractichthys longipinnis*
(Lowe, 1843)

Bigscale pomfret — Grootskub-pomfret

Brama longipinnis Lowe, 1843: 82 (Madeira). *Taractes longipinnis:* Smith, **SFSA No. 860** (in part); Barnard, 1948: 373*; Smith, 1965: 16*; 1966: 71. *Taractichthys longipinnis:* Mead, 1972: 85*.

D 33-38; A 27-30; P 20-22; GR 3+8 with 3 spinule platelets above and 3-4 below; LS 39-46; vertebrae (19-22)+(25-26) = 44-47; P about 1.5 times head length; V hardly exceeds eye diameter.

Grey or silver with coppery reflections. Preserved: black; P, distal part of V and crescentic border on C whitish; no pigment inside mouth. Attains over 1 m. Tropical/temperate Atlantic, south to Walvis Bay (or False Bay?).



207.7 *Taractichthys longipinnis*: 48 cm SL (Walvis Bay).

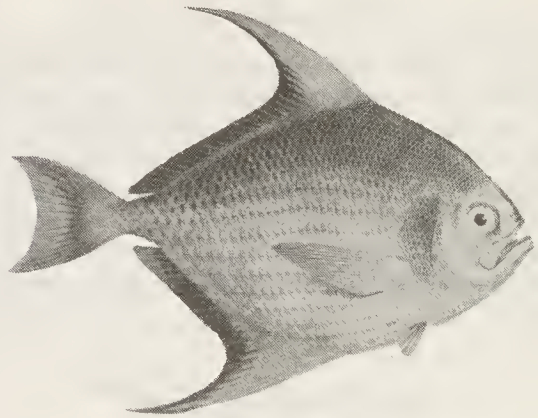
207.8 *Taractichthys steindachneri*
(Döderlein, 1883)

Sickle pomfret — Sekel-pomfret

Argo steindachneri Döderlein, *in* Steindachner & Döderlein, 1883: 34, Pl. 7 (Tokyo, Japan). *Taractes longipinnis* (*non* Lowe): Smith, **SFSA No. 860** (in part); Day et al., 1970: 96. *Taractichthys steindachneri:* Mead, 1972: 91*.

D 33-37; A 26-28; P 20-22; LS 34-38; vertebrae (19-21)+(23-26) = 44-46.

Attains over 60 cm and 11 kg in weight (estimated from otoliths to be about 8 years old). Indo-Pacific from California to Zanzibar and south to False Bay. References to *T. longipinnis* in the Indo-Pacific are considered misidentifications of *T. steindachneri.* False Bay is therefore a suspect locality for *T. longipinnis.*



207.8 *Taractichthys steindachneri:* 19.5 cm holotype (after Steindachner & Döderlein, 1883).

Family No. 208: CARISTIIDAE

by P.C. Heemstra

Manefishes — **Maanhaarvisse**

Body deep, compressed; scales thin and deciduous. Dorsal fin long and high, rays more or less elongate, origin over head; bases of anal-fin rays covered by a wide, thin skin flap. Anterior rays of dorsal and anal fins without segmentation, but they are bilaterally paired and flexible. Pelvic fins (I,5) inserted before pectoral fins; fold into a shallow groove that runs along ventral edge of belly to anal fin where the sides of the groove merge with the sheath at base of anal fin. Head bones thin and fragile. Branchiostegals 7.

Rare pelagic fishes found near the surface, or to depths of 500 m. This family is in dire need of revision. Two species occur in our area; each represents a different genus and neither fits any of the nominal genera of this family.

KEY TO SPECIES

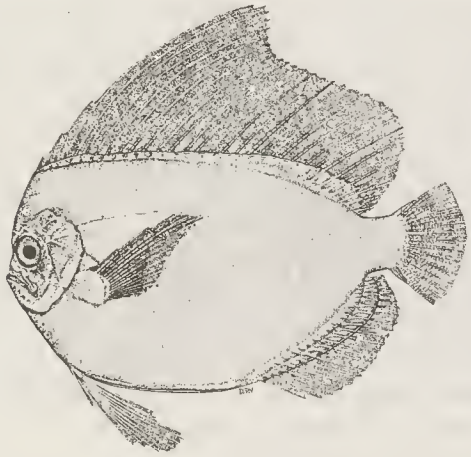
1a Maxilla completely hidden by a thin, flexible preorbital bone; eye diameter about 2.7 in body depth ..... *Caristius* sp.
1b Maxilla mostly exposed; eye diameter 5-7 in body depth ..... *C. groenlandicus*

208.1 *Caristius groenlandicus*
Jensen, 1942

Caristius groenlandicus Jensen, 1942: 49, Pl. 1 (off west coast of Greenland). *Platyberyx groenlandicus:* Penrith, 1969: 70.

D 34-36; A 21-22; P 18-19; GR (5-7)+(14-15); vertebrae 18+22. Forehead subvertical. Posterior nostrils slit-like, anterior circular. Sides of jaws with 1 row of slender canines; 2-5 rows of canines at front of jaws; several long slender canines on vomer (but our largest fish has only 1 long, curved, antrorse canine on the vomer); 3-5 canines on each palatine, mostly hidden by loose folds of skin.

Attains at least 30 cm. Known from off Greenland, British Columbia, Lüderitz (Namibia) and off Durban in 420 m (RUSI 17924, 254 mm SL).

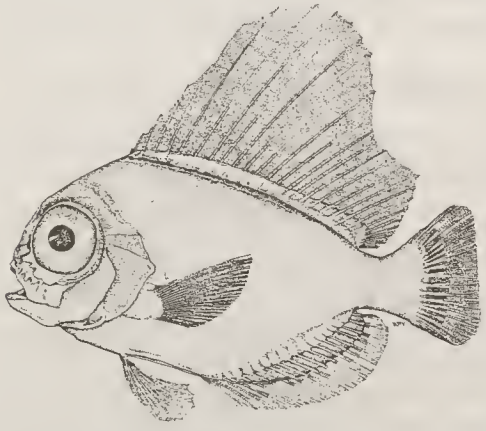


208.1 *Caristius groenlandicus:* 25.5 cm SL (off Durban).

208.2 *Caristius* sp.

D 28-29; A 17-20; P 18-21; GR (6-7)+(14-17); vertebrae (14-15)+(18-19) = 33. Teeth as in *Caristius groenlandicus*, except no teeth on palatines. Nostril configuration or number cannot be determined because front of head is damaged in both of our specimens.

Two specimens known: RUSI 17923, 71 & 162 mm SL from off Durban in 420 m.



208.2 *Caristius* sp: 16 cm SL (off Durban).

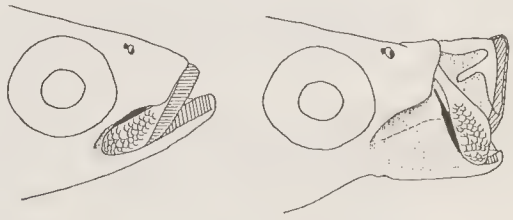
Family No. 209: EMMELICHTHYIDAE

by P.C. Heemstra

Rovers **Rondlopers**

Body oblong to fusiform. Dorsal fin continuous, notched, or divided into separate spinous and soft-rayed fins. Anal and soft dorsal fins with scaly basal sheath. Pelvic fins with well-developed scaly axillary process. Upper jaw very protrusible; maxilla scaly, not covered by preorbital bone when mouth is closed. Teeth rudimentary or absent. Gill-rakers long and numerous. Scales ctenoid, covering body and most of head. Vertebrae 10+14.

Adults usually near bottom in 100 - 500 m; some species attain 40-60 cm and are excellent eating. Occurring in all oceans, but nowhere abundant enough to be of significant commercial importance. Three genera, with a total of 10 species; 3 species in our area. Family revision by Heemstra & Randall (1977).



Head of emmelichthyid fish to show protrusible mouth: supramaxilla in black; upper and lower lips diagonally hatched. Scales on head not shown.

KEY TO GENERA

1a D continuous, not divided between spinous and soft-rayed parts; body depth greater than head length ..... *Plagiogeneion*

1b D divided to base, or spinous part completely separate from soft fin; body depth not greater than head length 2

2a D divided to base, but no distinct gap between spiny and soft-rayed fins; spinous D base shorter than head ..... *Erythrocles*

2b Spinous D separated from soft D by a distinct gap containing 2-4 short isolated or buried spines; spinous D base usually longer than head ..... *Emmelichthys*

Genus ***Emmelichthys*** Richardson, 1845

Four species; 1 in our area.

209.1 *Emmelichthys nitidus nitidus* Richardson, 1845

PLATE 78

Southern rover Suidelike rondloper

Emmelichthys nitidus Richardson, 1845: 47, Pl. 29, Figs. 7 & 8 (west Australia); Smith, **SFSA No. 574*.** *Emmelichthys nitidus nitidus:* Heemstra & Randall, 1977: 379*.

D X+I+I+I,9-11; A III,10; P 20-23; LL 87-98; GR (10-12)+(27-31). Depth 4.1-5.2; head 3.3-3.9. Two protuberances on rear margin of gill chamber.

Generally reddish, darker (bluish grey) dorsally and silvery white below. Attains 50 cm. Occasionally taken by trawl in 100 - 500 m off western Cape coast. Also occurs at Australia, New Zealand, St. Paul and Amsterdam Ids. *Emmelichthys nitidus cyanescens* (Guichenot), with LL 100-105, is the eastern Pacific subspecies.

Genus ***Erythrocles*** Jordan, 1919

Four species; 1 in our area.

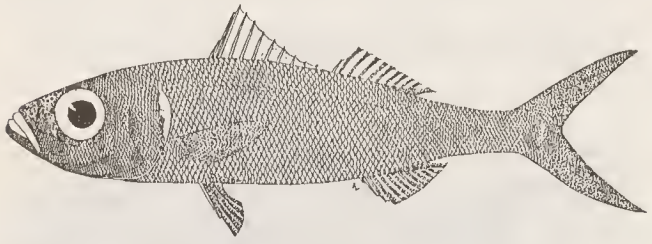
209.2 *Erythrocles schlegelii*
(Richardson, 1846)
PLATE 78

Japanese rubyfish — Japanse robynvis

Emmelichthys schlegelii Richardson, 1846: 272 (Nagasaki, Japan). *Erythrocles schlegelii:* Heemstra & Randall, 1977: 372*.

D X/I,10-12; A III,9-10; P 18-20; LL 66-71; GR (9-10)+(25-29). Depth 3.8-4.6; head 3.2-3.6. Two fleshy protuberances on rear margin of gill chamber. Adults with low keel on mid-lateral region of C peduncle.

Bluish grey dorsally, silvery white with pinkish tinge below; C and P reddish orange. Attains 50 cm. One specimen from off Durban; also known from Kenya and Japan.



209.2 *Erythrocles schlegelii:* 14.5 cm SL (off Durban).

Genus ***Plagiogeneion*** Forbes, 1890

Two species; 1 in our area. *P. macrolepis* McCulloch, 1914 (with LL 48-51) is known only from Australia.

209.3 *Plagiogeneion rubiginosus*
(Hutton, 1875)
PLATE 78

Rubyfish — Robynvis

Therapon rubiginosus Hutton, 1875, 314 (Otago, New Zealand). *Plagiogeneion rubiginosus:* Smith, **SFSA No. 575***; Penrith, 1967: 533; Amaoka et al., 1976: 59*; Heemstra & Randall, 1977: 367*.

D XII,10-12; A III,10; P 19-22; LL 67-73; GR (10-12)+(26-31).

Body mostly rosy pink, brownish dorsally, silvery below; fins red, C tips blackish. Attains 60 cm. Common in 500 m off Algoa Bay. Also known from New Zealand, Australia, Sri Lanka, St. Paul & Amsterdam Ids., and Vema Seamount west of Cape Town.

Family No. 210: CARANGIDAE

by W.F. Smith-Vaniz

Kingfishes — **Koningvisse**

Body variable in shape, ranging from elongate and fusiform to deep and strongly compressed; scales small, usually cycloid, those in straight part of lateral line often modified as enlarged, thickened spiny scutes. Mouth moderate; teeth variable, sometimes absent, usually in small rows or bands, or a single row of strong to moderate canines. Dorsal fin usually divided into separate spinous and soft-rayed fins or the spinous part very low with 4-8 spines (spines obsolete or embedded in some species, e.g. *Alectis*); anal fin with 2 anterior spines (1 spine in *Elagatis* and *Seriolina*) distinctly separated from rest of fin; anal-fin spines not visible (embedded) in adults of some species; caudal fin strong, forked, with slender peduncle. Adults often bluish grey dorsally, silvery below with iridescent sheen.

Body shape and colour pattern of these fishes change so much with growth that juveniles and adults of the same species are often difficult to recognise. In general, juveniles have deeper bodies, shorter fins (except fins longer in *Alectis* and some *Carangoides*) and more contrasting colour patterns, often consisting of dark bars. Mostly swift carnivorous fishes, usually occurring in schools and found in all but the coldest seas. Many are important sport fish, some reaching a large size, and nearly all are good eating. In other parts of the world, carangids are called "jacks" or "trevallies". In southern Africa the maasbanker or horse mackerel is of significant importance to the trawl fishery. About 25 genera, with a total of 140 species; 23 genera and 54 species represented in our area. Fork length (FL) is measured from the tip of the snout to the end of the middle caudal fin rays.

IMPORTANT IDENTIFICATION NOTES

Breast squamation: many species of *Carangoides* and *Caranx* have the breast only partially scaled, and the pattern of breast squamation is an important character used to distinguish species. The pattern of breast squamation is sometimes difficult to observe in fresh specimens; observation is facilitated by gently scraping the breast with a knife to remove mucus and allowing the breast to partially dry, hastened by blowing air on the area.

Gill-raker counts: in species with relatively numerous gill-rakers (e.g. *Decapterus* and *Trachurus*) great care must be taken not to overlook rakers at either end of the gill arch. In some genera the number of developed rakers decreases

with growth with a concomitant increase in the number of rudiments (tubercles or short rakers with the diameter of their bases greater than their height). When rudimentary rakers are included in the gill-raker counts, and large specimens are being examined, it is very important that all of the tubercles are counted.

Lateral-line scutes: size and configuration of the scales and scutes on the lateral line is variable and there may be a gradual transition from one type to another. Scutes are here defined as modified scales that either have their posterior margin with a small to moderate projecting spine, or the scale has a raised horizontal ridge and ends in an apex not exceeding a 90° angle. All scutes should be counted, including those extending onto the caudal-fin base. In some species it may also be necessary to remove small body scales that tend to overgrow or otherwise obscure the lateral line.

Measurements: the curved part of the lateral line is measured as a chord of the arch extending from the upper edge of the opercle to its junction with the straight part. The straight part of the lateral line is measured from its junction with the curved part to its termination on the caudal-fin base (end of the last scute).

KEY TO GENERA

1a V absent or if present (young), positioned distinctly anterior to vertical through P base; scales almost completely covering D and A ..... *Parastromateus*
1b V always present and never in front of vertical at P base; scales on D and A, if present, restricted to about basal ½ of fins 2

2a Posterior straight part of LL with scutes (weak or rudimentary in *Chloroscombus* and *Selene*); in adults, P long and falcate, in most genera longer than head (about equal to head length in *Selar* and *Trachurus* and shorter than head in some *Decapterus* spp.) 3
2b No scutes in LL (only pored scales, not enlarged); P usually shorter than head (ca. 0.9-2.0 in HL) 17

3a Second D and A with 1 or more distinctly separate finlets 4
3b Second D and A without finlets 5

4a A single detached terminal finlet in D and A; shoulder girdle (cleithrum) margin with 2 papillae, the lower one larger; maximum scute height smaller than eye diameter ..... *Decapterus*
4b Posterior D and A rays consisting of detached finlets; shoulder girdle margin smooth; maximum scute height larger than eye diameter ..... *Megalaspis*

5a Pored scales in curved LL scute-like, expanded dorso-ventrally (in large fish may be obscured by overgrowth of smaller scales); dorsal accessory LL normally extends posteriorly at least to below 3rd D spine, usually farther posteriorly ..... *Trachurus*
5b No enlarged scute-like scales in curved LL; dorsal accessory LL ending before D origin 6

6a Shoulder girdle (cleithrum) margin with a furrow ventrally, a large papilla immediately above it and a smaller papilla near upper edge ..... *Selar*
6b Shoulder girdle margin smooth 7

7a In adults, spinous D wholly buried or spines short and disconnected, height of longest spine subequal to pupil diameter; body superficially naked, scales (where present) minute or embedded; opercle scaleless 8
7b In adults, height of erect D usually longer than eye and at least anterior spines united by inter-radial membrane; small scales present over most of body; opercle at least partially scaled 9

8a In smaller fish, anterior soft-rays of D and A filamentous; V longer than upper jaw ..... *Alectis*
8b Anterior soft-rays of D and A never filamentous; V short (except in very young), about ⅓ length of upper jaw ..... *Selene*

9a Tongue, roof and floor of mouth white, the rest of mouth dark ..... *Uraspis*
9b Pigmentation of tongue and mouth lining not as above 10

10a Upper and lower jaws without teeth, except lower jaw with a few feeble teeth in young ..... *Gnathanodon*
10b Jaw teeth always present, varying from 1 or 2 rows of teeth to a band of minute teeth (teeth difficult to detect in some species of *Carangoides)* 11

11a Fleshy adipose eyelid completely covering eye except for vertical slit centered on pupil; terminal ray of D and A finlet-like, a little more separated from other rays but not detached, and about twice length of penultimate ray ..... *Atule*
11b Fleshy adipose eyelid, if present, not developed as above; terminal ray of D and A not finlet-like 12

12a GR extremely long, projecting into mouth alongside tongue; lower-limb GR 51-61; lower jaw becoming prominent in large adults, with the "chin" projecting beyond upper jaw ..... *Ulua*
12b GR of normal length and shape; lower-limb GR 14-33; shape of lower jaw not as above 13

13a Ventral profile of body strongly convex; LL scutes 6-12, weak and rudimentary; body notably compressed ..... *Chloroscombrus*
13b Ventral profile not notably more convex than dorsal profile; LL scutes 11-45, moderate to strong; body slightly to moderately compressed 14

14a Both jaws with a single row of numerous comb-like teeth; adipose eyelid well developed on rear ½ of eye ..... *Alepes*
14b Dentition not as above; adipose eyelid, if present, variously developed 15

15a Upper jaw with an outer series of moderate to strong canines and an inner band of fine teeth; lower jaw with a single row of teeth ..... *Caranx*
15b Dentition not as above 16

16a Both jaws with a band of teeth, at least anteriorly; breast naked ventrally (most species) to completely scaled ..... *Carangoides*
16b Both jaws with single series of short, conical teeth (upper jaw sometimes with an inner row of conical teeth anteriorly); breast completely scaled ..... *Pseudocaranx*

17a A base about 45 to 70% of D base length; C peduncle grooves present, dorsally and ventrally 18
17b Base of A as long as, or only slightly shorter than, base of soft D; no C peduncle grooves 21

18a Single 2-rayed finlet behind end of D and A; maxilla ends distinctly before eye (to below front margin of eye in young) ..... *Elagatis*
18b No finlets behind D and A; maxilla ends below eye 19

19a Maxilla broadly rounded and reaches below rear margin of eye; GR 4-10, mostly rudiments ..... *Seriolina*
19b Maxilla truncate or slightly rounded and reaches below front ½ of eye; GR 11-29, mostly well developed 20

20a First D spines 4 or 5; A rays 15-17; cutaneous keel laterally on C peduncle well developed ..... *Naucrates*
20b First D spines 7 or 8 (anterior spines may become completely buried in large fish); A rays 18-22; cutaneous keel on C peduncle absent to moderately developed ..... *Seriola*

21a Posterior D and A rays consisting of semi-detached finlets, distal ¼ to ½ of rays not connected by membrane; upper lip joined to snout at midline by a bridge of skin (frenum), but crossed by a shallow groove in very young ..... *Scomberoides*
21b Posterior D and A rays not consisting of semi-detached finlets; upper lip separated from snout at midline by a continuous deep groove 22

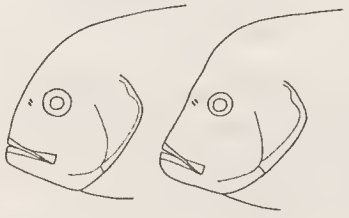
22a LL very irregular and sinuous, describing a convex curve above and a concave curve behind P; teeth in jaws in a broad band anteriorly, becoming narrower posteriorly; maxilla extending beyond eye ..... *Lichia*
22b LL only slightly irregular, weakly to moderately convex above P, becoming straight posteriorly; teeth, if present, in a narrow band in jaws; maxilla not extending past eye ..... *Trachinotus*

Genus ***Alectis*** Rafinesque, 1815

Three species; 2 in southern Africa.

KEY TO SPECIES

1a Suborbital depth relatively narrow, 1.7-3.0 in upper jaw length; lower GR (excluding rudiments) 12-17; profile of nape and head broadly rounded ..... *A. ciliaris*



A. ciliaris *A. indicus*

1b Suborbital depth broad, 0.8-1.0 in upper jaw length; lower GR (excluding rudiments) 21-26; profile of nape and head angular ..... *A. indicus*

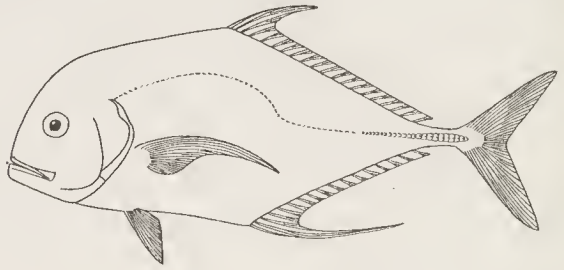
210.1 *Alectis ciliaris*
(Bloch, 1787)
PLATE 79

Threadfin mirrorfish — Draadvin-spieëlvis

Zeus ciliaris Bloch, 1787: 29, Pl. 191 (East Indies). *Alectis ciliaris:* Smith, **SFSA No. 527*;** Smith & Smith, 1966: 126*; van der Elst, 1981: 112*.

D VII (embedded and not apparent in adults) + I, 18-22; A II+I,18-20; anterior D & A rays extremely long and filamentous in young and juveniles; GR (4-6)+(12-17). Body superficially naked, scales minute and embedded.

Mostly silvery, with light metallic bluish tinge dorsally; small, diffuse, dark opercular spot; juveniles with 5 dark chevron-shaped bands on body. Attains at least 130 cm, common to 100 cm; world angling record 18.8 kg. Adults usually solitary and frequent shallow coastal waters to 100 m; young usually pelagic and drifting. Algoa Bay northwards; a circumtropical species. Elsewhere called "African pompano".

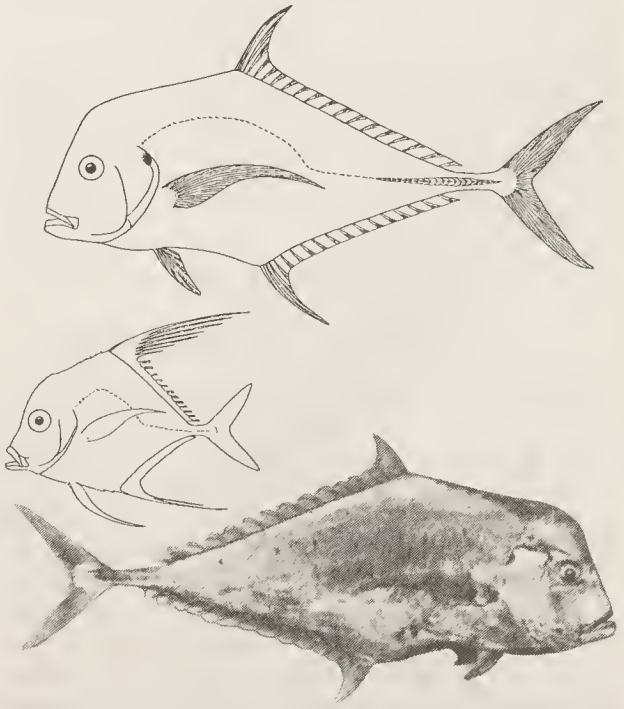


210.1 *Alectis ciliaris:* 61 cm FL.

210.2 *Alectis indicus*
(Rüppell, 1830)
PLATE 79

Indian mirrorfish — Indiese spieëlvis

Scyris indicus Rüppell, 1830: 128, Pl. 33, Fig. 1 (Red Sea). *Alectis indicus:* Smith, **SFSA No. 528*;** van der Elst, 1981: 113*.



210.2 *Alectis indicus:* top: 69 cm FL; middle: small juvenile; bottom: 112 cm large adult (N. Mozambique).

D VI (embedded and not apparent in adults) + I,18-20; A II+I,18-20; anterior D and A rays extremely long and filamentous in young and juveniles; GR (8-11)+(21-26). Body superficially naked, scales minute and embedded.

Mostly silvery, with dusky green tinge dorsally; small, diffuse, dark opercular spot; juveniles with 5-7 broad, dark bands. Attains 150 cm; South African spearfishing record 21.4 kg. Adults form large shoals, common in coastal waters including reef areas; juveniles solitary, often entering estuaries. Durban northward; widespread throughout Indian Ocean and eastward to Ryukyu Ids. and Australia. Also known as "Indian threadfish".

Genus ***Alepes*** Swainson, 1839

Four species; 1 in southern Africa.

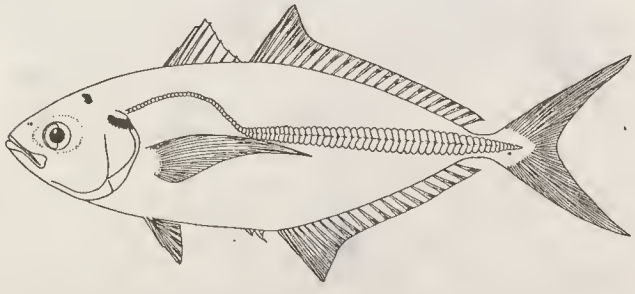
210.3 *Alepes djedaba*
(Forsskål, 1775)
PLATE 79

Shrimp scad — Krewel-skad

Scomber djedaba Forsskål, 1775: 56 (Red Sea). *Caranx microbrachium* Fowler, 1934: 420, Fig. 9 (Natal Coast); Smith, **SFSA No. 509***. *Caranx djedaba:* Smith, **SFSA No. 508***. *Alepes djeddaba* [*sic*]: van der Elst, 1981: 111*. *Selar kalla* (*non* Cuvier): Smith, **SFSA No. 502.**

D VIII+I,23-25; A II+I, 18-20; GR (10-14)+(27-33). Both jaws with a single row of numerous comblike teeth; adipose eyelid well developed only on rear half of eye. Straight LL with 0-2 scales and 39-51 scutes.

Greyish green above, silvery to white below; distinct black blotch on upper margin of opercle, bordered above by a smaller white spot; C yellowish, upper lobe dusky to black distally. Attains 34 cm. Common near inshore reefs, often in large schools. Durban northward throughout Indian Ocean; a recent immigrant to eastern Mediterranean from the Red Sea via the Suez Canal.



210.3 *Alepes djedaba:* 23.5 cm FL.

Genus ***Atule*** Jordan & Jordan, 1922

A monotypic genus that is superficially similar to *Decapterus* in having the terminal D and A rays semi-detached in large individuals.

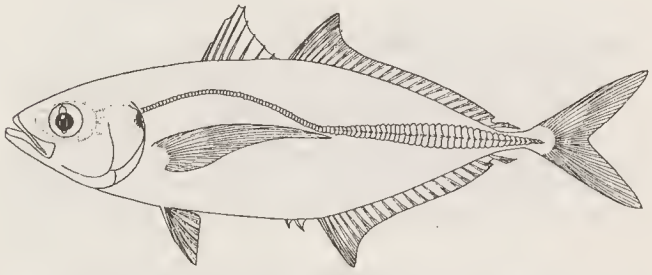
210.4 *Atule mate*
(Cuvier, 1833)
PLATE 79

Yellowtail scad — Geelstert-skad

Caranx mate Cuvier, *in* Cuv. & Val., 1833: 54 (Pondicherry, India; Seychelles; New Guinea); Smith, **SFSA No. 510*;** Smith & Smith, 1969: 22*. *Caranx affinis* Rüppell, 1836: 49, Pl. 14, Fig. 1 (Red Sea). *Decapterus normani* Bertin & Dollfus, 1948: 21, Fig. 7 (Madagascar).

D VIII+I,22-25; A II+I,18-21, terminal D and A rays finlet-like in large adults but joined to adjacent rays by inter-radial membrane; GR (10-13)+(26-31). Both jaws with single series of small, conspicuous teeth, and (in large adults) upper jaw with 2-3 rows of small canines anteriorly; adipose eyelid completely covering eye except for a vertical slit centered on pupil. Straight LL with 0-10 scales and 36-39 scutes.

Bright olive green dorsally, shading to white ventrally; 9-10 grey bands, wider than pale interspaces, usually present dorsolaterally; black opercular spot; D and C dusky greenish yellow. Attains 30 cm. Schools in inshore waters to 50 m depth. Mozambique northward; widespread in Indo-West Pacific eastward to Hawaiian Ids.



210.4 *Atulemate:* 28.5 cm FL.

Genus ***Carangoides*** Bleeker, 1851

Generic limits of *Carangoides* not well established; as here defined, 21 species, 12 in our area. *Citula* Cuvier, 1816 may be a valid senior synonym. Species of *Carangoides* that have variable patterns of breast squamation may key out under both sections of couplets when this character is used.

KEY TO SPECIES

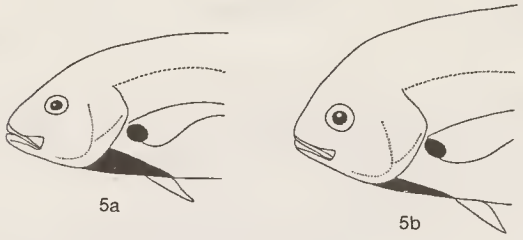
1a Breast completely scaled 2
1b Breast partially to completely naked 3

2a Second D with a dark submarginal band; rear margin of opercle not black; A rays 21-24 ..... *C. equula*
2b Second D without a dark submarginal band; rear margin of preopercle outlined in black; A rays 18-20 ..... *C. plagiotaenia*

3a Naked area of breast separated from naked base of P by a broad band of scales 4
3b Naked area of breast uninterrupted to naked base of P 8

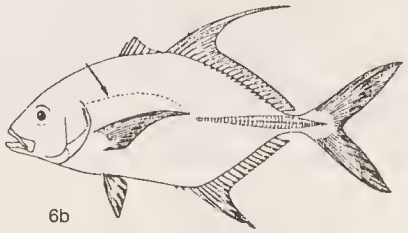
4a D rays 25-34; A rays 21-26 5
4b D rays 17-23; A rays 15-19 6

5a Naked area of breast extends well beyond origin of V ..... *C. fulvoguttatus*



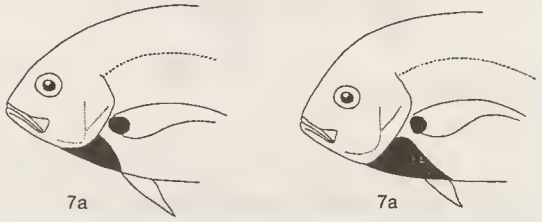
5b Naked area of breast does not extend past origin of V ..... *C. ferdau*

6a Straight part of LL slightly longer than curved part; LL scutes 37-45 ..... *C. oblongus*



6b Straight part of LL slightly shorter than curved part; LL scutes 20-38 7

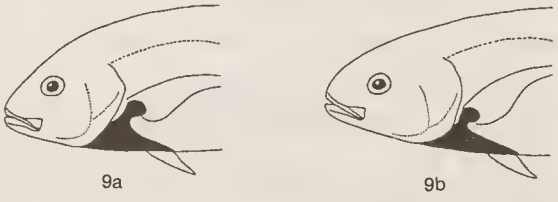
7a D rays 17-19; small dark blotches (becoming larger posteriorly) on back between bases of D rays; naked area of breast typically does not extend past V origin ..... *C. dinema*



7b D rays 20-23; colour pattern not as above; naked area of breast extends well beyond V origin ... *C. caeruleopinnatus*

8a D rays 25-32 (rarely 25) 9
8b D rays 17-23 10

9a Profile of snout angular, in specimens larger than ca. 30 cm FL, horizontal line from tip of snout distinctly below level of eye; A rays 22-26 (rarely 25 or 26); GR 22-27 ..... *C. fulvoguttatus*



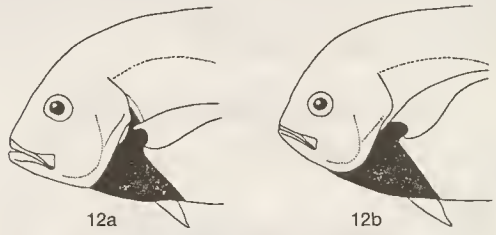
9b Profile of snout moderately rounded, in specimens larger than ca. 30 cm FL, horizontal line from tip of snout at or above lower edge of eye; A rays 24-26 (usually 25 or 26); GR 27-31 ..... *C. gymnostethus*

10a Small dark blotches (becoming larger posteriorly) on back between bases of D rays; naked area of breast typically does not extend beyond V origin; D rays 17-19 ..... *C. dinema*

10b Colour pattern not as above; naked area of breast extends well beyond V origin; D rays 18-23 11

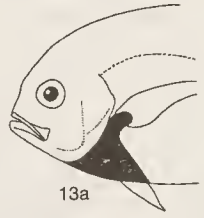
11a Total GR 31-38 12
11b Total GR 20-27 13

12a Height of D lobe shorter than head length; small area naked of scales anteriorly just above P base ..... *C. malabaricus*



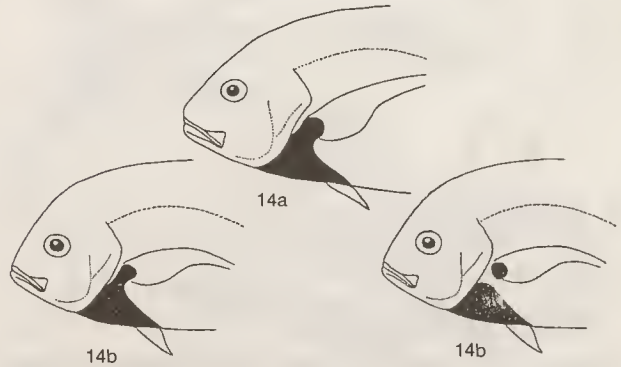
12b Height of D lobe longer than head length; area anteriorly just above P base usually completely scaled ..... *C. armatus*

13a Adults with a steep dorsal head profile, and with a distinct break, "bump", in profile in the interorbital region; 3-8 (usually 5-7) central rays of the D and A elongated in mature males; eye about equal to, or larger than snout length ..... *C. hedlandensis*



13b Dorsal head profile not as steep in adults, and no distinct break, "bump", in profile in the interobital region; central rays of D and A not elongated in mature males; eye slightly to much smaller than snout length 14

14a Dorsal profile of snout gently sloped, then abruptly vertical above mouth cleft; D rays 18-20; A rays 14-17 ..... *C. chrysophrys*



14b Dorsal profile of snout not as above; D rays 20-23 (usually 22 or 23); A rays 16-20 ..... *C. caeruleopinnatus*

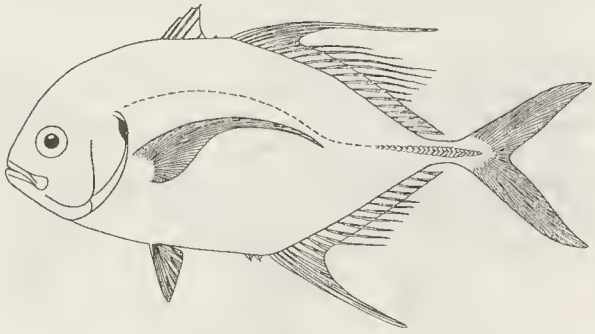
210.5 *Carangoides armatus*
(Rüppell, 1830)
PLATES 79 & 80

Longfin kingfish — Langvin-koningvis

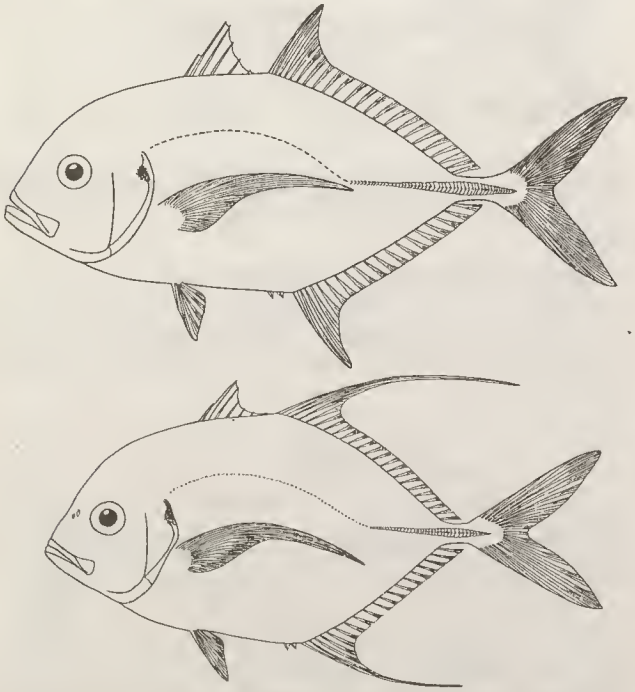
Citula armata Rüppell, 1830: 103 (Red Sea). *Caranx armatus:* Smith, **SFSA No. 518*;** Smith & Smith, 1963: 20*. *Carangoides armatus:* Williams et al., 1980: 14*; van der Elst, 1981: 114*. *Carangoides ciliarius:* M.M. Smith, 1973: 354.

D VIII+I,19-22; A II+I,16-18, adult males with 3-12 central D and A rays filamentous; GR (10-15)+(20-24). Straight LL with 11-24 weak scutes. Breast naked to behind V origin and laterally to P base. Soft D lobe falcate, longer than head length.

Bluish grey dorsally, silvery below; blackish blotch on upper opercular margin; V blackish in young, pale in adults. Attains 55 cm. Inhabits rock and coral coastlines as well as shallow bays. East London northward in coastal areas throughout Indian Ocean and eastward to Gulf of Thailand and Japan.



210.5 *Carangoides armatus:* 22 cm FL.



210.6 *Carangoides caeruleopinnatus:* top: 27.5 cm FL; bottom: 18 cm FL.

210.6 *Carangoides caeruleopinnatus*
(Rüppell, 1830)

Coastal kingfish — Kus-koningvis

Caranx caeruleopinnatus Rüppell, 1830: 100 (Red Sea). *Caranx (Citula) uii* Wakiya, 1924: 174, Pl. 22, Fig. 1 (Kii, Japan). *Carangoides caeruleopinnatus*: Smith, 1967: 140*; 1967: 144*; van der Elst, 1981: 115*. *Carangoides uii*: Smith, 1967: Pl. 31; M.M. Smith, 1972: 233*.

D VIII+I,20-23; A II+I,I6-20; GR (6-8)+(15-18). Breast naked to behind V origin, and usually laterally to P base. Straight LL with 20-38 small scutes. Soft D lobe filamentous in juveniles, usually shorter than head in adults.

Bluish green above, silvery below; sides with numerous small yellow spots; small black opercular blotch. Attains 40 cm. Commonly found over deeper coastal reefs, but rarely close to shore. Durban northward and eastward to Japan and Australia.

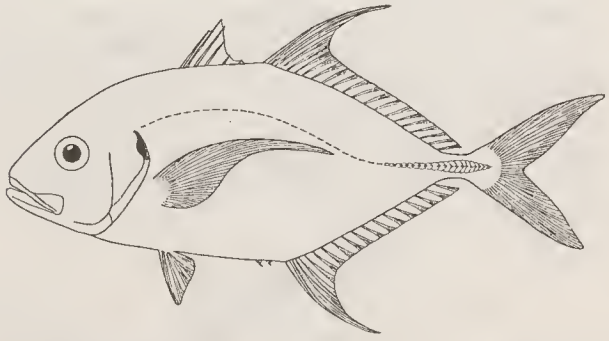
210.7 *Carangoides chrysophrys*
(Cuvier, 1833)
PLATE 79

Longnose kingfish — Langneus-koningvis

Caranx chrysophrys Cuvier, *in* Cuv. & Val., 1833: 77, Pl. 247 (Seychelles); Smith, **SFSA No. 516;** 1961: 568, Smith & Smith, 1963: 20*; Smith, 1967: Pl. 31. *Carangoides chrysophrys:* M.M. Smith, 1972: 233*.

D VIII+I,18-20; A II+I,14-17; GR (5-9)+(15-18). Straight LL with 20-37 weak scutes. Breast naked to behind V origin and laterally to P base. Dorsal profile of snout gently sloped then abruptly vertical just above mouth cleft. Soft D lobe falcate in young, becoming shorter than head in adults.

Body generally silvery, greenish above; small black opercular spot. Attains 60 cm. Inhabits coastal waters to at least 60 m. Algoa Bay northward, and eastward to Japan and Australia.



210.7 *Carangoides chrysophrys:* 27 cm FL.

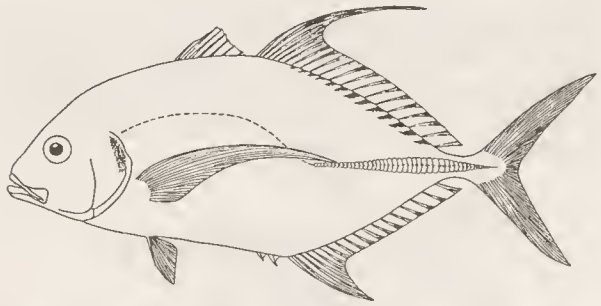
210.8 *Carangoides dinema*
Bleeker, 1851

Shadow kingfish — Skaduwee-koningvis

Carangoides dinema Bleeker, 1851: 365 (Batavia); M.M. Smith, 1972: 232*. *Caranx dinema:* Smith, **SFSA No. 519;** 1967: Pl. 30.

D VIII+1,17-19; A II+I,15-17; GR (7-9)+(16-19). Straight LL with 0-6 scales + 23-30 scutes. Breast naked to V origin, laterally naked area usually separated from naked P base by a band of scales. Curved LL slightly longer than straight LL.

Bluish green above, silvery white below; small dark blotches, becoming larger posteriorly, on back between bases of D rays. Attains 60 cm. Durban northward to Tanzania; elsewhere known from Japan to New Guinea and eastward to Tonga Ids.



210.8 *Carangoides dinema:* 43 cm FL.

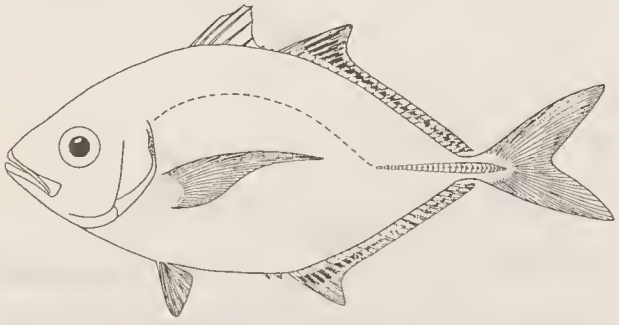
210.9 *Carangoides equula*
(Temminck & Schlegel, 1844)
PLATE 79

Whitefin kingfish — Witvin-koningvis

Caranx equula Temminck & Schlegel, 1844: 111, Pl. 60, Fig. 1 (Japan); Smith, **SFSA No. 515.** *Carangoides equula:* M.M. Smith, 1972: 230*. *Carangoides acutus* Kotthaus, 1974: 38, Fig. 314 (Gulf of Aden).

D VIII+1,23-25; A II+I,21-24; GR (7-10)+(18-23). Straight LL with 0-6 scales + 22-23 scutes. Breast completely scaled. Spinous D height equals or exceeds height of soft D lobe.

Bluish grey to green above, silvery white below; soft D and A with submarginal brownish band, fin lobes white distally; no opercular spot. Attains 37 cm. A benthic species largely restricted to shelf/slope habitats in 100 - 200 m. Algoa Bay northward, also off Somalia, Gulf of Oman, Japan, Australia, New Zealand, Hawaii and Easter Id.



210.9 *Carangoides equula:* 22 cm FL.

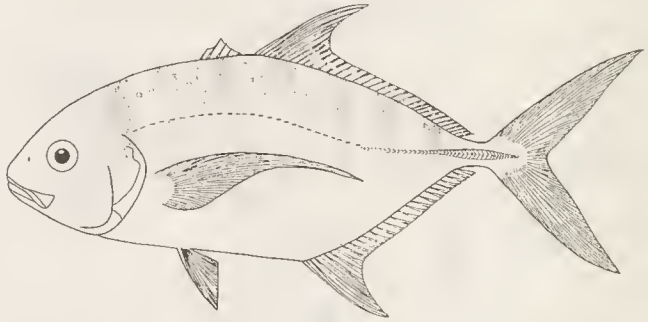
210.10 *Carangoides ferdau*
(Forsskål, 1775)
PLATE 79

Blue kingfish — Blou koningvis

Scomber ferdau Forsskål, 1775: 55 (Red Sea). *Caranx ferdau* Smith, **SFSA No. 523***; Smith & Smith, 1963: 20*; Smith, 1967: Pl. 30. *Carangoides ferdau:* M.M. Smith, 1972: 231*; van der Elst, 1981: 116*.

D VIII+I,26-34; A II+I,21-26; GR (7-10)+(17-20). Straight LL with 10-30 scales + 21-37 small scutes. Breast naked to V origin, laterally naked area separated from naked P base by a broad band of scales. Curved LL weakly arched.

Adults generally silvery, blue green above, paler below; sides usually with 5-6 dusky bands, inconspicuous golden spots sometimes present; no opercular spot. Attains 70 cm; South African spearfishing record 8.0 kg. Inhabits coastal waters adjacent to sandy beaches and reef habitats to 60 m. Port Elizabeth northward; a broadly distributed Indo-West Pacific species, eastward to Hawaiian Ids.



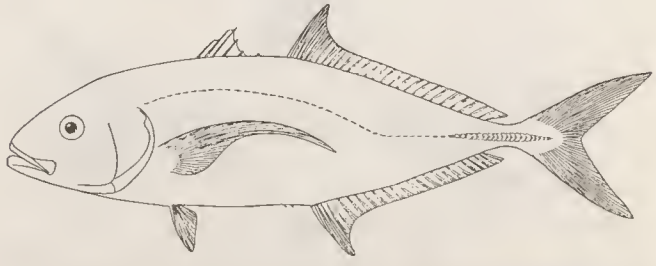
210.10 *Carangoides ferdau:* 30 cm FL.

210.11 *Carangoides fulvoguttatus*
(Forsskål, 1775)
PLATE 79

Yellowspotted kingfish — Geelspikkel-koningvis

Scomber fulvoguttatus Forsskål, 1775: 56 (Red Sea). *Caranx fulvoguttatus:* Smith, **SFSA No. 522***; Smith & Smith, 1963: 20*; Smith, 1967: Pl. 30. *Carangoides fulvoguttatus:* M.M. Smith, 1972: 231*; van der Elst, 1981: 117*.

D VIII+I,25-30; A II+I,21-26; GR (6-8)+(17-21). Straight LL with 18-27 scales + 15-21 scutes. Breast naked to behind V origin and variable laterally, extending uninterrupted to P base or separated by a band of scales. Adults with mouth cleft distinctly below level of lower margin of eye.



210.11 *Carangoides fulvoguttatus:* 74 cm FL.

Blue green above, silvery below, usually with many small brassy spots on sides; large adults often with 3 black blotches in a row on flanks mid-laterally. Attains 100 cm; South African spearfishing record 18 kg. Inhabits rocky coasts, reefs and offshore banks to 100 m. A favourite of spearfishermen. Durban northward; a widespread Indo-West Pacific species.

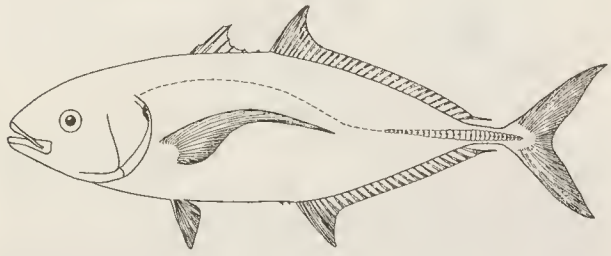
210.12 *Carangoides gymnostethus*
(Cuvier, 1833)
PLATE 80

Bludger — Bludger

Caranx gymnostethus Cuvier, *in* Cuv. & Val., 1833: 73 (Seychelles); Smith, 1967: Pl. 31. *Caranx gymnostethoides:* Smith, **SFSA No. 521*;** Smith & Smith, 1963: 20*. *Carangoides gymnostethus:* M.M. Smith, 1972: 232*; van der Elst, 1981: 118*.

D VIII+I,28-32; A II+I,24-26; GR (7-9)+(19-22). Straight LL with 14-25 scales + 20-31 scutes. Breast naked to behind V origin and laterally to P base. Adults with mouth cleft at level of lower margin of eye.

Olive green above, silvery white below, a few brown or golden spots sometimes present midlaterally; opercular spot dusky and usually inconspicuous. Attains 90 cm; South African spearfishing record 14.5 kg. Most common over slightly deeper offshore reefs; larger individuals usually solitary, juveniles form small schools. Algoa Bay northward; a widespread Indo-West Pacific species.



210.12 *Carangoides gymnostethus:* 52.5 cm FL.

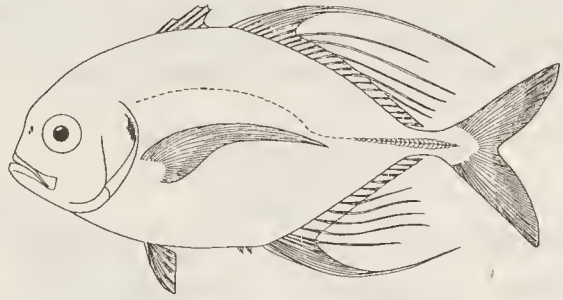
210.13 *Carangoides hedlandensis*
(Whitley, 1933)
PLATE 80

Bumpnose kingfish — Knopneus-koningvis

Olistus hedlandensis Whitley, 1934: 156, Fig. 2 (Port Hedland, Western Australia). *Atropus atropus* (*non* Bloch): Smith, **SFSA No. 505** (not figure). *Carangoides hedlandensis:* Williams et al., 1980: 17*.

D VIII+I,20-22; A II+I,16-18, adult males with 3-8 central D and A rays filamentous; GR (6-11)+(14-17). Straight LL with 17-29 weak scutes. Breast naked to behind V origin and laterally to P base. Soft D lobe longer than head length. Adults with distinct bulge in interorbital region.

Greenish blue dorsally, silvery grey below; blackish blotch on upper opercular margin; V blackish in young, pale in adults; C yellowish. Attains 32 cm. A coastal, demersal species. Durban northward in coastal waters and Seychelles, and eastward to Japan, Australia and Samoa. Literature records of *Atropus atropos* from South Africa are based on misidentified juveniles of this species.



210.13 *Carangoides hedlandensis:* 20 cm FL.

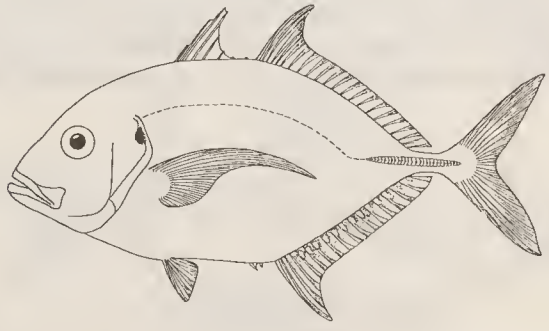
210.14 *Carangoides malabaricus*
(Bloch & Schneider, 1801)

Malabar kingfish — Malabar-koningvis

Scomber malabaricus Bloch & Schneider, 1801: 31 (India). *Caranx malabaricus:* Smith, **SFSA No. 517*;** 1967: 140*. *Carangoides malabaricus:* Smith, 1967: 151*; M.M. Smith, 1972: 232*; Williams & Venkataramani, 1978: 504*; van der Elst, 1981: 119*.

D VIII+I,20-23; A II+I,17-19; GR (8-12)+(21-27). Breast naked to behind V origin and laterally to P base, including small area anteriorly just above fin. Straight LL with 19-36 weak scutes. Soft D lobe only slightly falcate, shorter than head.

Generally silvery, bluish grey above; small, white spot often at base of A rays; small, black opercular spot. Attains 28 cm. A benthic, schooling species. Durban northward in tropical coastal waters of Indo-West Pacific.



210.14 *Carangoides malabaricus:* 24.5 cm FL.

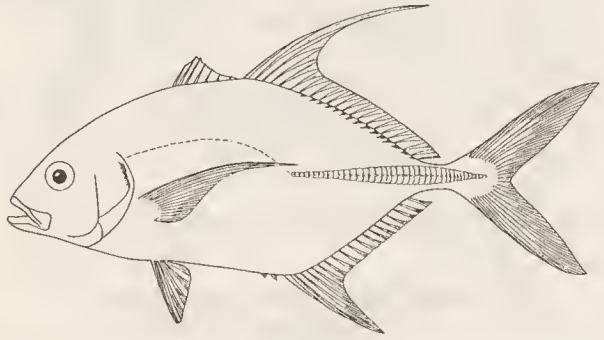
210.15 *Carangoides oblongus*
(Cuvier, 1833)
PLATE 80

Coachwhip kingfish — Sweepvin-koningvis

Caranx oblongus Cuvier, *in* Cuv. & Val., 1833: 128 (Vanikorō, Santa Cruz Ids.); Smith, **SFSA No. 525*;** Smith & Smith, 1969: 22*.

D VIII+I,20-22; A II+I,18-19; GR (7-9)+(17-21). Straight LL with 0-2 scales + 37-45 scutes. Breast naked to V origin, laterally naked area separated from naked P base by broad band of scales. Curved LL slightly shorter than straight LL.

Bluish green above, silvery below; small dark blotches on back between bases of D rays. Attains 46 cm. Durban northward throughout western Indian Ocean and from Japan to Australia and eastward to the Fiji Ids.



210.15 *Carangoides oblongus:* 28 cm FL.

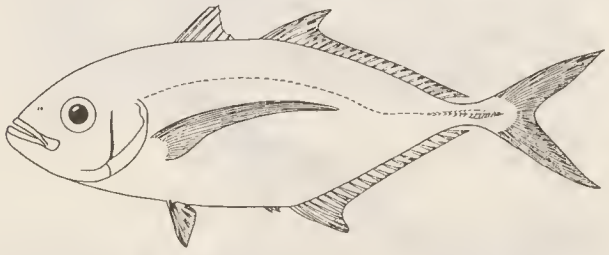
210.16 *Carangoides plagiotaenia*
Bleeker, 1857

Barcheek kingfish — Balkwang-koningvis

Carangoides plagiotaenia Bleeker, 1857: 59 (Amboina); M.M. Smith, 1972: 231. *Caranx vomerinus* Playfair, *in* Playfair & Günther, 1867: 59, Pl. 10, Fig. 1 (Seychelles). *Caranx compressus* Day, 1878: 221, Pl. 50, Fig. 1 (India); Smith, **SFSA No. 514*;** Smith & Smith, 1963: 20*.

D VIII+I,22-24; A II+I,18-20; GR (8-14)+(19-27). Straight LL with 20-26 scales + 11-18 scutes. Breast completely scaled. Adults with lower jaw somewhat enlarged and projecting beyond upper jaw.

Body generally silvery, sometimes with 6-7 dusky, oblique bars; adults with rear margin of preopercle distinctly dark or black; no opercular spot. Attains 50 cm. Prefers outer reef areas, usually taken while bottom fishing. Indo-West Pacific south to Durban and eastward to Marshall Ids.



210.16 *Carangoides plagiotaenia:* 30 cm FL.

Genus ***Caranx*** Lacepède, 1801

Generic limits of *Caranx* not well established; as here defined, 13 species, 7 in southern Africa. Breast squamation variable in *C. sem*, which will key out under both sections of first couplet.

KEY TO SPECIES

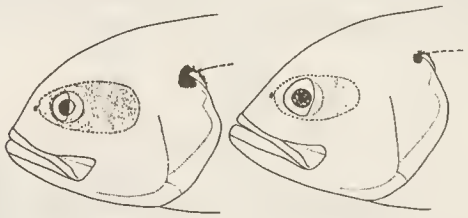
1a Breast completely scaled 2
1b Breast naked ventrally, frequently with a small patch of prepelvic scales 6

2a Soft D lobe relatively long, 2.3-5.3 in FL; in life, essentially uniform dark grey to brown; profile of head relatively steep and angular ..... *C. lugubris*
2b Soft D lobe 4.2-8.8 in FL; body coloration not as above; profile of head not noticeably steep and angular 3

3a Small black spots on head and body (forming at about 16-22 cm FL); snout length 9.2-12.7 in FL; total GR (including rudiments) 25-29 and total D + A rays = 39-44 ..... *C. melampygus*
3b No small black spots on head and body; snout 13.1-18.4 in FL; GR (including rudiments) 22-25, except 23-27 in *C. sem* which has 34-38 total D + A rays 4

4a No small black spot on upper margin of opercle; upper lobe of C frequently with distal ½ noticeably dark or black, especially in juveniles; in adults, adipose eyelid only slightly developed ..... *C. sem*
4b Small black spot on upper margin of opercle; upper lobe of C usually uniformly pigmented; in adults, adipose eyelid well developed, especially posteriorly 5

5a Dorsal profile of head strongly convex and, in adults, black spot on upper margin of opercle at least ½ diameter of pupil, and soft D lobe without a white tip; vertebrae 10+14 ..... *C. tille*



C. tille — *C. sexfasciatus*

5b Dorsal profile of head moderately convex and, in adults, black spot on upper margin of opercle no larger than ½ pupil diameter, and D lobe with a white tip; vertebrae 10+15 ..... *C. sexfasciatus*

6a GR (including rudiments) 20-24; body silvery to black; in fish larger than 15 cm FL, body depth 2.5-3.2 in FL ..... *C. ignobilis*
6b GR (including rudiments) 23-30 (rarely 23); body bronze to yellow green; in fish larger then 15 cm FL, depth 2.7-3.8 in FL 7

7a Total D + A rays = 34-38 (rarely 38); upper C lobe frequently with distal ½ noticeably dark or black (especially in juveniles), and rear margin of lower lobe without a narrow white border; no pale spot on shoulder just behind upper margin of opercle; adults without small black spots ..... *C. sem*
7b Total D + A rays = 37-41 (rarely 37); upper C lobe usually uniformly pigmented, and rear margin of lower lobe with a narrow white border; in life a conspicuous pale spot, ca. pupil diameter, on shoulder just behind upper margin of opercle; adults with small black spots on body (forming at ca. 25 cm FL) ..... *C. papuensis*

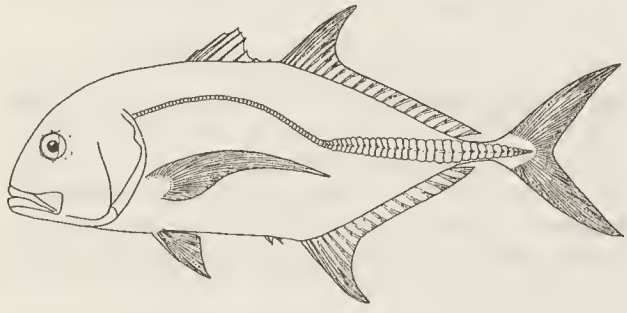
210.17 *Caranx ignobilis*
(Forsskål, 1775)

Giant kingfish — Reuse koningvis

Scomber ignobilis Forsskål, 1775: 55 (Red Sea). *Caranx ignobilis:* Smith, **SFSA No. 520*;** 1961: 568. Smith & Smith, 1963: 22*; Smith, 1967: Pl. 30; van der Elst, 1981; 120*.

D VIII+I,18-21; A II+I,15-17; D+A I,34-38; GR (5-7)+(15-17). Straight LL with 26-38 strong scutes. Breast naked ventrally, typically with a small patch of prepelvic scales.

Adults mainly silvery grey to black above, usually paler below; no dark spot at upper end of opercle. Fins usually uniformly pigmented grey to black, except fish from turbid coastal waters often with yellow fins. Common to ca. 100 cm, attains 165 cm and 53 kg. Abundant in tropical/subtropical marine habitats; juveniles often in esturaries. Widespread in Indo-West Pacific from Algoa Bay northward, eastward to Hawaiian and Marquesas Ids.



210.17 *Caranx ignobilis:* 59.5 cm FL.

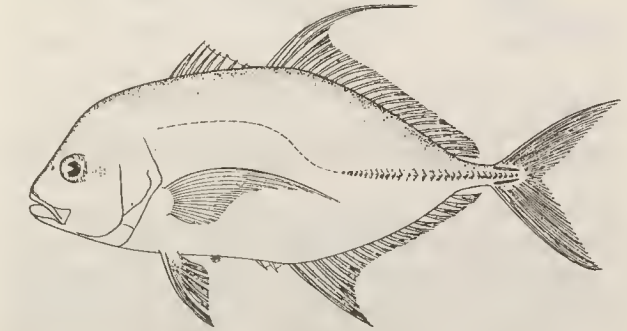
210.18 *Caranx lugubris*
Poey, 1860

Black kingfish — Swart koningvis

Caranx ascensionis Cuvier, *in* Cuv. & Val., 1833: 102, Pl. 249 (Ascension Id.). *Caranx lugubris* Poey, 1860: 222 (Cuba).

D VIII+I,20-22; A II+I,16-19; D+A I,37-41; GR (6-8)+(17-22). Straight LL with 26-32 strong scutes. Breast completely scaled.

Body and fins mostly uniform grey to black; small dark spot at upper end of opercle and scutes often black. Attains at least 85 cm. A circumtropical species apparently confined to clear, offshore waters usually in 25 - 65 m; early life history unknown. Local distribution poorly known; has been taken off East London and in Mozambique channel. *Caranx ascensionis* Cuvier, 1833 is the oldest available name for this species, but *C. lugubris* has had much greater usage in both fishery and taxonomic literature; and in the interest of nomenclatural uniformity and stability, the junior name is retained for this species.



210.18 *Caranx lugubris:* ca. 64 cm FL.

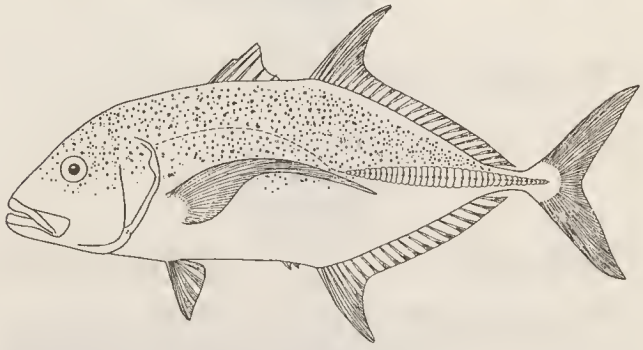
210.19 *Caranx melampygus*
Cuvier, 1833
PLATE 80

Bluefin kingfish — Blouvin-koningvis

Caranx melampygus Cuvier, *in* Cuv. & Val., 1833: 116 (Waigiou, Bourou, Vanicola & Mauritius); Smith, **SFSA No. 513;** Smith & Smith, 1963: 22*; van der Elst, 1981: 121*. *Caranx stellatus:* Smith, **SFSA No. 512*.**

D VIII+I,21-24; A II+I,17-20; D+A I,39-44; GR (5-9)+(17-20). Straight LL with 27-42 strong scutes. Breast completely scaled.

Adults with head and dorsal ½ of body brassy, suffused with blue and covered with small blue-black spots (forming at about 20 cm and increasing in number with size); 2nd D, A and C electric blue. In juveniles and young adults, head and body without spots and fins pale to dark dusky, except P yellow. Attains 80 cm and 7 kg; reported to 100 cm. A reef-associated species most common in offshore areas. Widespread from Natal northward throughout tropical Indo-Pacific to the Americas.



210.19 *Caranx melampygus:* 50 cm FL.

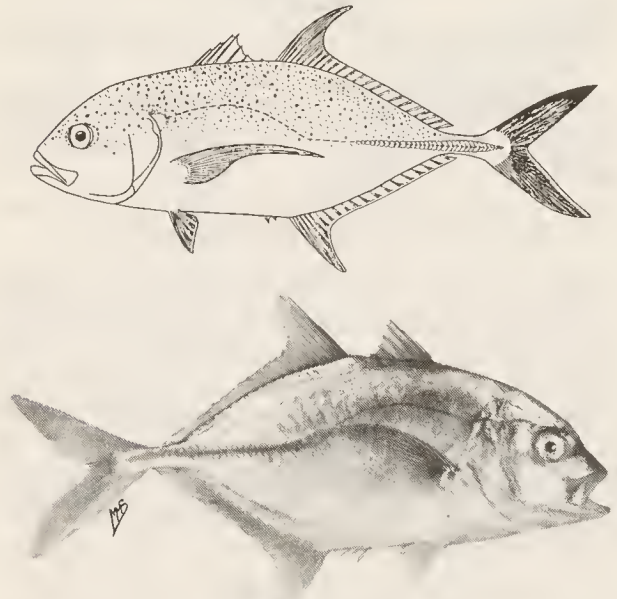
210.20 *Caranx papuensis*
Alleyne & Macleay, 1877
PLATE 80

Brassy kingfish — Brons koningvis

Caranx papuensis Alleyne & Macleay, 1877: 325 (New Guinea); van der Elst, 1981: 122*. *Caranx celetus* Smith, 1968: 182, Pl. 39, Figs. A-B (Zanzibar).

D VIII+I,21-23; A II+I,16-19; D+A I,37-41; GR (7-9)+(18-21). Straight LL with 31-39 strong scutes. Breast naked ventrally, usually with a patch of prepelvic scales.

Adults brassy to yellowish green above, silvery below; conspicuous pale spot on shoulder just behind posterodorsal margin of opercle; small black spots scattered on head and body above LL (forming at about 30 cm and becoming more numerous with age); upper C lobe uniformly dark, lower lobe dusky to yellow with narrow white distal margin. Attains 80 cm. Predominantly a seaward reef species, although juveniles taken in estuaries; rare in offshore areas. Port Alfred northward to Zanzibar, also Madagascar, Mauritius, Seychelles and Sri Lanka; elsewhere Ryukyu Ids. to Australia and eastward to Marquesas Ids.



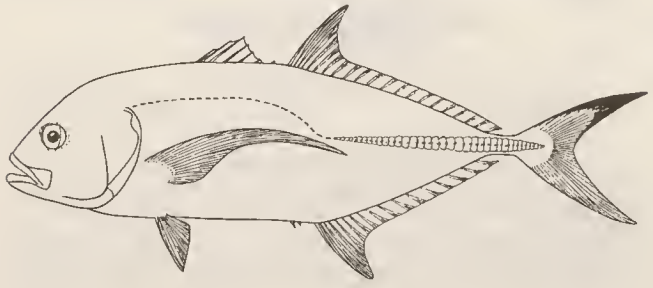
210.20 *Caranx papuensis:* top: 39 cm FL; bottom: 17.5 cm holotype of *C. celetus* (Durban).

210.21 *Caranx sem*
Cuvier, 1833
PLATE 80

Blacktip kingfish — Swarttip-koningvis

Caranx sem Cuvier, *in* Cuv. & Val., 1833: 79 (Pondicherry, India); van der Elst, 1981: 123*. *Caranx williamsi* Smith, 1968: 180, Pl. 38 (Durban).

D VIII+I,19-21; A II+I,15-17; D+A I,34-38; GR (6-8)+(17-19). Straight LL with 30-40 strong scutes. Breast completely scaled (least common) to naked ventrally but typically with a patch of prepelvic scales.



210.21 *Caranx sem:* 55 cm FL.

Adults dark bronze to yellow-green above, silvery bronze to yellowish below; C bright yellow to dusky, frequently with distal ½ of upper lobe noticeably darker to black; other fins bright yellow to dusky without any yellow hue. Attains at least 85 cm and 8 kg. Prefers open coastal waters; adults usually in small aggregations over rocky reefs, seldom in turbid or estuarine waters. Durban northward to Zanzibar, also Madagascar and Sri Lanka, Okinawa to Australia and Fiji Ids.

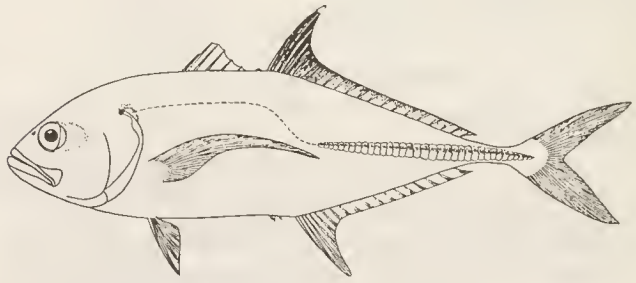
210.22 *Caranx sexfasciatus*
Quoy & Gaimard, 1825
PLATE 81

Bigeye kingfish — Grootoog-koningvis

Caranx sexfasciatus Quoy & Gaimard, 1825: 358, Pl. 65, Fig. 4 (Waigeo, Indonesia); Smith, **SFSA No. 511***; Smith & Smith, 1966: 125*; van der Elst, 1981: 124*. *Caranx forsteri*: Smith & Smith, 1969: 22*.

D VIII+I,19-22; A II+I,14-17; D+A I,33-39; GR (6-8)+(15-19). Straight LL with 27-36 strong scutes. Breast completely scaled.

Adults iridescent blue-green above, shading to silvery white below; small blackish spot near upper end of opercle (absent in young). Soft D lobe with white tip; C yellowish to black; LL scutes dark to black. Attains 85 cm. A reef-associated species, but juveniles may occur in estuaries. Widespread in tropical Indo-Pacific from Natal northward and eastward to the Americas. The most abundant *Caranx* species in our area.



210.22 *Caranx sexfasciatus:* 62 cm FL.

210.23 *Caranx tille*
Cuvier, 1833

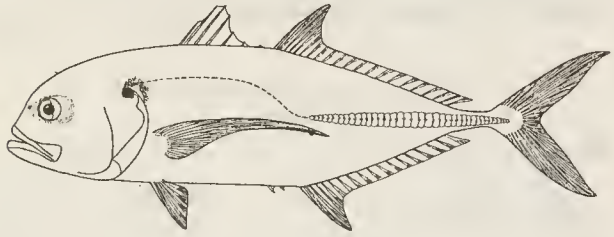
Tille kingfish — Tille-koningvis

Caranx tille Cuvier, *in* Cuv. & Val., 1833: 124 (Pondicherry, India).

D VIII+I,20-22; A II+I,16-18; D+A I,36-40; GR (6-8)+(15-17). Straight LL with 33-42 strong scutes. Breast completely scaled.

Adults dark olive green to bluish grey above, shading to silvery white below; blackish spot, at least ½ pupil diameter, on upper end of opercle (absent in young). Soft D lobe olive grey to blackish; LL scutes grey, except dark in C peduncle region. Attains at least 80 cm. A coastal species preferring

inshore waters. Indian Ocean distribution not well established, known from Durban northward to Zanzibar, also Madagascar, Sri Lanka, Okinawa to Australia and Fiji.



210.23 *Caranx tille:* 43 cm FL.

Genus ***Chloroscombrus*** Girard, 1858

Two species generally recognised, but the eastern Pacific *C. orqueta* Jordan & Gilbert, 1862 doubtfully distinct.

210.24 *Chloroscombrus chrysurus*
(Linnaeus, 1776)

Atlantic bumper — Atlantiese stamper

Scomber chrysurus Linnaeus, 1776: 494 (Charleston, South Carolina). *Chloroscombrus chrysurus:* Smith, 1965: 21*.

D VIII+I,25-28; A II+I,25-28; LL scutes 6-12, rudimentary and mainly on C peduncle; GR (9-12)+(30-37). Body notably compressed, with ventral profile strongly convex. Upper lobe of C longer than lower lobe.

Generally metallic blue above and silvery below; black saddle spot on upper part of C peduncle. Common to 22 cm, attains at least 30 cm; unconfirmed fishery records of 65 cm. Schooling species found in shallow coastal areas and estuaries on both sides of Atlantic; young occur at times far offshore, frequently associated with jellyfish. One specimen from Walvis Bay. Often makes a grunting sound when caught.

210.24 *Chloroscombrus chrysurus:* 20 cm (after Smith-Vaniz & Berry, 1981).

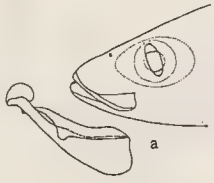
Genus ***Decapterus*** Bleeker, 1851

Nine species; 6 in southern Africa. *Decapterus muroadsi* (Temminck & Schlegel, 1844), reported from southern Africa by Smith (**SFSA No. 533**), is not identifiable.

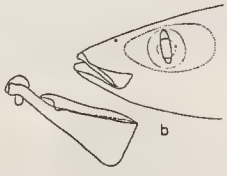
Lateral lines: A. *D. macarellus;* B. *D. macrosoma;* C. *D. tabl;* D. *D. punctatus;* E. *D. russelli;* F. *D. kurroides.*

KEY TO SPECIES

1a Rear end of upper jaw concave above, rounded and produced below; tip of appressed P falling considerably short of a vertical line from 2nd D origin 2
1b Rear end of upper jaw not shaped as above; tip of appressed P extending to or nearly to a vertical line from 2nd D origin (except shorter in *D. macarellus*) 3



1a *D. macrosoma*



1b *D. macarellus*

2a Straight part of LL with 14-29 scales and 24-40 scutes; interorbital scales not extending forward beyond rear margin of pupil; vertebrae 10+14 (Indian Ocean) ..... *D. macrosoma*
2b Straight part of LL with 0-4 scales and 32-42 scutes; interorbital scales usually extending to above front margin of pupil; vertebrae 10+15 (Atlantic Ocean) ..... *D. punctatus*

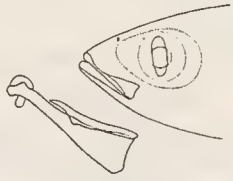
3a Rear end of upper jaw moderately rounded and slanted anteroventrally; tip of appressed P falling considerably short of a vertical line from 2nd D origin; straight part of LL with 18-36 scales anteriorly ..... *D. macarellus*
3b Rear end of upper jaw not as above; tip of appressed P extending to or nearly to a vertical line from 2nd D origin; straight part of LL with 0-10 scales anteriorly 4

4a In life, C hyaline to dusky yellow; lower GR usually 32-39 ..... *D. russelli*

D. russelli

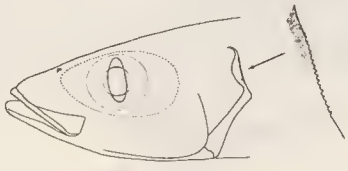
4b In life, C red; lower GR 26-33 5

5a Margin of opercular membrane smooth; curved LL scales 47-55; straight LL entirely of scutes ..... *D. kurroides*



D. kurroides

5b Margin of opercular membrane minutely serrated; curved LL scales 61-71; straight LL with 4-10 scales anteriorly ..... *D. tabl*



D. tabl

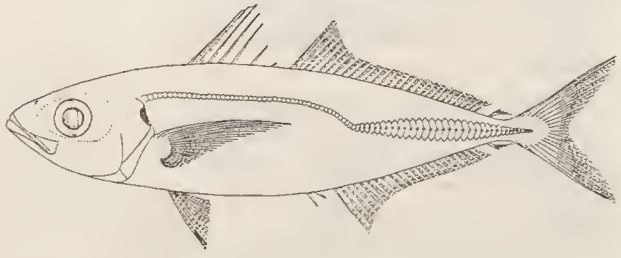
210.25 *Decapterus kurroides*
Bleeker, 1855

Redtail scad — Rooistert-skad

Decapterus kurroides Bleeker, 1855: 420 (Amboina).

D VIII+I,28-29+1; A II+I,22-25+1; LL (curved) 47-55 scales and 0-2 scutes, LL (straight) no scales and 31-36 scutes, LL (total) 80-86; GR (10-12)+(30-33). Upper jaw with a narrow band of minute teeth anteriorly. Margin of opercular membrane smooth.

Bluish green above, silvery white below; C bright red and D lobe dark distally sometimes with pale tip; small black opercular spot. Attains 45 cm. A schooling species taken by trawl in 100 - 300 m, but usually below 150 m. Not yet reported from our area, but almost certainly present. Known from Kenya, Tanzania and Réunion; also Japan, Indonesia, Philippines and Australia.



210.25 *Decapterus kurroides:* 24 cm FL.

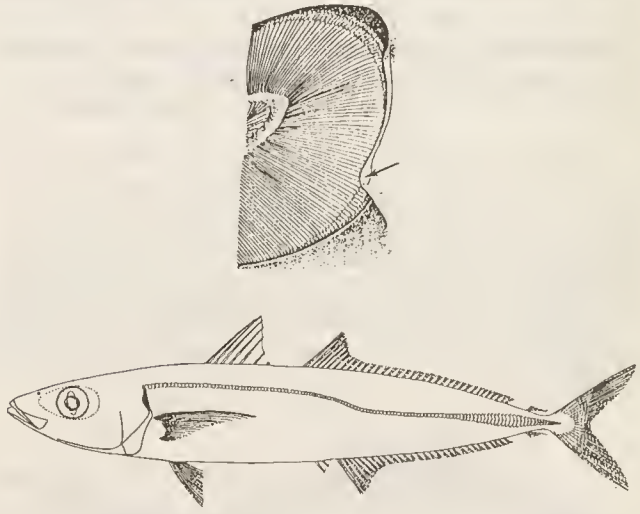
210.26 *Decapterus macarellus*
(Cuvier, 1833)

Mackerel scad — Makriel-skad

Caranx macarellus Cuvier, *in* Cuv. & Val., 1833: 40 (Martinique). *Caranx pinnulatus* Eydoux & Souleyet, 1850: 163, Pl. 3, Fig. 1 (Hawaiian Ids.).

D VIII+I,31-36+1; A II+I,27-30+1; LL (curved) 58-75 scales and no scutes, LL (straight) 14-29 scales and 24-40 scutes, LL (total) 110-138; GR (10-13)+(34-38). Rear end of upper jaw moderately rounded and slanted anteroventrally. Upper jaw without teeth. Interorbital scales usually extending to above front margin of pupil.

Bluish green above, silvery below; C yellow-green and D lobe sometimes dark distally; small black opercular spot. Attains 32 cm. A schooling species, occurring mostly in open water and common in insular habitats; sometimes at surface but usually in 40 - 200 m. Knysna northward; a circumtropical species.



210.26 *Decapterus macarellus:* 19.5 cm FL; gill chamber to show two small papillae on cleithrum.

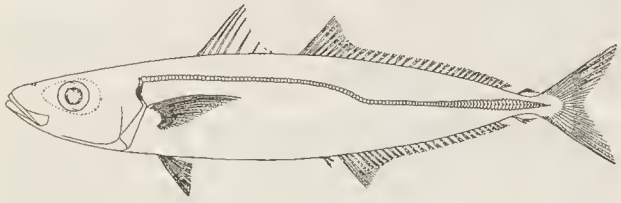
210.27 *Decapterus macrosoma*
Bleeker, 1851

Slender scad — Slank skad

Decapterus macrosoma Bleeker, 1851: 358 (Djakarta). *Decapterus lajang* (*non* Bleeker): Smith, **SFSA No. 532*;** Smith & Smith, 1963: 127*.

D VIII+I,33-38+1; A II+I,27-30+1; LL (curved) 58-72 scales and no scutes, LL (straight) 14-29 scales and 24-40 scutes, LL (total) 110-126; GR (10-12)+(34-38). Rear end of upper jaw concave above, rounded and produced below. Upper jaw without teeth. Interorbital scales not extending forward beyond rear margin of pupil.

Metallic blue above, silvery below; C hyaline to dusky and D lobe dark distally; small black opercular spot. Attains 35 cm. A schooling species usually taken by trawl in 30 to at least 170 m; reported to occur much deeper. Widespread in Indo-Pacific from Knysna northward; also in tropical eastern Pacific.



210.27 *Decapterus macrosoma*: 21 cm FL.

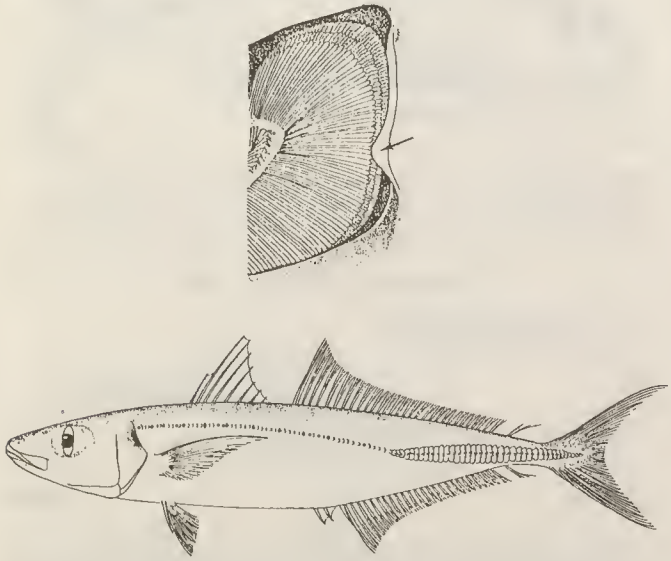
210.28 *Decapterus punctatus*
(Cuvier, 1829)

Round scad — Ronde skad

Caranx punctatus Cuvier, 1829: 208 (replacement name for Mitchill's "*Scomber hippos*"; New York Mkt.); Agassiz, *in* Spix & Agassiz, 1831: 108, Pl. 56, Fig. 2 (Atlantic Ocean, probably Brazil). *Caranx sanctaehelenae* Cuvier, *in* Cuv. & Val., 1833: 37 (St. Helena); Smith, **SFSA No. 529.** *Decapterus punctatus:* Smith, 1965: 19.

D VIII+I,30-34+1; A II+I,26-29+1; LL (curved) 48-62 scales and 0-7 scutes, LL (straight) 0-2 scales and 32-42 scutes, LL (total) 79-102; GR (11-15)+(31-41). Rear end of upper jaw slightly concave above, rounded and produced below. Upper jaw with single row of minute teeth. Interorbital scales usually extending to above front margin of eye.

Greenish above, whitish below; adults with 3-14 small black spots on curved LL; small black opercular spot. Attains 25 cm. Occurs in shelf waters on both sides of Atlantic from surface to 100 m; one specimen from Walvis Bay.



210.28 *Decapterus punctatus:* 18 cm FL; gill chamber to show two small papillae on cleithrum.

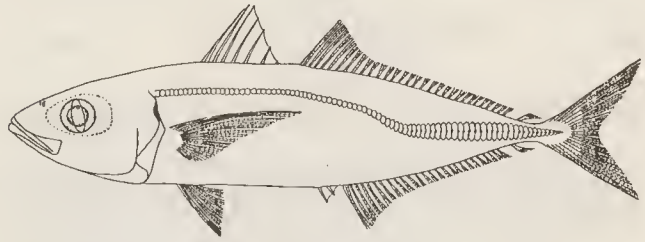
210.29 *Decapterus russelli*
(Rüppell, 1830)

Indian scad — Indiese skad

Caranx russelli Rüppell, 1830: 99 (Red Sea). *Caranx kiliche* Cuvier, *in* Cuv. & Val., 1833: 43 (Pondicherry, India). *Decapterus russelli* Smith, **SFSA No. 530.** *Decapterus punctatus* (*non* Cuvier): Smith, **SFSA No. 531.**

D VIII+I,28-31+1; A II+I,25-28+1; LL (curved) 42-62 scales and 0-4 scutes, LL (straight) 0-4 scales and 30-40 scutes, LL (total) 77-102; GR(10-14)+(30-39). Upper jaw with single series of minute teeth. Margin of opercular membrane smooth.

Bluish green above, silvery below; C hyaline to dusky yellow and D hyaline basally, light dusky distally; small black opercular spot. Attains 38 cm. Reaches sexual maturity during first year of life at about 12 cm. The most common Indian Ocean *Decapterus* in coastal waters and on open banks at depths to 100 m. Durban northward to Japan and Australia.



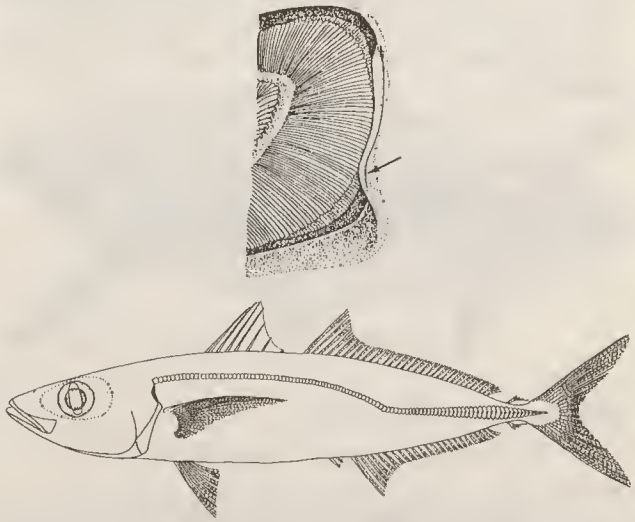
210.29 *Decapterus russelli*: 21 cm FL.

210.30 *Decapterus tabl*
Berry, 1968

Roughear scad — Skuuroor-skad

Decapterus tabl Berry, 1968: 152, Fig. 1 (Colombia).

D VIII+I,30-31+1; A II+I,24-25+1; LL (curved) 61-71 scales and no scutes, LL (straight) 4-10 scales and 30-40 scutes, LL (total) 103-113; GR



210.30 *Decapterus tabl:* 35.5 cm FL; gill chamber to show two small papillae on cleithrum.

(10-12)+(30-33). Upper jaw with single series of minute teeth. Margin of opercular membrane minutely serrated.

Blue to greenish above, silvery below; C bright red and tips of D rays reddish; small black opercular spot. Attains 50 cm. A schooling species usually taken by trawl in 200 - 360 m. Not yet reported from our area, but almost certainly present. Originally believed to be restricted to the Atlantic Ocean; now known from Kenya, Japan, Indonesia, Australia and Hawaiian Ids.

Genus ***Elagatis*** Bennett, 1840

A monotypic genus.

210.31 *Elagatis bipinnulata*
(Quoy & Gaimard, 1825)
PLATE 81

Rainbow runner — Reënboog-pylvis

Seriola bipinnulata Quoy & Gaimard, 1825: 363, Pl. 61, Fig. 3 (Keeling Id. New Guinea). *Elagatis bipinnulatus:* Smith. **SFSA No. 543*;** van der Elst, 1981: 125*.

D VI+I,25-28+2; A I+I,18-20+2. End of upper jaw terminating distinctly before eye (to below front margin of eye in young). A base relatively short, about 1.5 times soft D base. No scutes. C peduncle grooves present dorsally and ventrally.

Dark olive green or blue above, white below; 2 narrow light blue or bluish white stripes along sides, with a broader olive or yellowish stripe between them; fins with an olive or yellow tint. Attains 120 cm, common to 80 cm; world angling record 15.2 kg. A pelagic species, usually found at or near the surface, sometimes far offshore. An excellent food-fish with superb fighting abilities. Durban northward; a circumtropical species, but apparently rare in eastern Atlantic Ocean.

210.31 *Elagatis bipinnulata:* 30 cm FL.

Genus ***Gnathanodon*** Bleeker, 1851

A monotypic genus.

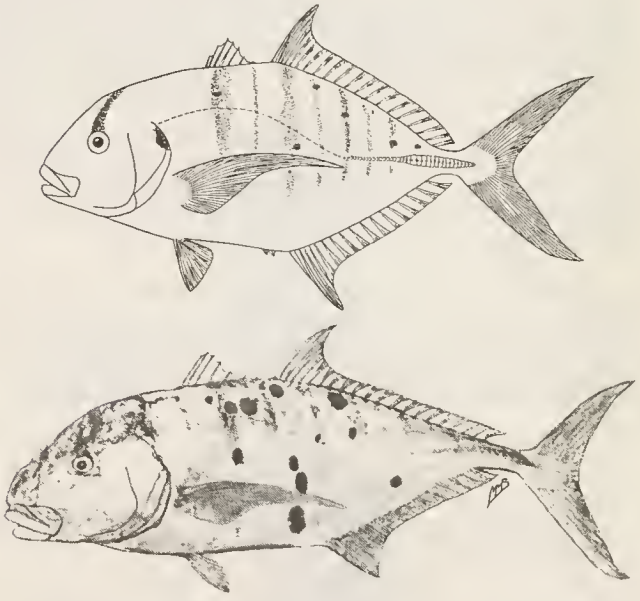
210.32 *Gnathanodon speciosus*
(Forsskål, 1775)
PLATE 81

Golden kingfish — Goue koningvis

Scomber speciosus Forsskål, 1775: 54 (Red Sea). *Caranx speciosus:* Smith, **SFSA No. 506*.** *Gnathanodon speciosus:* Smith & Smith, 1969; 22*; van der Elst, 1981: 126*.

D VII+I,18-20; A II+I,15-17; GR (19-22)+(27-30). Adults without teeth (young with a few feeble teeth in lower jaw); lips noticeably thick and fleshy. Breast completely scaled.

Young and small adults bright yellow to silvery with 7-11 black bands, usually alternating broad and narrow; all fins yellow, with C tips black. Adults with a few black blotches or spots on sides and bands, if present, obsolete. Attains 110 cm; South African spearfishing record 14.8 kg. A bottom feeder that uses its highly protractile mouth to root for crustaceans, molluscs and small fish. Young display "piloting" behaviour with sharks and other large fish such as groupers. Tropical Indo-Pacific south to northern Natal and eastward to the Americas.



210.32 *Gnathanodon speciosus:* top: 49.5 cm FL; bottom: 90 cm adult (Kenya).

Genus ***Lichia*** Cuvier, 1816

A monotypic genus.

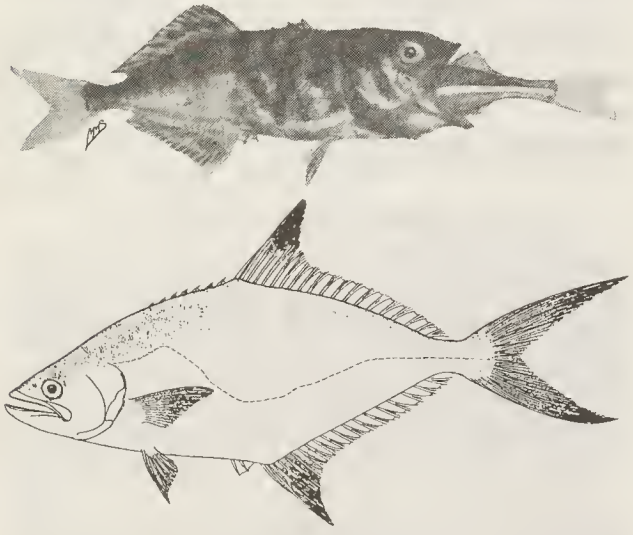
210.33 *Lichia amia*
(Linnaeus, 1758)
PLATE 81

Garrick — Leervis

Scomber amia Linnaeus, 1758: 229 (no locality). *Hypacanthus amia:* Smith, **SFSA No. 539*;** Smith & Smith, 1966: 52*; Smith-Vaniz & Staiger, 1973: 230*. *Lichia amia* van der Elst, 1981: 127*.

D VII+I,19-21; A II+I,17-21; GR (2+5)+(7-11); no scutes. LL very irregular and sinuous, describing a convex curve above and a concave curve behind P.

Adults brown dorsally, silvery white below LL with lobes of D and A black distally; juveniles with brownish black bands on sides. Common to 100 cm, reaches sexual maturity at ca. 55 cm, reported to attain 180 cm. South African angling record 32 kg. An inshore or estuarine species found in surface waters to a depth of at least 50 m and everywhere highly esteemed as a gamefish. Prefers live or moving bait, and may often be seen in pursuit of mullet at the surface. Mediterranean Sea, southward along the entire African coast and around the Cape to Delagoa Bay.



210.33 *Lichia amia*: 62 cm FL and juvenile choked by an atherinid (Knysna).

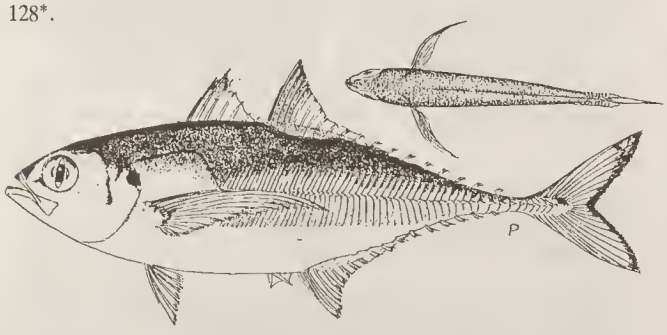
Genus ***Megalaspis*** Bleeker, 1851

A monotypic genus.

210.34 *Megalaspis cordyla*
(Linnaeus, 1758)

Torpedo scad — Torpedo-skad

Scomber cordyla Linnaeus, 1758: 298 (no locality). *Megalaspis cordyla:* Smith, **SFSA No. 534***; Smith & Smith, 1969: 22*; van der Elst, 1981: 128*.



210.34 *Megalaspis cordyla:* 20 cm (Inhaca Id.).

D VIII+I,18-20, posterior 7-9 rays consisting of semi-detached finlets; A II+I,16-17, posterior 8-10 rays semi-detached finlets; GR (8-11)+(18-22). Adipose eyelid completely covering eye except for vertical slit centered on pupil. Straight LL with 51-59 very large scutes.

Bluish grey to green above, shading to silvery below; large, black opercular spot; fins dark. Attains 80 cm. A schooling species usually found near the surface coastally but intolerant of turbid water. East London northward; tropical Indo-West Pacific to Japan and Australia.

Genus ***Naucrates*** Rafinesque, 1809

A monotypic genus.

210.35 *Naucrates ductor*
(Linnaeus, 1758)
PLATE 81

Pilotfish — Loodsvis

Gasterosteus ductor Linnaeus, 1758: 295 ("in Pelago"). *Naucrates ductor* Smith, **SFSA No. 535***; Smith & Smith, 1966: 83*.

D IV-V (some spines often minute or embedded in adults) +I,25-29; A II+I,15-17; GR (6-7)+(15-20). End of upper jaw relatively narrow, terminating below front margin of eye. A base 1.6-1.9 times second D base. No scutes. C peduncle grooves present dorsally and ventrally.

Head dark, body with 6-7 broad, dark bars, including one at end of C peduncle; remainder of body dark to pale bluish; C lobes with prominent white tips, smaller white tips on second D and A lobes. Attains 70 cm, common to 38 cm. Pelagic in oceanic waters; enjoys a semi-obligate commensal relationship with sharks, rays and other large fishes. Sometimes rides the bow wave of ships or large fishes, hence its common name "pilotfish". Common throughout Indian Ocean; a circumtropical species.

210.35 *Naucrates ductor:* 30 cm (E. of Port Alfred).

Genus ***Parastromateus*** Cuvier, 1831

Apolectus Cuvier, 1832 and *Formio* Whitley, 1929 are synonyms. A monotypic genus, previously classified in its own family, Apolectidae (or Formionidae).

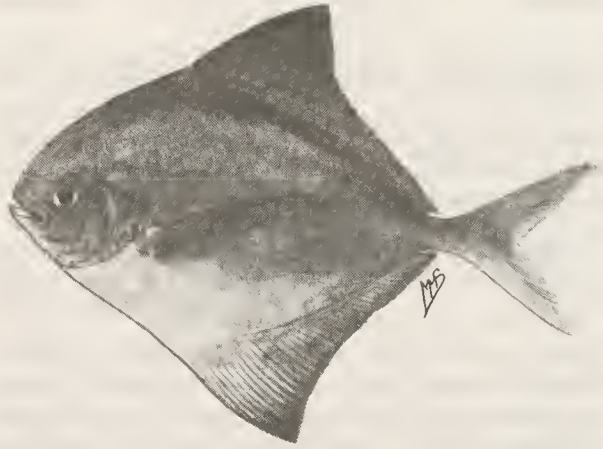
210.36 *Parastromateus niger*
(Bloch, 1795)
PLATE 81

Black pomfret Swart pomfret

Stromateus niger Bloch, 1795: 93, Pl. 422 (no locality). *Apolectus niger*: Smith, **SFSA No. 500***; Smith & Smith, 1963: 20*.

D IV-V (embedded and not apparent in all but young) +I,41-44; A II+I,35-39, profile of soft D and A nearly identical with elevated, broadly rounded anterior lobes; minute V present in young, absent in adults. Straight LL with 8-19 weak scutes, forming a slight keel on C peduncle.

Silvery grey to bluish brown, fins with dark edges; dark blotch on rear margin of opercle opposite P; young with dark bands and black, jugular V. Attains 55 cm. A pelagic species often occurring in large schools in 15 - 40 m generally over muddy bottoms. An excellent food-fish, only rarely takes a bait, and frequently swims on its side near surface. At times abundant in Delagoa Bay; eastward to southern Japan and Australia.



210.36 *Parastromateus niger*: 30 cm (S. Mozambique).

Genus ***Pseudocaranx*** Bleeker, 1863

Three species; 1 in southern Africa.

210.37 *Pseudocaranx dentex*
(Bloch & Schneider, 1801)
PLATE 81

White kingfish Wit koningvis

Scomber dentex Bloch & Schneider, 1801: 30 (Brazil). *Caranx georgianus* Cuvier, *in* Cuv. & Val., 1833: 85 (King George Sound, W. Australia). *Caranx natalensis* Gilchrist & Thompson, 1911: 39 (Umhloti, Natal). *Caranx adscensionis*: Smith, **SFSA No. 507**; Smith & Smith, 1966: 124*.

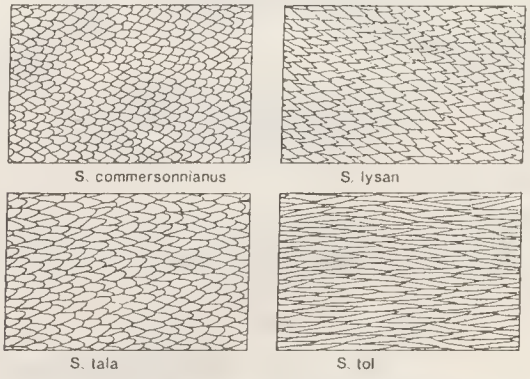
D VIII+I,25-26; A II+I,21-22; GR (11-13)+(24-27). Both jaws with a single series of blunt conical teeth; lips thick and fleshy in adults. Spinous D slightly higher than second D lobe. Breast completely scaled. Straight LL with 7-16 scales + 25-31 scutes.

Greenish blue above, silvery white below; yellow stripe usually present along midside of body; distinct, black opercular spot. Attains 96 cm. An opportunistic bottom feeder found mainly on banks and shelf slope habitats in 80 - 200 m, but may occasionally occur inshore. Durban southward; an anti-tropical species occurring on both sides of the Atlantic, Mediterranean and Indo-West Pacific eastward to Hawaiian Ids.

210.37 *Pseudocaranx dentex*: 41.5 cm FL.

Genus ***Scomberoides*** Lacepède, 1801

Four species; 3 in southern Africa. Generic revision by Smith-Vaniz and Staiger (1973) necessitated a complete change of the names Smith (1970) used for these fishes. Halstead et al. (1977) described the venom glands associated with the D and A spines of *S. lysan*. The A spines are the most venomous and can produce painful stings. The similar morphology of these spines in the other species of *Scomberoides* suggest that they are probably also venomous. Adults feed primarily on fish; juveniles use specialised juvenile dentition to aggressively remove scales and epidermal tissue from other fishes.



Scomberoides scale shapes.

KEY TO SPECIES

1a Lobe of D uniformly pigmented; GR 8-15; scales on midbody below LL oval; in life, large plumbeous oval blotches above or touching LL ..... *S. commersonnianus*

1b Distal ½ of D lobe abruptly and heavily pigmented; GR 21-27; scales on midbody below LL lanceolate or needle-like; in life, coloration not as above 2

2a Scales on midbody below LL lanceolate; in adults, maxilla extends to or slightly beyond rear margin of eye; in life, a double series of 6-8 dusky, roundish blotches above and below LL, occasionally connected by narrow isthmus ..... *S. lysan*

2b Scales on midbody below LL slender, needle-like; in adults, maxilla does not extend to rear margin of eye; in life, oval or vertically oblong dark blotches, the 1st 4 or 5 intersecting LL ..... *S. tol*

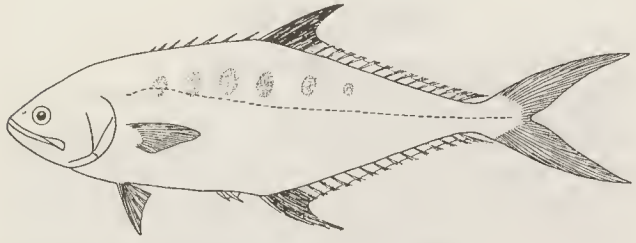
210.38 *Scomberoides commersonnianus*
Lacepède, 1801

Talang queenfish Talang-koninginvis

Scomberoides commersonnianus Lacepède, 1801: 50 (Madagascar). *Chorinemus lysan* (*non* Forsskål): Smith, **SFSA No. 546;** Smith, 1970: 225*. *Scomberoides commersonianus:* Smith-Vaniz & Staiger, 1973: 194*; van der Elst, 1981: 129*.

D VI-VII+I,19-21; A II+I,16-19; GR (0-3)+(7-12). No scutes; scales on midbody oval-shaped. Posterior soft D and A of semi-detached finlets. Maxilla extends well beyond eye in adults.

Adults with 5 to 8 large, plumbeous blotches above or touching LL, 1st 2 may intersect LL; D lobe dusky to dark and uniformly pigmented. Reported to attain 120 cm; South African spearfishing record 14.4 kg. Generally intolerant of low salinities and turbid water; swims in small groups and usually frequents reefs and offshore islands. Widespread throughout Indian Ocean from Algoa Bay northward; also Taiwan to Australia.



210.38 *Scomberoides commersonnianus:* 47 cm FL.

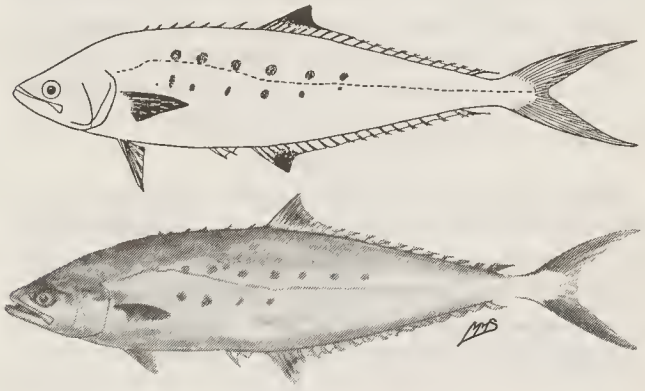
210.39 *Scomberoides lysan*
(Forsskål, 1775)

Doublespotted queenfish Dubbelkol-koninginvis

Scomber lysan Forsskål, 1775: 54 (Red Sea). *Chorinemus sanctipetri* Cuvier, *in* Cuv. & Val., 1832: 379, Pl. 236 (Malabar); Smith, **SFSA No. 545.** *Chorinemus tolooparah:* Smith, 1970: 221*. *Scomberoides lysan:* Smith-Vaniz & Staiger, 1973: 205*.

D VI-VII+I,19-21; A II+I,17-19; GR (3-8)+(15-20). No scutes; scales on midbody lanceolate. Posterior soft D and A of semi-detached finlets. Maxilla extends to or slightly beyond rear margin of eye in adults.

Adults with double series of 6 to 8 dusky roundish blotches above and below LL; distal ½ of D lobe abruptly and heavily pigmented. Attains 70 cm. Most common Indian Ocean *Scomberoides*, found in shallow lagoons to offshore areas from surface to 100 m. Widespread in tropical Indo-West Pacific from Durban northward and eastward to Hawaiian Ids. Due to strong superficial resemblance this and following species frequently misidentified as scombrids.



210.39 *Scomberoides lysan:* top: 52 cm FL; bottom: 75 cm (Seychelles).

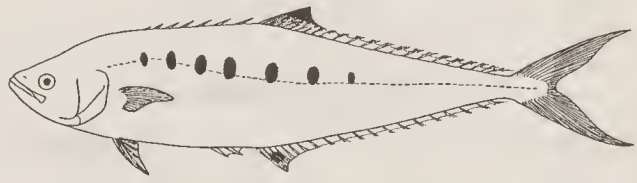
210.40 *Scomberoides tol*
(Cuvier, 1832)

Needlescaled queenfish Naaldskub-koninginvis

Chorinemus tol Cuvier, *in* Cuv. & Val., 1832: 385 (Malabar); Smith, **SFSA No. 544*.** *Chorinemus tala* (*non* Cuvier): Smith, 1970: 219*. *Scomberoides tol:* Smith-Vaniz & Staiger, 1973: 209*. *Scomberoides tala* (*non* Cuvier): van der Elst, 1981: 130*.

D VI-VII+I,19-21; A II+I,18-20; GR (4-7)+(17-20). No scutes; scales on midbody needle-like. Posterior soft D and A of semi-detached finlets. Maxilla extends to rear margin of pupil in adults.

Adults with 5 to 8 oval or vertically oblong black blotches, the 1st 4 or 5 of which intersect LL; distal ½ of D lobe abruptly and heavily pigmented. Attains 60 cm. Usually found in small schools near surface in coastal waters. Widespread throughout Indian Ocean from Natal northward; also Japan to Australia and eastward to Fiji Ids.



210.40 *Scomberoides tol:* 45 cm FL.

Genus ***Selar*** Bleeker, 1851

Two species; 1 in southern Africa.

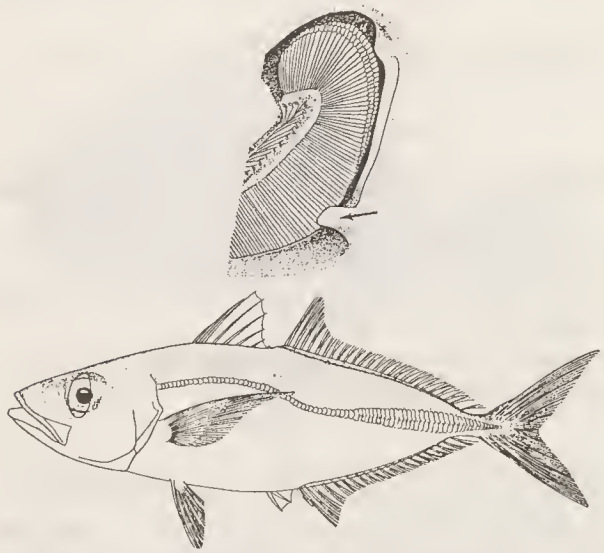
210.41 *Selar crumenophthalmus*
(Bloch, 1793)
PLATE 82

Bigeye scad — Grootoog-skad

Scomber crumenophthalmus Bloch, 1793: 77, Pl. 343 (Acara, Guinea). *Selar crumenophthalmus:* Smith, **SFSA No. 503*;** Smith & Smith, 1963: 22*.

D VIII+I,24-27; A II+I,21-23; GR (9-12)+(27-31). Shoulder girdle (cleithrum) margin with a furrow ventrally, a large papilla immediately above it and a smaller papilla near upper edge; adipose eyelid completely covering eye except for broad oval slit centered on pupil. Straight LL with 0-11 scales and 29-42 scutes.

Metallic blue to bluish green above, shading to white below; yellow stripe sometimes present from opercle margin to upper part of C peduncle; blackish opercular spot. Attains 30 cm. Forms small to large schools in inshore waters and shallow reefs to 170 m. Durban northward; worldwide in tropical and subtropical waters.



210.41 *Selar crumenophthalmus:* 24 cm FL; gill chamber to show large papillae on cleithrum.

Genus ***Selene*** Lacepède, 1802

About 7 species; 1 in southern Africa.

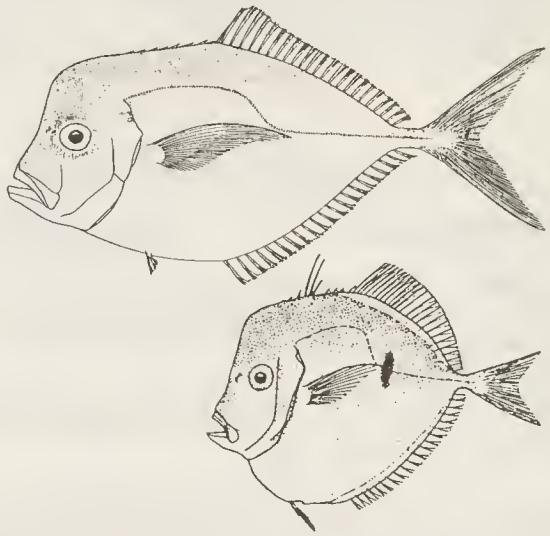
210.42 *Selene dorsalis*
(Gill, 1863)

Lookdown fish — Afkykvis

Vomer dorsalis Gill, 1863: 436 (*Argyreiosus setipinnis,* variety B of Günther; St. Vincent, Cape Verde Ids.); Smith, 1965: 20*. *Selene gibbiceps* Gilchrist, 1914: 130, Fig. (Walvis Bay). *Vomer gibbiceps:* Smith, **SFSA No. 526*.**

D VIII+I,23-24; A 0-II+I,18-20; LL scutes 8-17, weakly differentiated; GR (7-9)+(31-34). Body extremely compressed and superficially naked. D spines short and disconnected, wholly buried in adults. V rudimentary (except in very young), ca. ⅓ upper jaw length.

Mainly silvery with faint dusky opercular spot; juveniles with oval black spot over straight LL anteriorly. Attains 36 cm. Occurs near bottom to at least 60 m, from Senegal to Walvis Bay. *Selene setapinnis* (Mitchill) of the western Atlantic may possibly be the same species.



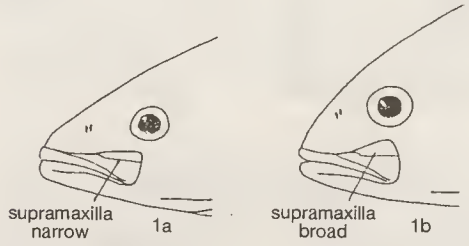
210.42 *Selene dorsalis:* top: 28 cm FL; bottom: 5.5 cm FL juvenile.

Genus ***Seriola*** Cuvier, 1816

No scutes; C peduncle grooves present dorsally and ventrally. Nine species; 3 in southern Africa.

KEY TO SPECIES

1a Maxilla moderately slender at end, with slender supramaxilla; C yellowish; in adults, a moderate cutaneous keel laterally on C peduncle; vertebrae 11+14 ..... *S. lalandi*



1b Maxilla relatively broad at end, with broad supramaxilla; C dark to dusky with a lighter rear margin; in adults, cutaneous keel on C peduncle absent to slightly developed; vertebrae 10+14 2

2a Dark bar often present from eye to D origin; in adults, length of D lobe about 1.3-1.6 times longer than P and 18-22% FL; in specimens larger than ca. 20 cm FL, GR (excluding rudiments) 22-26 ..... *S. rivoliana*

2b No dark bar from eye to D origin; in adults, length of D lobe about equal or slightly longer than P and 13-18% FL; in specimens larger than ca. 20 cm FL, total GR (excluding rudiments) 11-19 ..... *S. dumerili*

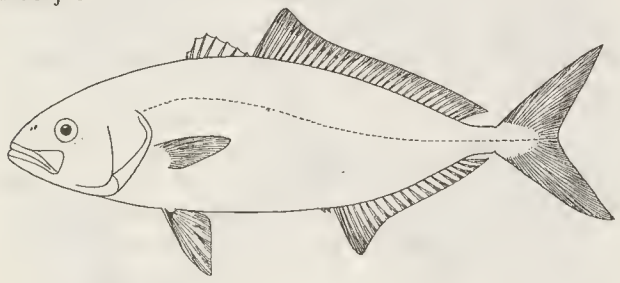
210.43 *Seriola dumerili*
(Risso, 1810)

Greater yellowtail — Groot geelstert

Caranx dumerili Risso, 1810: 175, Pl. 6, Fig. 20 (Nice). *Seriola rhombica* Smith, 1959: 259, Fig. 5 (Algoa Bay); 1961: 568, **No. 538b.**

D VI1 (1st spine minute or embedded in large adults) +I,29-35; A II+I,18-22; GR (5-7)+(14-16) = 20-24 in juveniles, and 11-19 total in adults. Maxilla reaches below rear margin of eye. In adults, height of D lobe equal to or slightly longer than P; A base 1.4-1.7 times in soft D base.

Bluish grey or olivaceous above, shading to silvery white below; often amber stripe along midside of body; fins mostly dusky, except V pale ventrally, and in juveniles all fins may be yellow, olive or amber. Attains 188 cm and 80.6 kg, common to 100 cm. Adults usually in 20 - 70 m, often on reefs or at deep offshore holes, in small to moderate schools or solitary. Algoa Bay to Persian Gulf, Japan, Australia and Hawaiian Ids.; elsewhere called "greater amberjack".



210.43 *Seriola dumerili*: 29 cm FL.

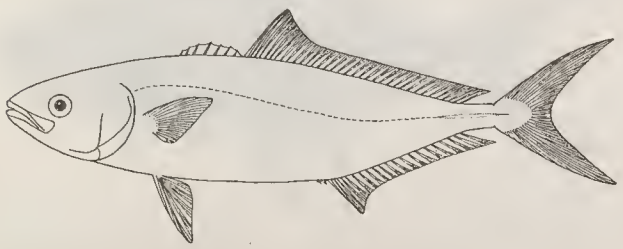
210.44 *Seriola lalandi*
Valenciennes, 1833
PLATE 82

Giant yellowtail — Reuse geelstert

Seriola lalandi Valenciennes, *in* Cuv. & Val., 1833: 208 (Brazil): Smith, **SFSA No. 537***; van der Elst, 1981: 131*. *Lichia pappei* Castelnau, 1861: 40 (Cape Province). *Seriola pappei:* Smith, 1959: 256*; Smith & Smith, 1966: 71*. *Seriola banisteri* Smith, 1959: 256, Fig. 2 (Natal). *Seriola (Regificola) pappei:* Smith, 1961: 568, **No. 537.** *Seriola (Regificola) banisteri:* Smith, 1961: 568, **No. 537a.**

D VII (1st spine minute or embedded in large adults) +I,30-35; A II+I,19-22; GR (7-10)+(15-20) = 22-29. Maxilla reaches below front margin of pupil. In adults, height of D lobe subequal or slightly shorter than P; A base 1.6-1.8 times in soft D base.

Blue to olivaceous above, shading to silvery white below; sometimes with narrow bronze stripe along midside of body; C olivaceous yellow. Attains 193 cm and 58 kg, common to 100 cm; South African angling record 33 kg. A highly esteemed gamefish usually found in large shoals to depths of 50 m. Most common in Atlantic Cape waters, but each winter follows the pilchard migrations northward to Transkei and Natal; a circumglobal species restricted to subtropical waters and consisting of a series of disjunct populations, many of which until recently considered to represent distinct species. Elsewhere called "yellowtail amberjack".



210.44 *Seriola lalandi*: 37.5 cm FL.

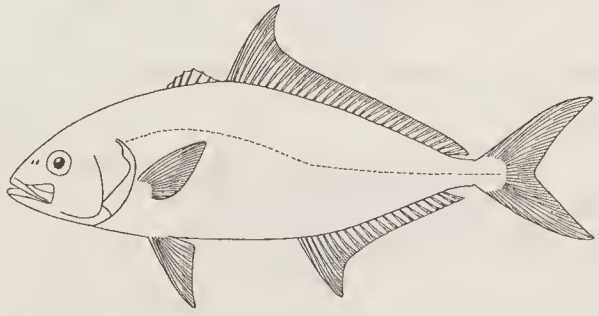
210.45 *Seriola rivoliana*
Valenciennes, 1833
PLATE 82

Longfin yellowtail — Langvin-geelstert

Seriola rivoliana Valenciennes, *in* Cuv. & Val., 1833: 207 (Greek Archipelago). *Seriola bonariensis:* Smith, **SFSA No. 538***; Smith & Smith, 1966: 71*. *Seriola songoro* Smith, 1959: 258, Fig. 3 (W. Indian Ocean); Smith & Smith, 1966: 71*. *Seriola bovinoculata* Smith, 1959: 259, Fig. 4 (Pinda, Mozambique). *Seriola (Buphthalmus) songoro:* Smith, 1961: 568, **No. 538.**

D VII (1st spine minute or embedded in large adults) +1,27-33; A II+I,18-22; GR (6-9)+(17-20) = 24-29 in juveniles, and 22-26 total in adults. Maxilla reaches below mid-point of pupil. In adults, height of D lobe 1.3-1.6 times longer than P; A base 1.5-1.6 times in soft D base.

Olivaceous to bluish green above, sides and belly lighter sometimes with brassy or lavender reflections; dark nuchal bar often persistent in adults; faint amber stripe frequently present along midside of body; fins mostly dark except V white ventrally. Attains 110 cm and 24 kg. Adults pelagic and epibenthic, and rarely caught in inshore waters. Knysna northward; a circumtropical species entering temperate waters in some areas. Elsewhere called "almaco jack".



210.45 *Seriola rivoliana:* 39 cm FL.

Genus ***Seriolina*** Wakiya, 1924

A monotypic genus.

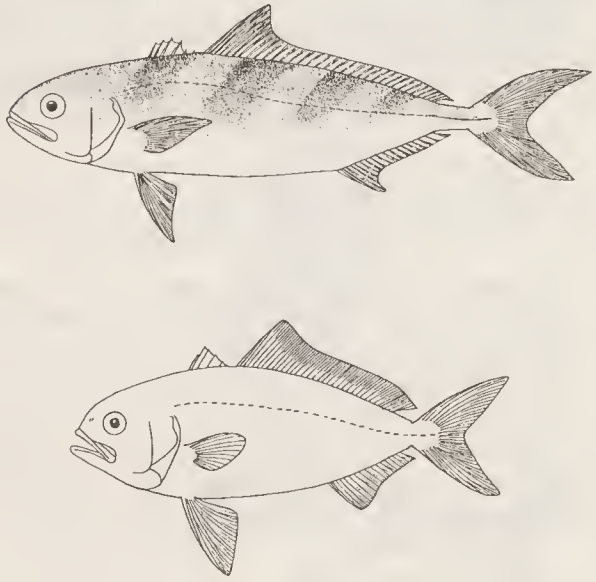
210.46 *Seriolina nigrofasciata*
(Rüppell, 1829)
PLATE 82

Blackbanded kingfish — Swartband-koningvis

Nomeus nigrofasciatus Rüppell, 1829: 82, Pl. 24, Fig. 1 (Red Sea). *Zonichthys nigrofasciata:* Smith, **SFSA No. 536***. *Seriolina nigrofasciata:* Smith, 1959: 260*; 1961: 568, **No. 536;** van der Elst, 1981: 132*.

D VII-VIII (posterior spines minute or embedded in large adults) +I,30-37; A I (usually embedded) +I,15-18; GR (1-2)+(5-8), mostly rudiments. Maxilla reaches below rear margin of eye. In adults, height of D lobe slightly longer than P; A base 2.1-2.3 times in soft D base. No scutes. C peduncle grooves present dorsally and ventrally.

Bluish grey to black above, white to dusky below; spinous D black, soft D and A dusky brown, lobe tips white; C and V yellowish brown to black. Young with 5-7 dark, oblique bands or blotches on upper body that fade with age. Attains 70 cm, South African angling record 5.2 kg. A generally solitary species preferring offshore reefs. An excellent food-fish. Algoa Bay northward and throughout Indian Ocean eastward to Japan and Australia.



210.46 *Seriolina nigrofasciata:* top: 40 cm FL adult, bottom: 12.5 cm FL juvenile.

Genus ***Trachinotus*** Lacepède, 1801

Nineteen species; 4 in southern Africa.

KEY TO SPECIES

1a One to 5 spots in a row on or near LL (spots absent on specimens smaller than about 10 to 13 cm FL); D rays 21-25 2
1b No spots on body; D rays 18-20 (except 21-23 in *T. africanus*) 3

2a In adults, anterior 2 spots larger than eye diameter and at least ⅔ of spot above LL; lower GR 11-15; in fish larger than ca. 25 cm FL, D lobe usually longer than A lobe and V 1.5-1.7 in P length ..... *T. botla*
2b In adults, all spots equal to, or smaller than eye, and with about ½ of spot below LL; lower GR 15-19; in fish larger than ca. 25 cm FL, D lobe consistently shorter than A lobe and V 1.9-2.3 in P length ..... *T. baillonii*

3a D rays 21-23; A rays 19-21 ..... *T. africanus*
3b D rays 18-20; A rays 16-18 ..... *T. blochii*

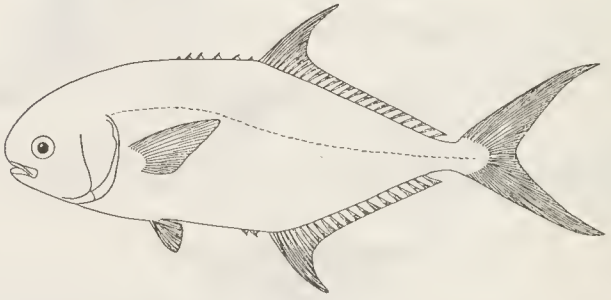
210.47 *Trachinotus africanus*
Smith, 1967
PLATE 82

Southern pompano — Suidelike pompano

Trachinotus africanus Smith, 1967: 160, Pls. 34-35 (Knysna); van der Elst, 1981: 133*. *Trachinotus blochii* (*non* Lacepède): Smith, **SFSA No. 542***; Smith & Smith, 1966: 123*.

D VI+I,21-23; A II+I,19-21; GR (7-10)+(11-14). Tongue with a narrow patch of teeth (absent in large adults). First predorsal bone shaped much like second predorsal bone.

Adults bluish dorsally, silvery below; A bright yellow, with fin lobe orange; C, P and V yellowish. Weight ca. 9 kg at 90 cm; Durban Aquarium fish reported to have exceeded 25 kg; South African spearfishing record 14 kg. Found in shallow coastal areas usually around reefs or rocky outcrops, young in sheltered bays. Occurs from Knysna northward to Delagoa Bay, then from Gulfs of Aden and Oman, and eastern Indian Ocean on western side of Indonesian Archipelago. This disjunct distributional pattern may be real and reflect limited availability of preferred habitat.



210.47 *Trachinotus africanus:* 61 cm.

210.48 *Trachinotus baillonii*
(Lacepède, 1801)

Smallspotted pompano — Kleinkol-pompano

Caesiomorus baillonii Lacepède, 1801: 92, Pl. 3, Fig. 1 (Madagascar). *Trachinotus baillonii:* Smith, **SFSA No. 541***; 1967: 163*.

D VI+I,20-24; A II+I,20-24; GR (7-13)+(15-19).

210.48 *Trachinotus baillonii:* 30 cm (N. Mozambique).

Adults silvery blue to grey above, silvery white below; sides with 1-5 small black spots in a longitudinal row on or near LL, these spots equal to or smaller than eye (spots absent in fish smaller than 15 cm, the number of spots generally increasing with age); C, 2nd D and A grey to black, the lobes usually darkest. Attains at least 54 cm and 1.0 kg. Inhabits coastal waters, and usually found in surge zone along sandy beaches; widespread in Indo-West Pacific from Natal northward and eastward to the Marshall and Line Ids.

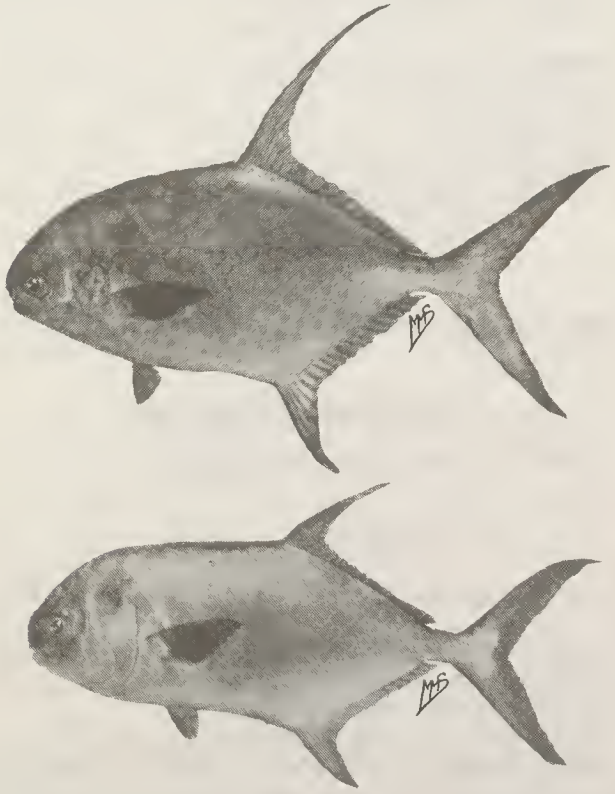
210.49 *Trachinotus blochii*
(Lacepède, 1801)

Snubnose pompano — Stompneus-pompano

Caesiomorus blochii Lacepède, 1801: 92, Pl. 3, Fig. 2 (Madagascar). *Trachinotus blochii:* Smith, 1967: 159*.

D VI+I,18-20; A II+I,16-18; GR (5-8)+(8-10). Tongue toothless.

First predorsal bone shaped like an inverted tear-drop or oval-shaped. Body generally silvery, paler below; large adults sometimes mostly golden orange, especially lower ½ of body; A dusky to dirty orange, lobe with brownish anterior margin; C and P dark or dirty orange; V white to dirty orange. Attains 65 cm. Widespread in Indo-West Pacific from Durban northward and eastward to Marshall Ids.



210.49 *Trachinotus blochii:* top: 57.5 cm (Kenya); bottom: 80 cm (N. Mozambique).

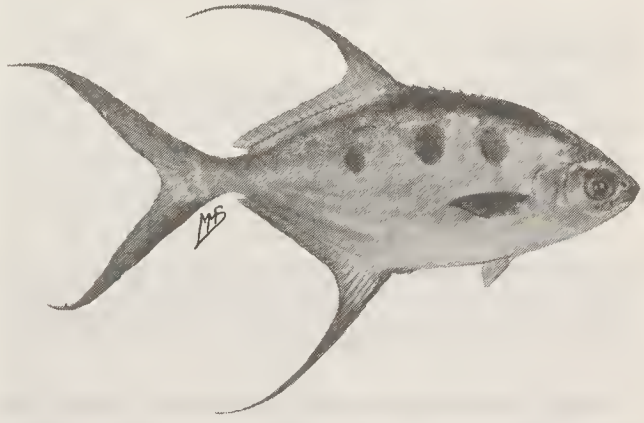
210.50 *Trachinotus botla*
(Shaw, 1803)

Largespotted pompano — Grootkol-pompano

Scomber botla Shaw, 1803: 591 (composite species based primarily on Russell's Fig. of "botla-parah" from Vizagapatam, India). *Trachinotus russelii* Cuvier, *in* Cuv. & Val., 1832: 436 (based on Russell's Fig. of "botla-parah"); Smith, **SFSA No. 540*;** 1967: 163*. *Palinurichthys umhlangae* Smith, 1949: 304, Fig. 849b (Umhlanga, Natal). *Trachinotus botla:* van der Elst, 1981: 134*.

D VI+I,22-24; A II+I,19-22; GR (6-9)+(11-15).

Adults bluish black above, silvery below; sides with 1-5 large plumbeous spots in a longitudinal row on or near LL, the anterior 2 spots larger than eye (spots absent on fish smaller than 15 cm, the number of spots generally increasing with age); C, 2nd D and A dusky to blue-black, the lobes usually darker. Attains 75 cm; South African angling record 2.3 kg. Inhabits coastal waters, often preferring the rough surge zone along sandy beaches, from Algoa Bay northward to Kenya; also Madagascar, Sri Lanka and western Australia. The eastern Australian *T. coppingeri* Günther, 1884 is a closely related endemic species. Validation and priority of *Scomber botla* is based on the action of Day (1876: 233) who as "first reviser" listed it as a synonym of *Trachinotus russelii*.



210.50 *Trachinotus botla:* 50 cm (Kenya).

Genus ***Trachurus*** Rafinesque, 1809

Eleven or 12 species; 2 in southern Africa. Also called "scad" or "horse mackerel".

KEY TO SPECIES

1a Dorsal accessory LL ends below 16th-30th D ray; GR 64-74 ..... *T. trachurus*

1b Dorsal accessory LL ends below 7th-9th D spine; GR 53-59 ..... *T. delagoa*

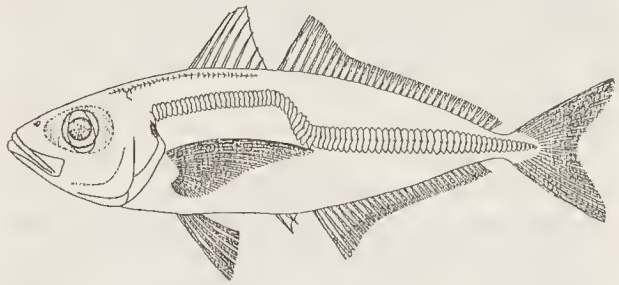
210.51 *Trachurus delagoa*
Nekrasov, 1970

African maasbanker — Afrikaanse maasbanker

Trachurus delagoa Nekrasov, 1970: 96, Fig. 5 (Delagoa Bay, Mozambique); Nekrassov, 1978: 17. *Trachurus margaretae* Berry & Cohen, 1974: 191, Fig. 2 (Durban).

D VIII+I,28-32; A II+I,24-28; GR (13-16)+(39-45). Curved LL with enlarged, scute-like scales (in large adults may become obscured by overgrowth of smaller body scales); scales and scutes in curved LL 28-34, straight LL with 35-41 scutes.

Dark blue above, silvery below; A and P pale yellow; C dark grey and V white or hyaline; black opercular spot. Attains 35 cm. Demersal species on sandy bottoms from the coastline to 400 m, but migrates to surface waters at night. Eastern Cape Province northward to Mozambique; also southern Madagascar and Walters Shoals.



210.51 *Trachurus delagoa:* 17 cm FL.

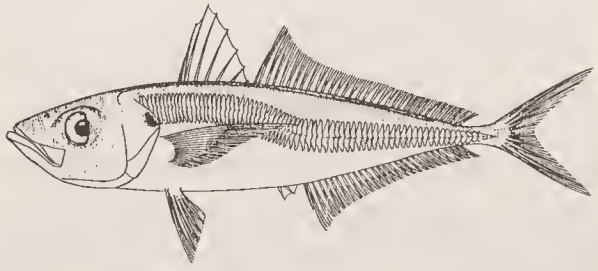
210.52 *Trachurus trachurus*
(Linnaeus, 1758)
PLATE 82

Maasbanker Maasbanker

Scomber trachurus Linnaeus, 1758: 298 (Mediterranean). *Trachurus capensis* Castelnau, 1861: 43 (South Africa); van der Elst, 1981: 135*. *Selar tabulae* Barnard, 1927: 538 (Table Bay). *Branchialepes tabulae:* Smith, **SFSA No. 504.** *Trachurus trachurus capensis:* Nekrasov, 1978: 17. *Trachurus trachurus:* Smith, **SFSA No. 501*;** Smith & Smith, 1966: 72*.

D VIII+I,30-36; A II+I,24-32; GR (16-20)+(47-55). Curved LL with enlarged, scute-like scales (in large adults may become obscured by overgrowth of smaller body scales); scales and scutes in curved LL 30-39, straight LL with 32-39 scutes. (Counts from South African specimens only.)

Bluish green, grey or nearly black above, shading to silvery white below; black opercular spot. Attains 70 cm, sexual maturity attained at 3 years and ca. 20 cm. The maasbanker is an important commercial species with 100-250 thousand tons trawled annually by west coast fishermen; it is also considered to be an excellent bait for large game fish. Delagoa Bay southward and around the Cape northward to Norway.



210.52 *Trachurus trachurus:* 33.5 cm FL.

Genus ***Ulua*** Jordan & Snyder, 1908

A single species generally recognised, but the Australian *Citula aurochs* Ogilby (1915) is congeneric.

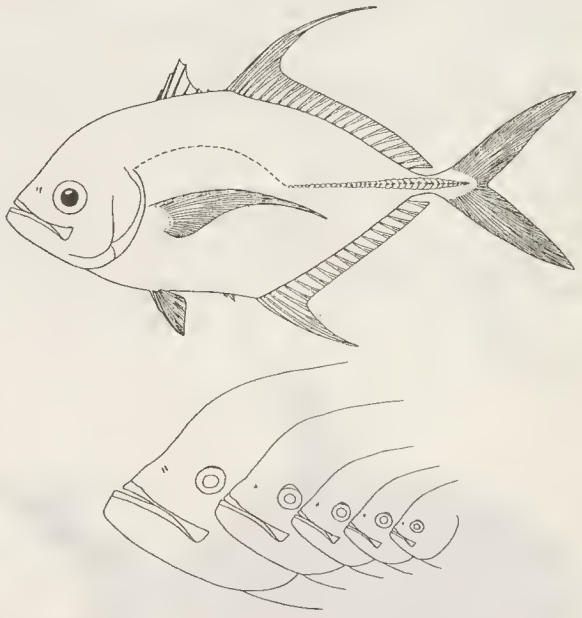
210.53 *Ulua mentalis*
(Cuvier, 1833)

Heavyjawed kingfish Grootkaak-koningvis

Caranx mentalis Cuvier, *in* Cuv. & Val., 1833: 124 (Red Sea). *Ulua mandibularis:* Smith & Smith, 1969: 22*.

D VIII+I,21-22; A II+I,17-18; GR (23-27)+(51-61). Lower jaw becoming very prominent in large adults. Breast naked to behind V origin and laterally to P base. Straight LL with 0-5 scales and 26-38 scutes.

Bluish green above, silvery below. Attains 100 cm. Madagascar northward and eastward to Taiwan and Australia.



210.53 *Ulua mentalis:* 26.5 cm FL; change of head profile with growth.

Genus ***Uraspis*** Bleeker, 1855

Two or 3 species; 1 in southern Africa.

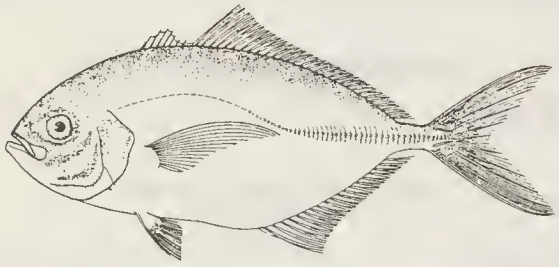
210.54 *Uraspis secunda*
(Poey, 1860)

Cottonmouth kingfish Katoenbek-koningvis

Caranx secundus Poey, 1860: 223 (Cuba). *Uraspis heidi* Fowler, 1938: 150 (Manasquan, New Jersey). *Uraspis wakiyai* Williams, 1961: 66, Fig. 1, Pl. 4 (Tanzania). *Uraspis uraspis*: Smith, 1962: 506*.

D VIII (several spines embedded and not apparent in all but very young) +I,27-32; A II (embedded in all but very young) +I,19-23; GR (4-8)+(13-16). Breast naked to V origin, laterally naked area separated from naked P base by broad band of scales. Straight LL with spines of some scutes directly anteriorly (antrorse) in juveniles and small adults.

Adults uniformly dark leaden to bluish black; juveniles with 6-7 wide, dark bands with pale interspaces. Tongue, roof and floor of mouth white or cream coloured, rest of mouth blue black. Attains 48 cm. Apparently an oceanic species; at surface, pelagic and benthic, usually in small schools. In Indian Ocean only known from Algoa Bay and Tanzania; elsewhere from scattered localities circumtropically.



210.54 *Uraspis secunda*: 32.5 cm FL.

Family No. 211: CORYPHAENIDAE

by M.M. Smith

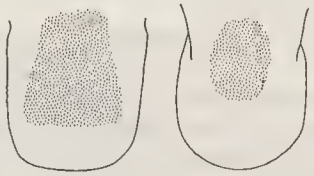
Dolphinfish **Dorades**

Elongate compressed body with small cycloid scales; dorsal fin from nape almost to caudal fin with no finlets; caudal fin deeply forked; pelvic fins well developed; bands of teeth on jaws, vomer and palatines.

Only one genus with 2 large colourful species; worldwide tropical fishes of the open ocean, but sometimes caught near land. Swift predators feeding on fish and squid, often follow ships and congregate below floating objects. Flesh highly esteemed. Revised by Gibbs & Collette, 1959.

KEY TO SPECIES

1a Greatest body depth in adults more than 25% SL; D rays 52-59; tooth patch on tongue almost square; P equals ½ head length ..... *C. equiselis*



C. equiselis *C. hippurus*

1b Greatest body depth in adults less than 25% SL; D rays 58-66; tooth patch on tongue oval; P more than ½ head length ..... *C. hippurus*

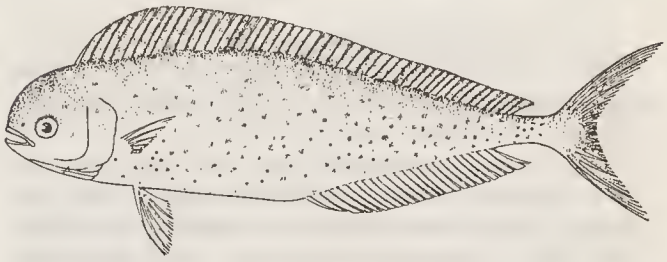
211.1 *Coryphaena equiselis*
Linnaeus, 1758

Pompano dolphinfish Pompano-dorade

Coryphaena Equiselis Linnaeus, 1758: 261 (open ocean). Gibbs & Collette, 1959*.

D 52-59; A 23-29; P 18-21; vertebrae 33; LL 160-200; GR young (1-2)+(10-11), adults 0+(8-10).

The pompano dolphinfish is much rarer than, but so similar to, *C. hippurus* that it has probably been confused with that species. Not definitely known from our area, but probably occurs here. Attains 75 cm. Adults appear to be more strictly oceanic than *C. hippurus*.



211.1 *Coryphaena equiselis*: 50 cm (after Collette, 1984).

211.2 *Coryphaena hippurus*
Linnaeus, 1758
PLATE 83

Dolphinfish Dorade

Coryphaena hippurus Linnaeus, 1758: 261 (open ocean); Smith, **SFSA No. 872***; Gibbs & Collette, 1959*; Smith & Smith, 1966: 134*; van der Elst, 1981: 163*.

D 58-67; A 25-30; P 17-20; vertebrae 31; LL 200-280; GR young (1-2)+(6-11), adults 0+(8-9). Head profile of male starts developing a bony crest after length 30 cm, becoming vertical in large fish (200 cm).

Colour gorgeous, as illustrated; juveniles with light tips to C. Juveniles pelagic but often drift into estuaries, where their cryptic colouring provides good camouflage in the seaweeds. Attains 2 m and 39.5 kg. One of the famous game fishes of the world, known throughout all tropical and subtropical waters to 35°S, with occasional large adults being caught off the Cape south coast. Often caught trolling in open tropical waters, as very partial to flying fish.

Family No. 212: RACHYCENTRIDAE

by M.M. Smith

Cobia **Kobia**

Body elongate, subcylindrical, with minute scales; head broad, depressed; mouth large with bands of fine teeth in jaws, on palate bones and tongue. Gasbladder absent; vertebrae 12+13. This family contains a single genus, *Rachycentron* Kaup, 1826 and one species.

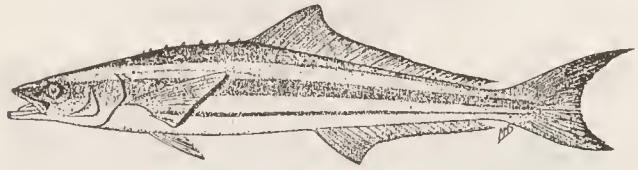
212.1 *Rachycentron canadum*
(Linnaeus, 1766)

Prodigal son — Kobia

Gasterosteus canadus Linnaeus, 1766: 491 (Carolina, U.S.A.). *Rachycentron canadus:* Smith, **SFSA No. 548***. *Rachycentron canadum:* Smith, 1980: 178; van der Elst, 1981: 260*.

D VII-IX+I,33-36; A II-III,22-28; P 21-22; LL over 300; GR 2+(9-10). D spines low, separate; 2 or 3 weak A spines; C rounded in young to lunate in adults, upper lobe longer.

Dark brownish, silvery band (2 in juveniles) along body; C with white outer edges. Attains about 2 m and 50 kg. Eggs planktonic; adults migrate to our waters mainly during the summer, occasionally reaches False Bay. Often caught offshore over the continental shelf and frequently seen swimming with remoras of similar appearance; a fine sporting fish, fights gamely and jumps repeatedly. Eats mainly crustaceans. Often has parasitic worms in the stomach but despite this the flesh is good eating. Warm waters of the Mediterranean, Atlantic and Indo-Pacific (not in eastern Pacific).



212.1 *Rachycentron canadum:* 120 cm (Transkei).

Family No. 213: ECHENEIDAE

by P.C. Heemstra

Remoras — **Remoras**

Head flattened on top and bearing a laminated adhesive disc by which the remoras attach themselves to sharks, batoids, bony fishes, turtles, cetaceans, ships, etc. The peculiar sucking disc is thought to represent a greatly modified spinous dorsal fin. Some remora species appear to prefer a certain kind of host, but others will attach to a variety of animals. Although some remoras feed on the ectoparasites of their hosts, they will also take any small available prey. Four genera with a total of 8 species; 6 species in our area.

KEY TO GENERA

1a Body long and slender, depth 10-14 in SL; D and A bases long, 2-3 times head length 2
1b Body more robust, depth 5-8 in SL; D and A bases less than twice head length 3

2a Disc laminae 21-28 ..... *Echeneis*
2b Disc laminae 9-11 ..... *Phtheirichthys*

3a Disc laminae 12-14; D rays 17-22 ..... *Remorina*
3b Disc laminae 14-27; D rays 22-34 ..... *Remora*

Genus ***Echeneis*** Linnaeus, 1758

Monotypic.

213.1 *Echeneis naucrates*
Linnaeus, 1758
PLATE 82

Shark remora — Haai-remora

Echeneis neucrates Linnaeus, 1758: 261 ("Pelago Indico"; species name misspelled). *Echeneis naucrates:* Smith, **SFSA No. 949*;** Day et al., 1970: 97; Cressey & Lachner, 1970: 317.

D 34-42; A 32-38; P 21-24; lower GR 11-16 (excluding rudiments); vertebrae 14+16.

Colour brown to black, with bands as shown. Attains 90 cm. The most abundant of the remoras, in all warm waters (but not eastern Pacific); found on a variety of hosts, usually large sharks; often seen swimming free.

Genus ***Phtheirichthys*** Gill, 1863

Monotypic.

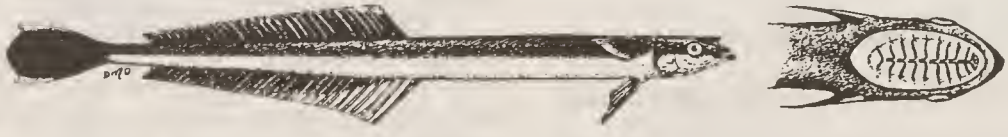
213.2 *Phtheirichthys lineatus*
(Menzies, 1791)

Slender remora — Slank remora

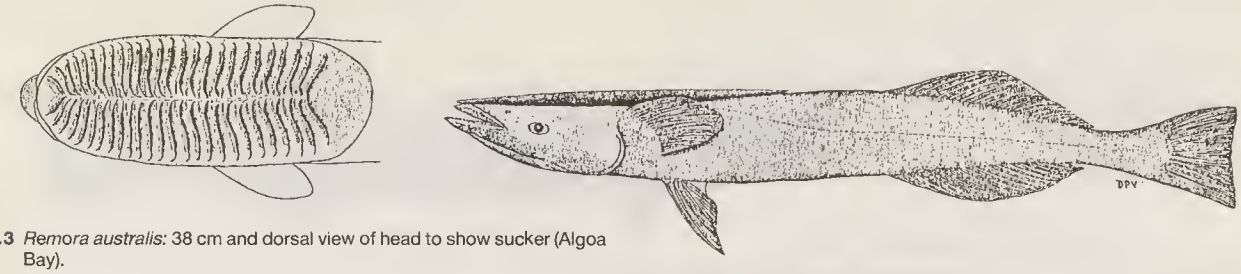
Echeneis lineata Menzies, 1791: 187, Pl. 17, Fig. 1 (tropical Pacific Ocean). *Phtheirichthys lineatus:* Smith, **SFSA No. 945*;** Strasburg, 1967; Cressey & Lachner, 1970: 316.

D 32-38; A 31-38; P 17-21; GR (1-3)+(14-17); total vertebrae 40.

Colour bluish black above, white below; 3 stripes along the sides: upper pale blue, middle black, and lower stripe silvery. Attains 45 cm. Rare; worldwide in tropical/subtropical waters. Found on a variety of hosts, most often barracuda (*Sphyraena*); sometimes enters the gill chambers.



213.2 *Phtheirichthys lineatus:* 56 cm and dorsal view of head to show sucker (S. Mozambique).



213.3 *Remora australis:* 38 cm and dorsal view of head to show sucker (Algoa Bay).

Genus ***Remora*** Gill, 1863

five species, three in our area.

KEY TO SPECIES

1a Disc laminae 14-20 2
1b Disc laminae 24-27; D 23-26 ..... *R. australis*

2a D 22-26; A 22-24 ..... *R. remora*
2b D 27-34; A 25-30 ..... *R. brachyptera*

213.3 *Remora australis*
(Bennett, 1840)

Whale remora — Walvis-remora

Echeneis australis Bennett, 1840: 273 (type-locality not given). *Remilegia australis:* Smith, 1953: 521, **No. 949a***; 1958: 319*; Cressey & Lachner, 1970: 311.

D 22-26; A 21-26; P 21-24; GR (1-3)+(13-19); vertebrae 12+15. Disc length about ½ SL.

Colour dark blue to slate grey; fins with narrow white edge. Attains 40 cm. Worldwide, pelagic; found only on cetaceans.

213.4 *Remora brachyptera*
(Lowe, 1839)

Spearfish remora — Speervis-remora

Echeneis brachyptera Lowe, 1839: 89 (Madeira). *Remora brachyptera:* Smith, **SFSA No. 948;** Cressey & Lachner, 1970: 315; Lachner, 1973: 639.

D 27-34; A 25-34; P 23-27; lower GR 12-14 (including rudiments); total vertebrae 12+15.

Colour brownish. Attains 30 cm. Worldwide; prefers billfishes, attaching to body of host or in gill cavity.

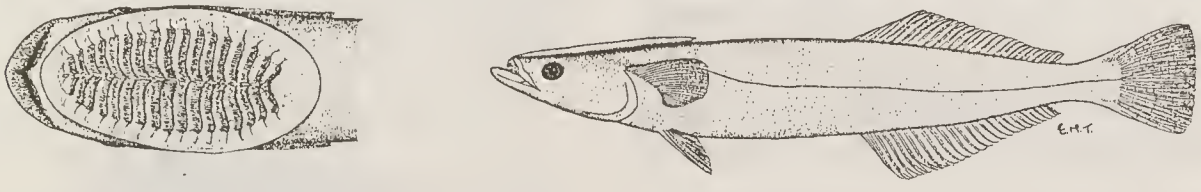
213.5 *Remora remora*
(Linnaeus, 1758)
PLATE 82

Remora — Remora

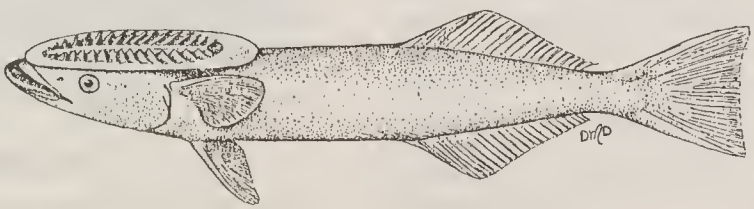
Echeneis remora Linnaeus, 1758: 260 ("Pelago Indico"). *Remora remora:* Smith, **SFSA No. 947***; Smith & Smith, 1966: 135*; Cressey & Lachner, 1970: 312; Lachner, 1973: 638.

D 22-26; A 22-24; P 26-30; GR (5-6)+(26-28) including 1 or 2 rudiments.

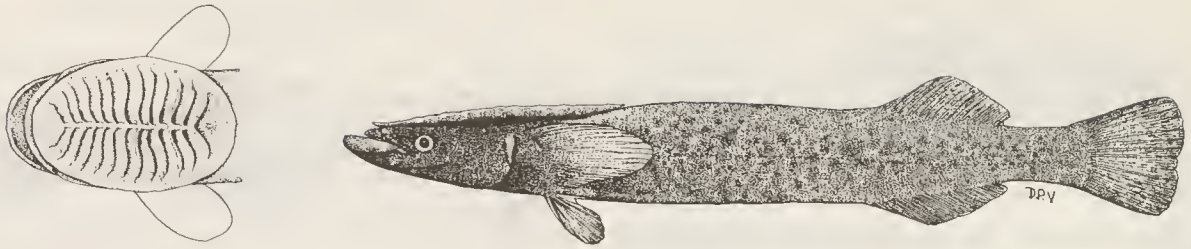
Colour dark brownish grey. Attains 62 cm. Worldwide; common; prefers sharks, often found in the gill chambers. The Latin word *remora* means "delay" or "hindrance" and was applied to these fishes because they were thought to delay a ship's progress when they attached to the hull.



213.4 *Remora brachyptera:* 12 cm and dorsal view of head to show sucker (Algoa Bay).



213.5 *Remora remora:* 23 cm (Algoa Bay).



213.6 *Remorina albescens:* 14 cm and dorsal view of head to show sucker (Algoa Bay).

Genus ***Remorina*** Jordan & Evermann, 1896

Monotypic.

213.6 *Remorina albescens*
(Temminck & Schlegel, 1845)

White remora — Wit remora

Echeneis albescens Temminck & Schlegel, 1845: 272, Pl. 120, Fig. 3 (Nagasaki, Japan). *Echeneis clypeata* Günther, 1860: 401 (Cape Seas). *Remora albescens,* Smith, **SFSA No. 946.** *Remorina albescens:* Cressey & Lachner, 1970: 315; Lachner, 1973: 640.

D 17-22; A 21-26; P 18-21; lower GR about 10, including rudiments.

Colour: pale grey to white. Attains 30 cm. Worldwide, rarely near shore; prefers manta rays (Mobulidae), attaching near mouth, in mouth cavity and gill chambers.

Family No. 214: CIRRHITIDAE

by J.E. Randall

Hawkfishes — **Valkvisse**

A continuous, notched dorsal fin with 10 spines and 11-17 rays; anal fin with 3 spines and 5-7 rays; pectoral fins with 14 rays, the lower 5-7 unbranched and usually enlarged with membranes deeply incised. One or more cirri projecting from interspinous membranes near tips of dorsal spines; a fringe of cirri on hind edge of front nostrils. No gasbladder. Scales cycloid, 3-5 rows above lateral line. Two indistinct flattened spines on opercle. An outer row of canine teeth in jaws (those anteriorly in upper jaw and 2-4 on side of lower jaw longest), and a band of villiform teeth medial to canines (villiform teeth restricted to front of lower jaw). Vertebrae 26.

Small to medium-sized fishes, usually occurring in shallow water (a few species are commonly found at depths greater than 30 or 40 m). Hawkfishes reside on the bottom, often using their thickened lower pectoral rays to wedge themselves in place, particularly in wave-washed areas; some species seek refuge among branches of live coral. Carnivorous, feeding mainly on benthic crustaceans and small fishes. *Cyprinocirrhites* is exceptional in rising off the bottom to feed on zooplankton. Nine genera and 35 species; tropical and subtropical in all oceans (3 species in Atlantic, 3 in eastern Pacific, the rest Indo-Pacific). Randall (1963) reviewed the family. Randall & Heemstra (1978) showed that *Serranocirrhitus latus* Watanabe, described as a cirrhitid, is an anthiine fish, Family Serranidae; they also transferred *Isobuna japonica* (Steindachner) from the Cirrhitidae to the genus *Plectranthias* of the Anthiinae.

KEY TO GENERA

1a Snout elongate, its length about 2 in head; body slender, the depth 4.4-4.6 in SL; canine teeth in jaws only slightly longer than inner villiform teeth ..... *Oxycirrhites*
(One species, *O. typus* Bleeker, known from Red Sea to Baja California, usually at depths greater than 30 m; not recorded from southern Africa but might be expected south of 20°S)

1b Snout not elongate, its length about 3-5 in head; body not slender, the depth 2.0-3.4 in SL; canine teeth in jaws notably longer than inner villiform teeth 2

2a C lunate; D X,16-17 ..... *Cyprinocirrhites*
2b C rounded, truncate, or slightly emarginate; D X,11-15 3

3a Rows of large scales above LL to base of D spines 5; a single cirrus from membrane near tip of each D spine ..... *Paracirrhites*
3b Rows of large scales above LL to base of D spines 3-4; a tuft of cirri from membrane near tip of each D spine 4

4a Cheek scales small, in more than 12 irregular rows; spinous D membranes not deeply incised; lower 7 P rays unbranched ..... *Cirrhitus*
4b Four or 5 rows of large scales on cheek (small scales usually present as well); spinous D membranes moderately to deeply incised; lower 5-7 P rays unbranched 5

5a D X,14-15; upper 2 P rays unbranched ..... *Cirrhitops*
(*C. fasciatus* (Bennett) known from Mauritius, Réunion, Madagascar, Japan and Hawaiian Ids.)

5b D X,11-13; only uppermost P ray unbranched 6

6a Preopercle finely serrate; interorbital space scaly; 1st D soft-ray not produced into a filament; lower 5 (rarely 6) P rays unbranched ..... *Amblycirrhitus*
6b Preopercle coarsely serrate; interorbital space not scaly; 1st D soft-ray usually produced into a filament; lower 6 or 7 P rays unbranched ..... *Cirrhitichthys*

Genus ***Amblycirrhitus*** Gill, 1862

Six species, 1 in our area.

214.1 *Amblycirrhitus bimacula*
(Jenkins, 1903)
PLATE 83

Twospot hawkfish — Tweekol-valkvis

Cirrhitoidea bimacula Jenkins, 1903: 459, Fig. 36 (Honolulu); Smith, 1955: 309*; 1961: 567, **No. 393a.** *Amblycirrhitus bimacula:* Randall, 1963: 427*; Smith, 1965: 30.

D X,12; A III,6; P 14 (uppermost and lower 5 rays unbranched); LL 40-42; 3 scale rows above LL; 4 or 5 rows of large scales on cheek; GR (3-5)+(11-12); body depth 2.8-3.0 in SL; interorbital space scaled; palatine teeth present; preopercle finely serrate; a tuft of cirri from membrane near tip of each D spine.

About 10 slightly irregular dark bars on body (sometimes broken into spots) and 2 narrow diagonal bars on cheek; a large ocellated black spot on opercle and another at base of soft D. Attains 8 cm. Indo-Pacific on coral reefs or rocky bottom; extends south to Durban.

Genus ***Cirrhitichthys*** Bleeker, 1856

Nine species, 1 in our area. *Cirrhitichthys guichenoti* (Sauvage, 1880), known from Réunion and Mauritius, has a similar colour pattern to *C. oxycephalus,* but differs in having D X,13; A III,7; LL 52-53, and a longer snout (2.7-2.8 in head compared to 3.5-3.7 for *C. oxycephalus*); this species was redescribed by Randall (1980).

214.2 *Cirrhitichthys oxycephalus*
(Bleeker, 1855)
PLATE 83

Spotted hawkfish — Gespikkelde valkvis

Cirrhites oxycephalus Bleeker, 1855: 408 (Ambon). *Cirrhitichthys aprinus* (*non* Cuvier): Smith, **SFSA No. 393*.** *Cirrhitichthys oxycephalus:* Randall, 1963: 437*.

D X,12(rarely 13); A III,6; P 14 (uppermost and lower 6 rays unbranched); LL 41-45; 3 scale rows above LL; 4 rows of scales on cheek; GR (3-5)+(10-11); interorbital space not scaled; body depth 2.8-3.0 in SL; palatine teeth present; preopercle coarsely serrate; a tuft of cirri near tip of each D spine; membranes of spinous D moderately incised; 1st D soft-ray elongate (in fish > 35 mm SL); maxilla reaching or extending past vertical at front edge of eye; 5th D spine longest, 1.7-2.2 in body depth.

214.2 *Cirrhitichthys oxycephalus:* 7 cm (N. Mozambique).

Pale with 4 lengthwise rows of subquadrate dark brown spots; a row of smaller spots on LL between the larger spots; small dark brown spots on head, those on lower part arranged in 2 bands ventrally from eye. Attains 95 mm. Indo-Pacific and tropical eastern Pacific on coral reefs or rocky bottom; extends south to East London.

Genus ***Cirrhitus*** Lacepède, 1803

Six species, 2 in our area.

KEY TO SPECIES

1a Supraorbital ridge low; P not reaching vertical at tips of V; longest unbranched P rays only slightly longer than longest branched rays ..... *C. pinnulatus*
1b Supraorbital ridge high; P reaching slightly past vertical at tips of V; longest unbranched P rays nearly ⅓ longer than longest branched rays ..... *C. punctatus*

214.3 *Cirrhitus pinnulatus*
(Schneider, 1801)
PLATE 83

Marbled hawkfish — Marmer-valkvis

Labrus pinnulatus Schneider, *in* Bloch & Schneider, 1801: 264 (Tahiti). *Cirrhitus pinnulatus:* Smith, **SFSA No. 394*;** Randall, 1963: 396*.

D X,11; A III,6; P 14 (uppermost and lower 7 rays unbranched); LL 39-42; 4 scale rows above LL; about 12 rows of scales on cheek; GR (5-7)+(12-14); interorbital space naked; body depth about 3.0 in SL; palatine teeth present; preopercle finely serrate; a tuft of cirri from membrane near tip of each D spine; C slightly rounded.

Body light brown, shading to whitish ventrally, with 3 rows of white spots about the size of eye and numerous smaller dark brown (brownish red in life) spots (sometimes obscuring white spots). Largest reported, 28 cm. Indo-Pacific; in our area south to Port Alfred. An inshore species of hard substratum exposed to wave action. Schultz (1950) noted slight differences in number of LL scales (42-44), GR and in colour of *C. pinnulatus* in the Red Sea and named this variant *C. spilotoceps.* Randall (1963) preferred to use this name as a subspecies.

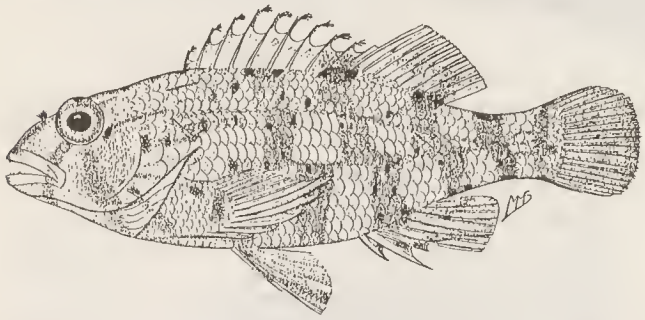
214.4 *Cirrhitus punctatus*
Cuvier, 1829

Blackspotted hawkfish — Swartgekolde valkvis

Cirrhitus punctatus Cuvier, *in* Cuv. & Val., 1829: 70 (Madagascar); Randall, 1963: 398*. *Cirrhitus nigropunctatus* Schultz, 1950: 547, Pl. 13, Fig. B (Mauritius); Smith, 1953: 517, **No. 394a.** *Cirrhitus mossambicus* Smith, 1951: 629, Fig. 1 (Mozambique Id.); 1961: 567, **No. 394b.**

D X,11; A III,6; P 14 (uppermost and lower 7 rays unbranched); LL 40-43; 4 scale rows above LL; small scales on cheek; GR (6-7)+(11-12); interorbital space naked; body depth 3.1-3.4 in SL; palatine teeth present; preopercle finely serrate; bony supraorbital ridge high and extending more than ½ an eye diameter behind eye; a tuft of cirri from membrane near tip of each D spine.

Body mottled with large irregular brown and pale brown blotches; upper ⅔ of head and body with numerous blackish dots; a curved blackish line posteriorly from eye. Reaches 17 cm. Madagascar, Mauritius, Mozambique, and South Africa to the Bizana coast. A rocky shore species.



214.4 *Cirrhitus punctatus:* 5 cm holotype of *C. mossambicus* (Mozambique Id.)

Genus ***Cyprinocirrhites*** Tanaka, 1917

One species.

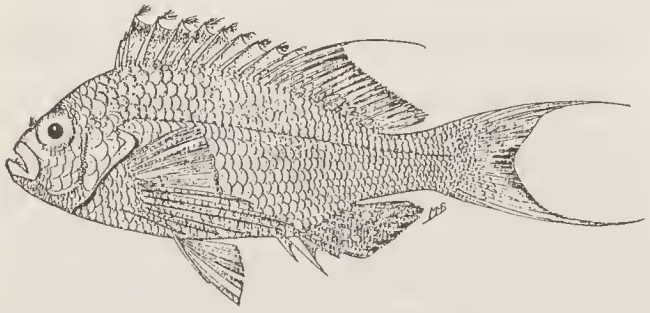
214.5 *Cyprinocirrhites polyactis*
(Bleeker, 1875)
PLATE 83

Swallowtail hawkfish — Swaelstert-valkvis

Cirrhitichthys polyactis Bleeker, 1875: 16 (Ambon). *Cyprinocirrhites polyactis:* Smith, 1961: 517, **No. 396a*;** Randall, 1963: 443*; Smith, 1965: 28*; Winterbottom, 1978: 47.

D X,16-17; A III,6-7; P 14 (uppermost and lower 6 rays unbranched); LL 45-49; 3 scale rows above LL; 4 rows of scales on cheek; GR (3-4)+(10-13); interorbital space and dorsal part of snout scaled; body depth 2.7-2.8 in SL; snout 2.7-2.8 in head; palatine teeth present; preopercle coarsely serrate; a tuft of cirri from membrane near tip of each D spine; 3rd D spine longest, 2.3-2.5 in body depth; 1st D soft-ray produced into a filament; C lunate.

Body mottled light yellowish to orange-brown; outer ⅓ of spinous D dusky; juveniles brilliant orange-gold. Attains about 14 cm. East Africa to western Pacific; south to Algoa Bay. Feeds on zooplankton. Generally found in 30 - 120 m.



214.5 *Cyprinocirrhites polyactis:* 14 cm (Madagascar).

Genus ***Paracirrhites*** Bleeker, 1875

Seven species; 2 in our area.

KEY TO SPECIES

1a Second P ray unbranched; no scales on snout before nostrils; a U-shaped mark extending posteriorly and diagonally upward from eye ..... *P. arcatus*

1b Second P ray branched; snout almost entirely scaly; no U-shaped postocular mark ..... *P. forsteri*

214.6 *Paracirrhites arcatus*
(Cuvier, 1829)
PLATES 83 & 84

Horseshoe hawkfish — Hoefyster-valkvis

Cirrhites arcatus Cuvier, *in* Cuv. & Val., 1829: 74 (Mauritius). *Paracirrhites arcatus* Smith, **SFSA No. 396*;** Randall, 1963: 411*; Winterbottom, 1978: 47.

D X,11; A III,6; P 14 (upper 2 and lower 6 or 7 rays unbranched); LL 45-50; 5 scale rows above LL; 5 or 6 rows of scales on cheek; GR (4-5)+(12-13); interorbital space and snout to nostrils scaly; body depth about 2.6 in SL; palatine teeth absent; preopercular margin smooth; a single cirrus from membrane near tip of each D spine.

Body light greyish brown with a pink or white stripe on upper side from below 7th D spine to C; a large U-shaped area behind eye, enclosed by a tricoloured border of orange, dark brown, and light blue. A 2nd colour form is dark brown without the pale body stripe. Attains 14 cm. Indo-Pacific south to the Transkei. A coral-reef species.

214.7 *Paracirrhites forsteri*
(Schneider, 1801)
PLATE 83

Freckled hawkfish — Gesproete valkvis

Grammistes forsteri Schneider, *in* Bloch & Schneider, 1801: 191 (Tahuata, Marquesas Ids.). *Paracirrhites forsteri:* Smith, **SFSA No. 395*;** Randall, 1963: 406*.

D X,11; A III,6; P 14 (uppermost and lower 7 rays unbranched); LL 45-49; 5 scale rows above LL; 5 or 6 scale rows on cheek; GR (5-6)+(11-13); interorbital space and almost all of snout scaly; body depth 2.6-2.8 in SL; palatine teeth absent; upper ⅖ of preopercular margin finely serrate; a single cirrus from membrane near tip of each D spine.

Body yellowish with a broad blackish stripe on upper side (faint on some individuals, broken into large spots on others; often restricted to rear ½ of body); head and front of body with numerous small dark reddish spots. Occasional individuals dark brown with orange-red spots anteriorly. Attains about 22 cm. Indo-Pacific, south to Inhaca, Mozambique. Often seen resting on live coral. Feeds heavily on small fishes, occasionally on crustaceans.

Family No. 215: CHEILODACTYLIDAE

by M.M. Smith

Fingerfins **Vingervinne**

Body oblong with small to moderate scales. Mouth small, terminal or subterminal; lips thick in adult; teeth feeble, villiform, in bands anteriorly, none on vomer or palatines. Maxilla exposed; no supramaxilla, preopercle smooth, no spines on opercle. Gills 4, a slit behind 4th; pseudobranchiae present. Vertebrae 14+21 except *C. pixi* with 13+21. Dorsal fin single with 16-20 spines and 19-31 soft-rays; scaly sheath along bases of anal and dorsal fins. Adults with lower 4-7 pectoral rays simple, thickened and elongated with up to 50% of distal part free, used for balancing the resting fish or feeling for food. Pectoral formula given as follows: number of upper simple rays + number of branched rays + number of lower elongate simple rays.

Small juveniles often shelter under floating objects and are difficult to recognise as lower pectoral rays are not yet elongated. All species eat small invertebrates: worms, crabs, shellfish; the larger fishes sometimes take squid or fish bait. Flesh excellent. Five endemic species in 2 genera in our area. Taxonomic review of South African species by M. M. Smith (1980).

KEY TO GENERA

1a Scales small, about 80 in LL; no naked groove below D sheath; 4-5 enlarged lower P rays ..... *Cheilodactylus*
1b Scales moderate, 46-55 in LL; a naked groove below D sheath; 6-7 enlarged lower P rays ..... *Chirodactylus*

Genus ***Cheilodactylus*** Lacepède, 1803

Dorsal sheath of 6, and anal sheath of 3-4 scale rows. South African species with crossbars.

KEY TO SPECIES

1a C with oblique dark bars; scale edge smooth; D rays 23-25 ..... *C. fasciatus*
1b C uniform; scale edge with skinny flap; D rays 19-23 ..... *C. pixi*

215.1 *Cheilodactylus fasciatus*

Lacepède, 1803
PLATE 85

Redfingers Rooivingers

Cheilodactylus fasciatus Lacepède, 1803: 6, Pl. 1 (no locality); Smith, **SFSA No. 397*;** Smith & Smith, 1966: 86*; Penrith, 1976: 152; Smith, 1980: 5*. *Chilodactylus multiradiatus* Castelnau, 1861: 12 (Cape Province).

D XVII-XIX,23-25; A III,9-11; P (1-2)+(7-9)+(5-4) total 14; LL about 80; GR (5-6)+(13-15). Depth 3.2-3.7, head 2.7-3.5. Eye 0.7-1.0 in interorbital, 3.4-4.5 in head. Longest P ray reaches A origin, about equals head length in adult.

Dark brown bars always staggered anteriorly, C with 10-12 oblique sepia streaks. Attains 30 cm. Subtidally to 25 m from Kunene River, Namibia to Natal; common in rocky tidepools on south coast.

215.2 *Cheilodactylus pixi*

Smith, 1980
PLATE 84

Barred fingerfin Balk-vingervin

Cheilodactylus pixi Smith, 1980: 2, Pl. 1, Figs. A & B (off Kowie River).

D XVIII-XX,19-23; A III,9-11; P 1+(7-8)+(5-4) total 13; LL (78-85)+(3-5); GR (4-6)+(13-16). Depth 2.6-3.3; head 3.0-3.5. Eye 0.7-1.1 in interorbital, 3.4-4.5 in head. Longest P ray equal to or slightly longer than head, does not reach A origin. Scales with skinny flaps on smooth margin, giving fish a rough sandpaper appearance.

Body bars always continuous from top to bottom; C uniform. Attains 18 cm. Common in 5 - 30 m among rocks, from Knysna to Coffee Bay; taken in 97 m off Transkei.

Genus ***Chirodactylus*** Gill, 1862

The genus *Palunolepis* Barnard, 1927 is considered a synonym. D sheath scales in 1-3 rows; A sheath of 1 row of scales. Gasbladder present in South African species.

KEY TO SPECIES (Trichotomous)

1a Head and front of body dark dorsally, divided from light ventral colour by silver streak; D rays 28-31; naked groove at D base starts below 2nd or 3rd D spine ..... *C. brachydactylus*
1b Colour uniform brown; D rays 22-24; naked groove at D base starts below 2nd or 3rd D spine ..... *C. grandis*
1c Colour uniform scarlet with conspicuous shining black (or dark red) area on body at P axil; D rays 26-27; naked groove starts below 10th to 13th D spine ..... *C. jessicalenorum*

215.3 *Chirodactylus brachydactylus*

(Cuvier, 1830)
PLATE 85

Twotone fingerfin Steenklipvis

Cheilodactylus brachydactylus Cuvier, *in* Cuv: & Val., 1830: 361 (Cape of Good Hope). *Chilodactylus brevispinis* Regan, 1921: 416 (Natal). *Palunolepis brachydactylus:* Smith, **SFSA No. 398*;** Smith & Smith, 1966: 87*. *Chirodactylus brachydactylus:* Smith, 1980: 8*; van der Elst, 1981: 153*.

D XVII-XVIII,28-31; A III,8-10; P 2+6+6; LL (46-50)+(3-5); GR 6+(14-15). Depth 2.6-3.0, head 2.9-3.3. Eye 0.8-1.2 in interorbital, 4.0-4.8 in head. Longest P ray about head length, not reaching past anus.

Easily distinguished by the bicoloration, but very similar to *C. jessicalenorum* in counts and measurements. Both species are common on Aliwal Shoal south of Durban. Attains 40 cm. Walvis Bay to Delagoa Bay; plentiful in

pools on south Cape coast and has been caught in 240 m off Natal. One of the commonest fishes along our rocky shores, but hardly ever takes a bait.

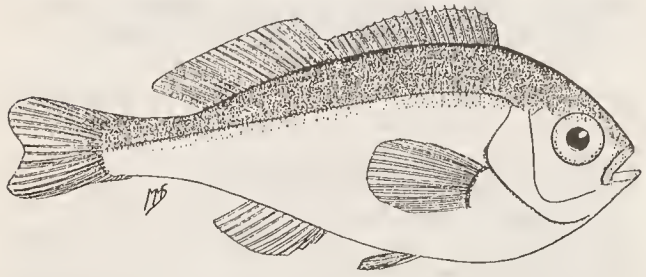
215.4 *Chirodactylus grandis*
(Günther, 1860)
PLATE 85

Bank steenbras — Banksteenbras

Chilodactylus grandis Günther, 1860: 79 ("Cape seas"). *Palunolepis grandis:* Smith, **SFSA No. 399*;** Smith & Smith, 1966: 77*. *Chirodactylus grandis:* Smith, 1980: 6*; van der Elst, 1981: 154 (in part; figure is *C. jessicalenorum*).

D XVII-XVIII,22-24; A III,8; P 2+6+6; LL (47-50)+(3-5); GR (6-7)+14. Depth 2.7-2.9, head 2.9-3.2. Eye 1.0-1.8 in interorbital, 4.5-6.6 in head. Longest P ray not reaching past anus.

The largest species of this family, attains at least 1 m; flesh greatly esteemed. Caught by trawlers and occasionally by line boats using fish bait, from Walvis Bay to possibly Natal, from 20 m in False Bay to 150 m off the Cape south coast. Natal records are likely to be *C. jessicalenorum.*



215.4 *Chirodactylus grandis:* 5 cm (Algoa Bay).

215.5 *Chirodactylus jessicalenorum*
Smith, 1980
PLATE 85

Natal fingervin — Natalse vingerfin

Chirodactylus jessicalenorum Smith, 1980: 7, Pl. 2, Figs. B & B' (off Durban). *Chirodactylus grandis:* van der Elst, 1981: 154* (in part: figure only).

D XVII-XVIII,26-27; A III,7-8; P 2+6+6; LL 46-54; GR (6-7)+(14-16). Depth 2.6-2.8, head 2.5-3.5. Eye 0.9-1.3 in interorbital, 4.0-5.8 in head. Longest P ray reaches beyond A origin, nearly twice length of upper P rays.

Easily recognised by its scarlet colour and shining red-black blotch at P base. Has been confused with the uniformly coloured but duller *C. grandis* from which it can immediately be distinguished by the longer soft D. Attains at least 50 cm. Known from Coffee Bay (Transkei) to Sodwana Bay from 3 - 20 m; mainly speared.

Family No. 216: PEMPHERIDAE

by P.C. Heemstra

Sweepers — **Veërs**

Body oblong or elongate-oval, compressed. Scales moderate, cycloid or ctenoid, deciduous or not; lateral line single, complete, extending well out on caudal fin; snout naked; rest of head, including maxillae and lower jaw, scaly. Mouth large, terminal, oblique, the lower jaw projecting; upper jaw slightly protrusile; preorbital narrow, not covering maxilla when mouth is closed; no supramaxilla. Eye large, 1.9-2.7 in head length, its diameter much greater than snout length; two nostrils. Jaws with a single row or narrow band of small conical teeth; vomer and palatines toothed; entopterygoids, pterygoids and tongue edentate. Gills 4, a slit behind the last; branchiostegals 7, membranes separate, free from isthmus. Dorsal fin single, much shorter than anal, its origin well in advance of anal fin origin; with 8-10 soft-rays and 5 or 6 graduated spines closely applied to front edge of fin; anal fin long, with 3 small spines and 20-45 soft-rays; pectoral fins pointed, shorter than head, with 16-18 rays; ventral fins I,5, shorter than pectorals, inserted below base of pectorals, with a short axillary process; caudal fin truncate to shallowly forked, with 15 branched rays. Vertebrae 10+15; predorsal bones 3.

Pempherids are small to moderate-sized fishes (less than 20 cm) of shallow (less than 100 m) water. Most species occur in tropical/subtropical regions. Common on coral reefs, but not often seen during the day because of their cryptic nocturnal habits. Pempherids sometimes form huge schools attracted to divers. The family is in dire need of revision, hence the number of valid species (circa 20) is approximate at best. Four species occur in our area. In some species the lateral line scales are mostly hidden by the overlying scales, and to obtain accurate counts, it is necessary to remove these overlying scales. Body depth is measured at the dorsal fin origin.

KEY TO GENERA

1a A naked, with 20-23 soft-rays; body elongate (depth less than or subequal to head length) ..... *Parapriacanthus*
1b A scaly, with 35-44 soft-rays; body deep (depth greater than head length) ..... *Pempheris*

Genus *Parapriacanthus* Steindachner, 1870

Scales ctenoid; LL scales exposed, extending halfway along middle C rays; top and sides of snout naked. Of the 5 or 6 valid species in this genus, at least 3 species have luminescent organs inside the abdominal cavity: one in front of the pelvic fins (medial to the pelvic girdle) and the other along the ventral midline just in front of the anus. One species in our area.

216.1 *Parapriacanthus ransonneti*
Steindachner, 1870
PLATE 85

Slender sweeper — Slank veër

Parapriacanthus ransonneti Steindachner, 1870: 63, Pl. 1, Figs. 1 & 2 (Nagasaki); Tominaga, 1963: 271*. *Pempherichthys Güntheri* Klunzinger, 1871: 470 (Red Sea). *Parapempheris argenteus* von Bonde, 1923: 11, Pl. 2, Fig. 2 (off Natal). *Parapriacanthus guentheri*: Smith, **SFSA No. 640***; Winterbottom, 1976: 62.

D V,9; A III,20-23 (1st spine sometimes extremely minute and hidden by scales); P 16-17; LL 67-75+8-10 scales on C; GR (6-7)+(18-19). Body depth 2.9-3.1, head 2.8-2.9 in SL.

Body pale pink; belly and sides of head silvery; dorsal scales of head and body with a dark mark formed by a group of small chromatophores. Attains 75 mm. Contrary to the observations of Winterbottom (1976), our specimens have both luminescent organs exactly as described by Haneda and Johnson (1962) for *Parapriacanthus beryciformes*, which Tominaga (1963) showed to be a synonym of *P. ransonneti*. Red Sea and Indian Ocean south to the Transkei; also known from Mauritius and Japan.

Genus ***Pempheris*** Cuvier, 1829

Scales cycloid or ctenoid; LL extends to tips of middle C rays. About 15 (?) species. Our 3 species have LL scales mostly covered by overlying scales, 9 pyloric caeca and the swimbladder with a distinct constriction.

KEY TO SPECIES

1a LL 47-53; A III,35-40; A base blackish ..... *P. schwenkii*
1b LL 53-61; A III, 37-44; A base not darker than rest of fin or ventral part of body 2

2a A pale, with distinct black (or dark brown) margin; body depth 2.2-2.4 in SL; horizontal eye diameter 2.4-2.6 in head length ..... *P. mangula*
2b A dusky, the tips of the rays pale; body depth 2.0-2.2 in SL; eye diameter 2.1-2.4 in head length ..... *P. adusta*

216.2 *Pempheris adusta*
Bleeker, 1877
PLATE 85

Dusky sweeper — Donker veër

Pempheris adustus Bleeker, 1877: 50 (Ambon). *Pempheris oualensis* (*non* Cuvier): Smith, **SFSA No. 642** (in part, figure is of *P. mangula*); Winterbottom, 1976: 63. *Pempheris onalensis* (*sic*): van der Elst, 1981: 233*.

D VI,9; A III,37-43; P 17-18; LL 53-58; GR (8-10)+(20-23).

Body and head coppery brown with silvery and brassy reflections; D tip blackish; more or less distinct black blotch at base of P. Attains 17 cm. Indo-West Pacific, south to the Transkei. Common on coral reefs.

216.3 *Pempheris mangula*
Cuvier, 1829
PLATE 84

Black-edged sweeper — Swartrand-veër

Pempheris mangula Cuvier, 1829: 195 (on *Manula Kutti* Russell, 1803: 10, Pl. 114; India); Fowler, 1931: 55. ?*Pempheris molucca* Cuvier, 1829: 195 (on Renard, 1718: 15, 85; Djakarta); Smith, **SFSA No. 643** (in part, "*Pempheris mangula* Bleeker" (*sic*) used in synonymy, but description does not apply to *P. mangula*). *Pempheris oualensis* (*non* Cuvier): Smith, **SFSA No. 642*** (fig. only).

D VI,9; A III,40-44; P 17-18; LL 55-61; GR (8-9)+(21-23).

Colour similar to *P. adusta*, but A and C margins dark. Attains 16 cm. Indo-West Pacific, south to at least Porto Amelia; probably occurs in our area.

216.4 *Pempheris schwenkii*
Bleeker, 1855
PLATE 84

Black-stripe sweeper — Swartstreep-veër

Pempheris schwenkii Bleeker, 1855: 314 (Batu Ids., Indonesia); Smith, **SFSA No. 641**.

D VI,8-9; A III,35-40; P 18; LL 47-53; GR (7-9)+(19-24).

Head and body dusky silver; A pale with dark stripe along the base; C dusky, with upper and lower edges blackish. Attains 15 cm. Indo-West Pacific, south to Natal. Less common than *P. adusta* in our area.

Family No. 217: BATHYCLUPEIDAE

by P.C. Heemstra

Bathyclupeids — **Batiklupeiede**

Body elongate, compressed, covered with deciduous, cycloid scales. Mouth oblique, lower jaw projecting. Dorsal fin short, without spines, located on rear half of body; anal fin base much longer than dorsal base; pelvic fins minute, in advance of pectorals, with 1 weak spine and 5 rays. Narrow band of villiform teeth on jaws, palatine and vomer. Gills 4; branchiostegal rays 7, the membranes separate, free from isthmus.

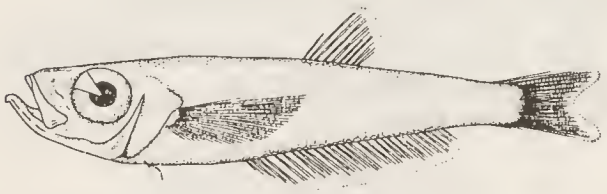
As implied by the name, bathyclupeids resemble a herring or pilchard (Family Clupeidae). The dorsal profile from upper jaw to caudal fin is almost straight, and the position of the dorsal and anal fins also give these fishes a very herring-like appearance. Although the dorsal fin lacks spines, the bathyclupeids are included in the order Perciformes by recent authors. Rare fishes of deep water (400 - 3 000 m) in the Atlantic, Indian and western Pacific oceans. One genus, *Bathyclupea* Alcock, 1891, with 7 nominal species; 1 species in our area.

217.1 *Bathyclupea elongata*
Trunov, 1975

Bathyclupea elongata Trunov, 1975: 998, Fig. (Atlantic Ocean; 30°01'S, 14°56'E; 462 - 475 m).

D 10; A I,27; P 27; GR 1+14. Body depth 4.7, head 3.0 in SL; eye diameter greater than snout length, 12.8% SL; P length less than head.

Attains 178 mm. Known only from the holotype taken off the western Cape Province.



217.1 *Bathyclupea elongata:* 18 cm holotype (after Trunov, 1975).

Family No. 218: CICHLIDAE

by P.C. Heemstra

Cichlids **Cichliede**

Body oblong, somewhat compressed, with moderate cycloid scales. Single dorsal fin with 15-17 spines and 10-13 soft-rays. Anal fin with 3 spines and 7-10 soft-rays. A single nostril on each side of snout. Lower pharyngeal "jaws" fused into a single unit; upper pharyngeal "jaws" movably articulated with cranium. Premaxillae and maxillae not functionally connected. Lateral line interrupted.

Primarily freshwater fishes, but at least one species is occasionally found in estuaries. The cichlids dominate the lakes of Africa; Lake Malawi has over 200 endemic species. The tremendous numbers of endemic species of cichlids in the African great lakes (Malawi, Victoria and Tanganyika) is considered an example of "explosive evolution" or "adaptive radiation". This relatively rapid (on a geological time scale) development of numerous related species and genera which occupy a wide variety of ecological niches has occurred independently in each of these three lakes.

The diagnosis given above is based on *Oreochromis mossambicus;* other cichlids that occur in rivers of southern Africa are unlikely to be found in estuaries.

218.1 *Oreochromis mossambicus*
(Peters, 1852)
PLATE 85

Mozambique tilapia Blou kurper

Chromis (Tilapia) mossambicus Peters, 1852: 681 (Mozambique). *Chromis niloticus* var. *mossambicus:* Peters, 1868: 23, Pl. 4, Fig. 4 (labelled *C. var mossambicus* on Plate).

D XV-XVII,10-13; A III,7-10; P 13-14; GR (3-4)+(14-20); LL (18-21)+(12-15).

Head and body greenish dorsally; flanks silvery with 3 more or less distinct black blotches. Attains about 40 cm, 3.3 kg. At home in fresh or saltwater, but rarely found in the open sea. Bushmans River northwards; widely introduced as a fish-culture species. The female carries the fertilised eggs in her mouth until they hatch. For additional information on *O. mossambicus* and related species, see the excellent work by Trewavas (1983).

Family No. 219: POMACENTRIDAE

by G.R. Allen

Damselfishes **Nooientjies**

Compressed body, ovoid to almost orbicular, covered with ctenoid scales usually extending onto fins. Lateral line interrupted; anterior section of tubular scales more or less parallel with dorsal profile and usually ending below soft dorsal; posterior part consisting of several pits or obscure pores along caudal peduncle. Snout usually short and blunt. Mouth small, slightly protractile; teeth conical or compressed, uniserial or in 2 or more rows, the outer series somewhat enlarged. No teeth on palate. Lower pharyngeals fused into a triangular unit. Gill opening unrestricted; 3½ gills; pseudobranchiae present. One nostril (rarely 2) on each side. A single dorsal fin with 8-17 (14 is maximum in our area) stout spines, spinous portion longer than soft. Anal fin with 2 spines, the first much shorter than the second. Caudal fin forked to emarginate.

Small fishes of no commercial importance except as aquarium pets. Occurring in all tropical seas where they are one of the most abundant groups on coral reefs in terms of number of individuals and species. Approximately 300 species of which 45 belonging to 12 genera are found off southern Africa.

KEY TO GENERA

1a More than 50 scales in a longitudinal series from rear edge of gill opening to base of C; all bones of the opercular series strongly serrate ..... *Amphiprion*
1b Fewer than 50 scales in a longitudinal series from rear edge of gill opening to C 2

2a 40-50 scales in a longitudinal series from rear edge of gill opening to C; most of opercular bones at least slightly serrate ..... *Teixeirichthys*
2b Fewer than 40 scales in a longitudinal series from rear edge of gill opening to C; only preopercle serrate, or all opercular bones relatively smooth 3

3a Upper and lower edge of C base usually with 2-3 projecting (easily detectable with dissecting needle) spiniform, procurrent rays; teeth usually conical in 2 or more rows (except in *Chromis dasygenys* which has flattened teeth in a single row) 4
3b Upper and lower edge of C base without projecting spiniform procurrent rays; teeth conical to flattened in 1 or 2 rows 5

4a Suborbital and rear margin of preopercle finely serrate; body shape orbiculate, the depth 1.4-1.7 in SL ..... *Dascyllus*
4b Suborbital edge smooth or covered with scales; rear margin of preorbital usually smooth or only weakly crenulate; body nore elongate, the depth 1.7-2.4 in SL ..... *Chromis*

5a Body elongate, depth 2.9-3.4 in SL; small slender papillae on rear edge of orbit ..... *Lepidozygus*
5b Body orbiculate to oval, depth usually 1.7-2.6 in SL; no papillae on edge of orbit 6

6a Posterior tips of D, A and C filamentous (at least in adults); C lunate or strongly emarginate ..... *Neopomacentrus*
6b Posterior tips of D, A and C not filamentous; C emarginate 7

7a Rear margin of preopercle serrate 8
7b Rear margin of preopercle smooth 9

8a 1 row of teeth in jaws; A II,12-14 ..... *Stegastes*
8b 2 rows of teeth in jaws; A II,12-17 ..... *Pomacentrus*

9a Scale rows from LL to base of 6th D spine 3-3½ ..... *Abudefduf*
9b Scale rows from LL to base of 6th D spine 1½ - 2½ 10

10a Teeth in 1 row; 12 D spines ..... *Plectroglyphidodon*
10b Teeth in 2 rows; 13 D spines 11

11a Body depth usually less than 2.0 in SL; suborbital scaly ..... *Paraglyphidodon*
11b Body depth usually more than 2.0 in SL; suborbital without scales ..... *Chrysiptera*

Genus ***Abudefduf*** Forsskål, 1775

Abudefduf sculptus (Peters, 1855) from Mozambique is a mystery species (see Smith, **SFSA No. 766;** 1960: 339). Fourteen species; 7 in our area.

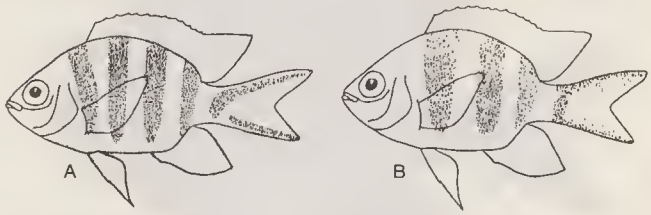
KEY TO SPECIES

1a Large dark spot covering most of side of C peduncle; sides of body without markings ..... *A. sparoides*
1b Dark spot on side of C peduncle absent; sides of body usually with dark and light transverse bands 2

2a C peduncle with prominent black spot on dorsal surface; soft D rays 15-16 (rarely 14) ..... *A. sordidus*
2b C peduncle without black spot on dorsal surface (except dark saddle present on *A. septemfasciatus* less than 5 cm SL); soft D rays usually 12-14 (last ray sometimes branched near base) 3

3a Each C lobe with prominent longitudinal dark band near outer margin 4
3b C lobes without longitudinal dark band 5

4a 5 broad dark crossbars on body, the last bar (at C base) separate from dark longitudinal band on lower C lobe ..... *A. sexfasciatus*



(A) *A. sexfasciatus;* (B) *A. natalensis* colour pattern (after Hensley & Randall, 1983).

4b 4 broad dark crossbars on body, the last joined to dark longitudinal band on each C lobe ..... *A. natalensis*

5a Colour of body brown, with 0-5 narrow light bars on sides ..... *A. notatus*
5b Colour of body generally pale with 5 or 6 dark bars on sides 6

6a 5 dark bars present on sides, usually distinct ..... *A. vaigiensis*
6b 6 dark bars present on sides, sometimes faint ..... *A. septemfasciatus*

219.1 *Abudefduf natalensis*
Hensley & Randall, 1983
PLATE 85

Fourbar damsel — Vierbalk-nooientjie

Abudefduf sexfasciatus (*non* Lacepède): Smith, **SFSA No. 762** (in part); 1960: 332 (not Pl. 29, Fig. C). *Abudefduf natalensis* Hensley & Randall, 1983: 2, Figs. 1, 2, 3A (Sodwana Bay).

D XII-XIII,12-13; A II,12-13; P 18-20; LL 20-22; total GR 22-26. Depth 1.7-2.0; head 2.9-3.5.

Body pale, with 4 broad dark bars, 1st bar below 1st 5 or 6 D spines in adults; last bar at C base joining dark band along both lobes of C; in juveniles, the dark bar at C base is not or only barely connected to dark band along lower C lobe; spinous part of D dark grey to black; front part of A also dark. Attains 17 cm. Transkei to Kosi Bay, northern limit uncertain.

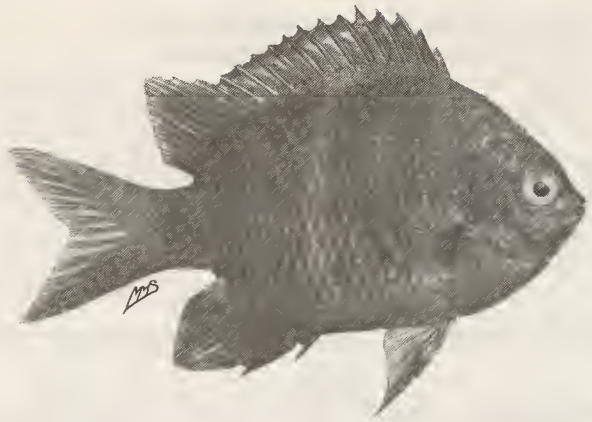
219.2 *Abudefduf notatus*
(Day, 1869)

Dusky damsel — Donker nooientjie

Glyphidodon notatus Day, 1869: 521 (Andamans). *Abudefduf notatus:* Smith, 1960: 332*; Allen, 1975: 114*; Smith, 1980: 180.

D XIII,13-14; A II,13-14; P 18; LL 19-21; total GR 26-27. Depth 1.7-1.9; head 3.6.

Dark brown; blue spots on scales and dark mark at P base; C pale yellow. Attains 17 cm. Inhabits rocky shores in 1 - 12 m usually in areas exposed to wave action; Indo-West Pacific south to Kosi Bay.



219.2 *Abudefduf notatus:* 15.5 cm (Seychelles).

219.3 *Abudefduf septemfasciatus*
(Cuvier, 1830)
PLATE 85

Sevenbar damsel — Sewebalk-nooientjie

Glyphisodon septemfasciatus Cuvier, *in* Cuv. & Val., 1830: 463 (Mauritius). *Abudefduf septemfasciatus:* Smith, 1953: 520, **No. 762*;** 1960: 333*; Allen, 1975: 115.

D XIII,12-13; A II,12-13; P 18-20; LL 20-22; total GR 23-25. Depth 1.8-2.1; head 2.9-3.3.

Attains 23 cm. Inhabits rocky shores exposed to wave action in 0 - 3 m. Tropical Indo-West Pacific south to Durban.

219.4 *Abudefduf sexfasciatus*
(Lacepède, 1801)
PLATE 86

Stripetail damsel — Streepstert-nooientjie

Labrus sexfasciatus Lacepède, 1801: 430, Pl. 19, Fig. 2 (Indo-Pacific). *Abudefduf sexfasciatus:* Smith, **SFSA No. 762** (in part); 1960: 332* (in part). *Abudefduf coelestinus:* Allen, 1975: 114*.

D XIII,12-14; A II,12-14; P 18-19; LL 19-21; total GR 22-27. Depth 1.8-2.0; head 3.0-3.5.

Body with 5 dark bars, 1st just in front of D across rear edge of operculum to P base; last bar at C base. Attains 17 cm. Inhabits reefs in 1 - 12 m, Indo-West Pacific and Red Sea, south to Pinda, Mozambique.

219.5 *Abudefduf sordidus*
(Forsskål, 1775)
PLATE 86

Spot damsel — Kol-nooientjie

Chaetodon sordidus Forsskål, 1775: 62 (Red Sea). *Abudefduf sordidus:* Smith, **SFSA No. 760*;** 1960: 333*; Allen, 1975: 115*.

D XIII,14-16; A II,14-15; P 19; LL 21-23; total GR 26-28.

Attains 23 cm. Inhabits rocky shores exposed to wave action in 0 - 3 m. Indo-Pacific to Hawaiian Ids.; south to Port Alfred.

219.6 *Abudefduf sparoides*
(Cuvier, 1830)
PLATE 86

False-eye damsel — Valsoog-nooientjie

Glyphisodon sparoides Cuvier, *in* Cuv. & Val., 1830: 469 (Réunion). *Abudefduf sparoides:* Smith, **SFSA No. 765*;** 1960: 335*. *Pomacentrus zanzibarensis* von Bonde, 1934: 452, Pl. 23, Fig. 5 (Zanzibar).

D XIII,13; A II,12; P 18; LL 20-21; total GR 26-27. Depth 1.8-2.0; head 3.0-3.2.

Attains 16 cm. Inhabits reefs and rocky shores in 1 - 6 m from Kenya to Transkei coast, also at Réunion, Mauritius and probably Madagascar.

219.7 *Abudefduf vaigiensis*
(Quoy & Gaimard, 1825)
PLATE 86

Sergeant major — Sersant-majoor

Glyphisodon vaigiensis Quoy & Gaimard, 1825: 391 (Iles de Papous). *Abudefduf quinquilineatus* von Bonde, 1934: 452, Pl. 23, Fig. 6 (Zanzibar). *Abudefduf saxatilis* (*non* Linnaeus): Smith, **SFSA No. 761*;** 1960: 332*; Allen, 1975: 115*.

D XIII,12-13; A II,11-13; P 18-19; LL 20-21; total GR 25-28. Depth 1.7-1.9; head 3.5-3.6. Generally white to pale blue, yellowish dorsally with 5 black bars on side.

Attains 20 cm. Inhabits reefs and rocky shores in 1 - 12 m in the tropical Indo-West Pacific, south to Port Alfred.

Genus ***Amphiprion*** Bloch & Schneider, 1801

Colourful reef fishes that live commensally with sea anemones. Allen (1975) has published a monograph on the biology and classification of this group. Twenty-five species; 2 in our area.

KEY TO SPECIES

1a Body uniform pale pink with paler stripe from snout to D base; teeth compressed ..... *A. akallopisos*
1b Two to 3 light bars or saddles across dark body; teeth conical ..... *A. allardi*

219.8 *Amphiprion akallopisos*
Bleeker, 1853
PLATE 86

Nosestripe anemonefish — Neusstreep-anemoonvis

Amphiprion akallopisos Bleeker, 1853: 281 (Sumatra); Smith, 1960: 319*; Allen, 1975: 79*; Smith, 1980: 180. *Phalerebus akallopisos:* Smith, 1961: 568, **No. 745a.**

D VIII-X,17-20; A II,12-14; P 16-18; LL 34-45; total GR 17-20. Depth 2.1-2.5; head 3.1-3.4.

Attains 9 cm. Commensal with large sea anemones (usually *Heteractis magnifica*). *A. akallopisos* is a protandrous hermaphrodite with each anemone harbouring a large dominant female, a slightly smaller functional male and a number of smaller stunted juveniles. If the female is removed, the male changes sex and the largest juvenile develops into a functional male (Fricke & Fricke, 1977). Reefs of the tropical Indian Ocean (except Maldives and Sri Lanka) and the Seribu Ids. (Java Sea); south to Aliwal Shoal (near Durban).

219.9 *Amphiprion allardi*
Klausewitz, 1970
PLATE 86

Twobar anemonefish — Tweebalk-anemoonvis

Amphiprion allardi Klausewitz, 1970: 181, Figs. 1-6 (Mombasa); Allen, 1972: 129*. *Amphiprion bicinctus* (*non* Rüppell): Smith, **SFSA No. 748***. *Amphiprion polymnus* (*non* Linnaeus): Smith, **SFSA No. 747***. *Amphiprion ephippium* (*non* Bloch): Smith, 1960: 319* (in part).

D X-XI,15-17; A II,13-15; P 19-21; LL 35-41; total GR 18-20. Depth 1.8-2.0; head 3.1-3.5.

Attains 14 cm. Commensal with large sea anemones (usually *Heteractis* and *Stichodactyla* spp.). Known only from reefs of east Africa as far south as Durban.

Genus ***Chromis*** Cuvier, 1814

Approximately 75 species; 11 in our area.

KEY TO SPECIES

1a D spines 12 2
1b D spines 13 or 14 (rarely 12) 7

2a Front ½ of body dark brown, rear ½ abruptly white ..... *C. dimidiata*
2b Colour not as in 2a 3

3a Scales of body each with about 1-3 small auxiliary scales at base ..... *C. lepidolepis*
3b Scales of body without auxiliary scales 4

4a D without scaly sheath; colour generally pale (light green to bluish in life) ..... *C. caerulea*
4b D with scaly sheath; colour generally brown, sometimes with blue spots 5

5a Body relatively slender, greatest depth about 2.4-2.6 in SL; colour brownish with blue spots forming lines on each scale row; C pale, with or without narrow black upper and lower margins ..... *C. nigrura*
5b Body relatively ovate, greatest depth about 1.7-2.0 in SL; colour mainly uniform brown to tan; C with or without dark margins 6

6a Base of P dark brown to blackish; C without black longitudinal band along upper and lower edge ..... *C. agilis*
6b Base of P pale; C with prominent black band along upper and lower edge ..... *C. ternatensis*

7a D spines 13 (rarely 12 or 14) 8
7b D spines 14 10

8a Teeth of jaws more or less flattened, in a single row; edge of preopercle not blackish ..... *C. dasygenys*
8b Teeth of jaws conical, in 2 or more rows; edge of preopercle blackish 9

9a Dark blotch behind opercle prominent; P base with large dark blotch; C more or less uniform with pale rear edge ..... *C. opercularis*
9b Dark blotch behind opercle usually faint; P base at most dusky; C lobes each with broad dark stripe ..... *C. weberi*

10a 3 spiniform procurrent rays on dorsal edge of C; D XIV,11-12; GR 23-25; black stripe on distal part of A ..... *C. woodsi*
10b 2 spiniform procurrent rays on dorsal edge of C; D XIV,13-14; GR 26-29; no black stripe on A ..... *C. axillaris*

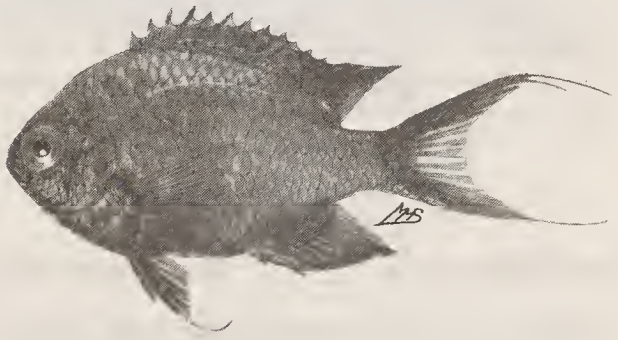
219.10 *Chromis agilis*
Smith, 1960
PLATE 86

Rusty chromis — Roesrooi chromis

Chromis agilis Smith, 1960: 324, Pl. 26, Fig. A and Pl. 32, Fig. J (Astove Id.); Allen, 1975: 75*.

D XII,12-14; A II,12-14; P 16; LL 14-16; total GR 27-30. Depth 1.7-1.9; head 3.4-3.6.

Attains 8 cm. Inhabits reefs to at least 56 m along east African coast south to Bazaruto, but generally rare. Also known from scattered localities in the tropical Indo-Pacific to Hawaii.



219.10 *Chromis agilis:* 7 cm holotype (Darros Id.).

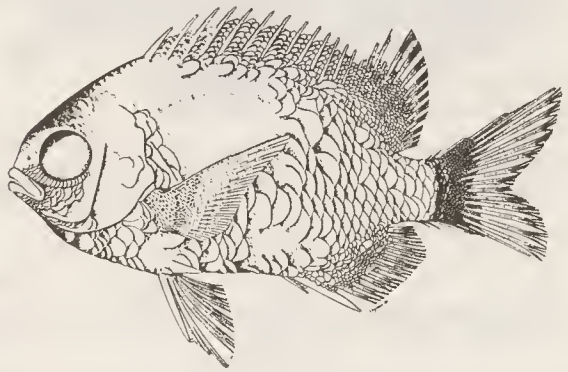
219.11 *Chromis axillaris*
(Bennett, 1831)

Grey chromis — Grys chromis

Heliastes axillaris Bennett, 1831: 128 (Mauritius). *Chromis axillaris:* Smith, 1960: 324; Bruner & Arnam, 1979: 57*.

D XIV,13-14; A II,12-13; P 18-19; LL 15-17; GR (7-8)+(19-22). Depth 1.9-2.0; head 3.2-3.3; 2nd A spine elongate.

Generally pale grey-green grading to whitish on lower ½ of body; fins generally pale; C slightly dusky with broad black bar across base; outer portion of P axil black. Attains 13 cm. Solitary individuals, pairs, or small aggregations typically feed on plankton up to several metres above the bottom in 30 - 50 m. Somalia south to Beira; also known from Mauritius.



219.11 *Chromis axillaris:* 9 cm SL (after Bruner & Arnam, 1970).

219.12 *Chromis caerulea*
(Cuvier, 1830)
PLATE 86

Blue puller — Blou trekker

Heliases caeruleus Cuvier, *in* Cuv. & Val., 1830: 497 (New Guinea; Caroline Ids.). *Chromis caeruleus:* Smith, 1960: 323*; 1961: 568, **No. 746d;** Allen, 1975: 79*.

D XII,9-11; A II,9-11; P 18; LL 15-17; total GR 28-30. Depth 2.0-2.1; head 3.0-3.4.

Attains 8 cm. Large aggregations typically feed on plankton above rich beds of live coral in 2 - 12 m. Tropical Indo-West Pacific, south to Inhaca. Usually occurs with the similar coloured *C. atripectoralis* Welander & Schultz, 1951, which is distinguished by a black P axil but has not yet been recorded from southern Africa.

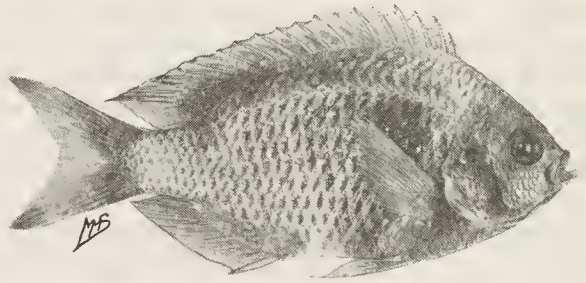
219.13 *Chromis dasygenys*
(Fowler, 1935)
PLATES 84 & 86

Bluespotted chromis — Blouspikkel-chromis

Abudefduf dasygenys Fowler, 1935: 400 (Natal); Smith, **SFSA No. 768*;** 1960: 334*. *Pomacentrus sindensis* (*non* Day): Regan, 1916: 169; Smith, **SFSA No. 755*.**

D XIII,12-13; A II,12-13; P 19-20; LL 17-19; total GR 26-28. Depth 2.1-2.3; head 3.3-3.8.

Generally blue-grey with yellowish suffusion on upper part of head and body. Scales with blue streaks and spots. A small white spot on upper edge of tail base (fades rapidly after death). Attains 12 cm. Inhabits reefs, weed beds and rocky shores in 2 - 12 m; common around breakwater at mouth of Durban Harbour. Known only from Delagoa Bay to Durban but probably extends further south.



219.13 *Chromis dasygenys:* 12.5 cm (Inhaca Id.).

219.14 *Chromis dimidiata*
(Klunzinger, 1871)
PLATE 86

Chocolate dip — Sjokoladedip

Heliastes dimidiatus Klunzinger, 1871: 529 (Red Sea). *Chromis dimidiatus:* Smith, **SFSA No. 746a*;** 1960: 324*.

D XII,12-13; A II,12-13; P 16; LL 14-16; total GR 27-29. Depth 2.0-2.1; head 3.1-3.3.

Attains 7 cm. Tropical Indian Ocean reefs down to at least 30 m; Red Sea to Durban, common.

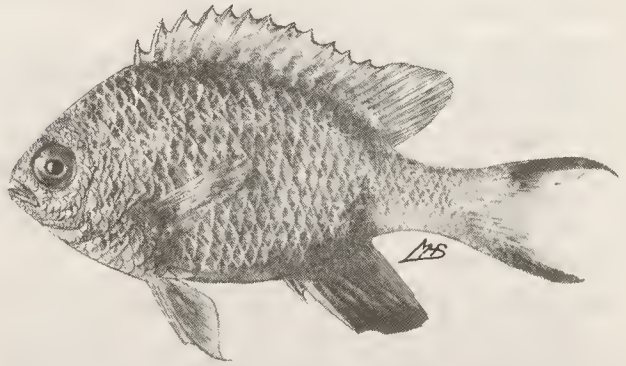
219.15 *Chromis lepidolepis*
Bleeker, 1877
PLATE 89

Brown chromis — Bruin chromis

Chromis lepidolepis Bleeker, 1877: 389 (Timor); Allen, 1975: 83*; Smith, 1980: 180. *Lepidochromis brunneus* Smith, 1960: 328, Pl. 32, Fig. B (Baixo Pinda, Mozambique).

D XII,11-12; A II,11-12; P 18; LL 17-18; total GR 27-31. Depth 2.0-2.2; head 3.3-3.4.

Generally brown with black streak along each C lobe. Attains 8 cm. Tropical Indo-Pacific to Fiji Ids., south to Durban; on reefs to at least 20 m.



219.15 *Chromis lepidolepis:* 7.5 cm holotype of *Lepidochromis brunneus* (N. Mozambique).

219.16 *Chromis nigrura*
Smith, 1960
PLATE 86

Blacktail chromis — Swartstert-chromis

Chromis nigrurus Smith, 1960: 325, Pl. 29, Fig. 1 (Inhaca); Smith, 1980: 180.

D XII,10-11; A II,11; P 17; LL 15-16; total GR 26-27. Depth 2.4-2.5; head 3.1-3.2.

Yellow C with or without narrow black upper and lower margins. Attains 6 cm. Abundant on reefs in 1 - 30 m in tropical western Indian Ocean to Sri Lanka and the Maldives; south to Transkei coast.

219.17 *Chromis opercularis*
(Günther, 1867)
PLATE 87

Doublebar chromis — Dubbelbalk-chromis

Heliastes opercularis Günther, *in* Playfair & Günther, 1867: 84, Pl. XI, Fig. 2 (Zanzibar). *Chromis opercularis:* Smith, 1960: 325*; Smith, 1980: 180.

D XIII,11-12; A II,10-12; P 18-19; LL 17-18; total GR 26-29. Depth 2.1-2.3; head 3.4-3.6.

Attains 16 cm. Inhabits reefs to at least 40 m depth. Tropical Indian Ocean, south to Sodwana Bay.

219.17 *Chromis opercularis:* 14.5 cm (N. Mozambique).

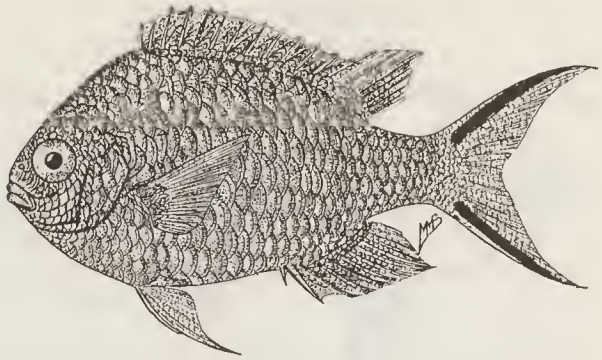
219.18 *Chromis ternatensis*
(Bleeker, 1856)
PLATE 89

Golden chromis — Goue chromis

Heliastes ternatensis Bleeker, 1856: 377 (Ternate). *Chromis ternatensis:* Smith, 1960: 325*; 1961: 568, **No. 746c;** Allen, 1975: 90*.

D XII,10-12; A II,10-12; P 17-19; LL 14-16; total GR 28-33. Depth 1.8-2.0; head 3.4-3.5.

Generally golden brown, with paler scale centres, darker on back. Attains 10 cm. Inhabits coral reefs, forming midwater aggregations in 2 - 15 m. Tropical Indo-Pacific to Fiji Ids.; south to Inhaca.



219.18 *Chromis ternatensis:* 9 cm (N. Mozambique).

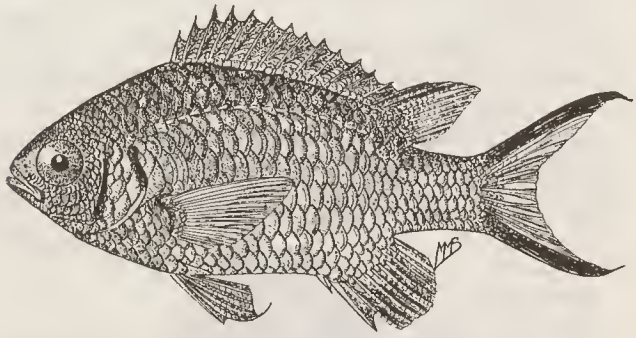
219.19 *Chromis weberi*
Fowler & Bean, 1928

Darkbar chromis — Donkerbalk-chromis

Chromis weberi Fowler & Bean, 1928: 41, Pl. 1 (Philippines); Allen, 1975: 86*; Smith, 1980: 181. *Chromis simulans* Smith, 1960: 326, Fig. 4 (Mozambique Id.).

D XII-XIV,11-12; A II,11-12; P 19-20; LL 17-19; total GR 28-32. Depth 2.1-2.4; head 3.0-3.3.

Generally brown. Attains 12 cm. Inhabits reefs to at least 40 m. Tropical Indo-West Pacific; abundant at Sodwana Bay and Aliwal shoal (near Durban).



219.19 *Chromis weberi:* 11 cm holotype of *C. simulans* (Mozambique Id.).

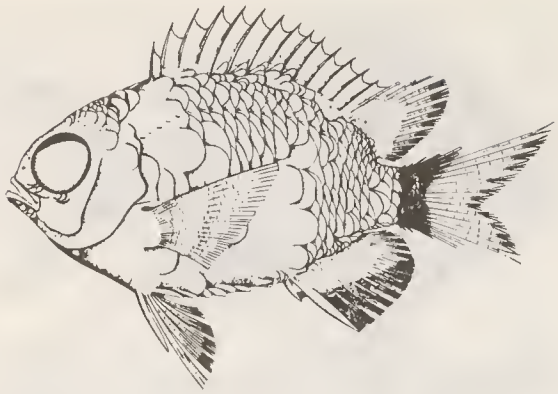
219.20 *Chromis woodsi*
Bruner & Arnam, 1979

Spiny chromis — Stekel-chromis

Chromis woodsi Bruner & Arnam, 1979: 50, Figs. 1 & 2 (Somalia coast, 11°24′N; 16°35′E).

D XIV,11-12; A II,12-13; P 17-18; LL tubules 17-18; LS 22-23; GR (6-7)+(17-19) = 23-25. Depth 1.8-2.0, head 2.6-3.0.

Ground colour of preserved specimen golden orange, dark areas dark brown or black; membrane of D, A and P speckled or dusky; C base and ventral ½ of A black. Attains 74 mm SL; known from 59 - 175 m off the Somalia coast to just outside our area in the Mozambique Channel (19°09′S, 36°55′E).



219.20 *Chromis woodsi:* 7.5 cm SL holotype (after Bruner & Arnam, 1979).

Genus ***Chrysiptera*** Swainson, 1839

Twenty-one species; 4 in our area.

KEY TO SPECIES

1a Colour pattern consisting of alternating black and white bars ..... *C. annulata*
1b Colour pattern not as in 1a 2

2a Anus black; body generally pale (grey or light blue in life); juveniles with blue stripes anterodorsally ..... *C. glauca*
2b Anus not black; body yellow to brown, juveniles with blue stripes anterodorsally 3

3a Colour pale (bright yellow in life) with blue band from snout along upper back to end of D, frequently with 1 or 2 black spots on soft D; another colour phase consisting of brown ground colour and 3-4 yellowish crossbars with elongate black spot at base of soft D ..... *C. leucopoma*
3b Colour mainly brown with blackish blotch covering most of soft D; P yellowish; juveniles largely yellow with blue band along upper back and 2 black spots at base of rear ½ of D ..... *C. unimaculata*

219.21 *Chrysiptera annulata*
(Peters, 1855)
PLATE 87

Footballer — Voetbalspeler

Pomacentrus annulatus Peters, 1855: 455 (Mozambique); Smith, **SFSA No. 754***. *Abudefduf annulatus:* Smith, 1960: 331*.

D XIII,12-13; A II,12-13; P 18; LL 17-18; total GR 15-16. Depth 2.0-2.1; head 3.0-3.2.

Attains 7 cm. Inhabits weed/sand areas in 0 - 2 m from Red Sea to Durban; also at Mauritius, Réunion, Aldabra and Madagascar.

219.22 *Chrysiptera glauca*
(Cuvier, 1830)
PLATE 87

Blue damsel — Blou nooientjie

Glyphisodon glaucus Cuvier, *in* Cuv. & Val., 1830: 475 (Guam). *Abudefduf glaucus:* Smith, 1960: 336*. *Glyphidodontops glaucus:* Allen, 1975: 154*. *Chrysiptera glauca:* Smith, 1980: 181.

D XII1,12-13; A II,11-13; P 18; LL 15-19; total GR 19-24. Depth 2.2-2.3; head 3.1-3.3.

Generally pale blue or light grey. Juveniles with neon blue lines on forehead. Attains 10 cm. Inhabits rocky shores and reef flats exposed to wave action in 0 - 2 m. Indo-West Pacific; south to Sodwana Bay.

219.23 *Chrysiptera leucopoma*
(Cuvier, 1830)
PLATE 87

Blueribbon damsel — Bloulint-nooientjie

Glyphisodon leucopomus Cuvier, *in* Cuv. & Val., 1830: 480 (Caroline Ids.). *Glyphisodon xanthozona* Bleeker, 1853: 283. *Abudefduf xanthozonus:* Smith, 1960: 337*; 1961: 569, **No. 769*a.** *Abudefduf biocellatus* (*non* Quoy & Gaimard): Smith, **SFSA No. 769***; 1960: 337*. *Glyphidodontops leucopomus:* Allen, 1975: 155*. *Chrysiptera leucopoma:* Smith, 1980: 181.

D XIII,12-13; A II,11-13; P 17-19; LL 17-19; total GR 17-21. Depth 2.3-2.7; head 3.3-3.5.

Two distinct colour varieties: *leucopomus* variety - generally yellow, with bright blue area extending from eye along back and 2 black spots on soft D; *xanthozonus* variety - see illustrations. Intermediate colour varieties are occasionally observed. Attains 7 cm. Inhabits rocky shores and reef flats exposed to wave action in 1-2 m. Tropical Indo-West Pacific. In the Pacific the dark (*xanthozonus*) variety has been referred to as *C. albofasciatus* Hombron & Jacquinot and *C. amabilis* De Vis.

219.24 *Chrysiptera unimaculata*
(Cuvier, 1830)
PLATES 84 & 87

Onespot damsel — Eenkol-nooientjie

Glyphisodon unimaculatus Cuvier, *in* Cuv. & Val., 1830: 478 (Timor). *Abudefduf biocellatus* (*non* Quoy & Gaimard): Smith (in part), 1960: 337*; 1961: 569, **No. 769a.** *Abudefduf zonatus* (*non* Cuvier): Smith, 1960: 337*. *Glyphidodontops unimaculatus:* Allen, 1975: 162.

D XIII,13-14; A II,12-14; P 18-19; LL 16-18; total GR 22-23.

Juveniles mainly yellow with blue lines on forehead and upper back. Also with 2 blue-edged ocelli, one at base of last D spines and other at base of soft D rays. Attains 8 cm. Inhabits reef flats and rocky areas exposed to periodic wave action in 0 - 3 m. Indian Ocean and Indo-Australian Archipelago; south to Transkei.

Genus ***Dascyllus*** Cuvier, 1829

Nine species; 3 in our area. Recently revised by Randall & Allen (1977).

KEY TO SPECIES

1a Soft D rays usually 12 (rarely 11 or 13); colour of head and body pale with 3 black bars ..... *D. aruanus*
1b Soft D rays 14-16; colour not as in 1a 2

2a Preserved generally pale tan to brown, usually with darker scale margins; no contrasted pale spot on upper side and forehead; frequently a black bar from D origin to V base; LL tubes absent on C peduncle, instead grooves, pits or pores present on mid-lateral scales ..... *D. carneus*
2b Preserved generally brown to blackish, most scales of body with darker marginal band; often a prominent pale spot dorsally on side or on forehead, especially in smaller (less than 50 mm) specimens; no black bar from D origin to V base; 1 or more well-developed tubed scales mid-laterally on C peduncle ..... *D. trimaculatus*

219.25 *Dascyllus aruanus*
(Linnaeus, 1758)
PLATE 89

Zebra humbug — Sebra-humbug

Chaetodon aruanus Linnaeus, 1758: 275 (Indies). *Dascyllus aruanus:* Smith, **SFSA No. 749*;** 1960: 327*; Allen, 1975: 103*.

D XII,11-13; A II,11-13; P 17-19; LL 15-19; GR (5-8)+(15-19). Depth 1.5-1.7; head 2.9-3.1.

Attains 10 cm. Commonly forms aggregations of 30 or more fish which shelter among branched madreporian corals on sheltered reefs in 1 - 12 m. Tropical Indo-West Pacific south to Durban, but rare south of Inhaca.

219.25 *Dascyllus aruanus:* 9 cm (N. Mozambique).

219.26 *Dascyllus carneus*
Fischer, 1885
PLATE 87

Twobar humbug — Tweebalk-humbug

Dascyllus carneus Fischer, 1885: 71, Pl. 11, Fig. 5 (Mozambique); Smith, **SFSA No. 750*;** Randall & Allen, 1977: 368*. *Dascyllus marginatus* (*non* Rüppell): Smith, **SFSA No. 753*.** *Dascyllus reticulatus* (*non* Richardson): Smith, 1960: 327*.

D XII,14-16; A II,13-14; P 19-21; LL 17-19; GR (6-8)+(17-20). Depth 1.5-1.6; head 3.0-3.4.

Spinous D and A electric blue in life (the black membrane between the spines hardly registers), other fins pale. Attains 7 cm. Inhabits reefs to at least 40 m, usually in aggregations around small coral heads. Tropical Indian Ocean and Java Sea south to Durban.

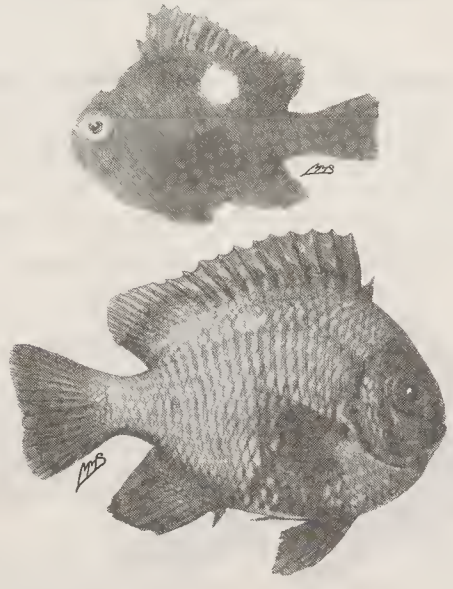
219.27 *Dascyllus trimaculatus*
(Rüppell, 1829)

Domino — Domino

Pomacentrus trimaculatus Rüppell, 1829: 39, Pl. 8, Fig. 3 (Red Sea). *Dascyllus axillaris* Smith, 1935: 205, Pl. 22, Fig. D (Great Fish Point); **SFSA No. 752.** *Dascyllus trimaculatus:* Smith, **SFSA No. 751*;** 1960: 328*; Allen, 1975: 106*; Randall & Allen, 1977: 360*.

D XII,14-16; A II,14-15; P 20-21; LL 17-19; GR (6-8)+(16-19). Depth 1.4-1.6; head 3.1-3.6.

Colour black to dark brown with 3 white spots. Adults generally lose the forehead spot, and the spot on the upper side is much reduced or frequently absent. Attains 14 cm. Inhabits reefs to at least 55 m; juveniles usually associate with sea anemones, *Diadema* sea urchins, or small coral heads. Tropical Indo-West Pacific, south to Great Fish Point.



219.27 *Dascyllus trimaculatus:* top: 2.5 cm; bottom: 10.5 cm (both N. Mozambique).

Genus ***Lepidozygus*** Günther, 1862

One species; widespread in the Indo-Pacific region.

219.28 *Lepidozygus tapeinosoma*
(Bleeker, 1856)
PLATE 87

Redwing coral damsel — Rooivlerk-koraalnooi

Pomacentrus tapeinosoma Bleeker, 1856: 376 (Ternate). *Lepidozygus anthioides* Smith, 1955: 888, Pl. 20, Fig. C (Astove Id.); 1961: 569, **No. 758c.** *Lepidozygus tapeinosoma:* Allen, 1975: 107*; Smith, 1980: 181.

D XII,14-15; A II,15-16; P 21-23; LL 19-20; total GR 26-28. Depth 2.9-3.4; head 3.8-4.1.

Colour of head and body changes to reddish after death. Attains 10 cm. Inhabits reefs to at least 20 m; usually found with aggregations of *Nemanthias carberryi,* tropical Indo-West Pacific, south to Durban.

Genus ***Neopomacentrus*** Allen, 1975

Fourteen species; 3 in our area.

KEY TO SPECIES

1a Edge of suborbital hidden by scales ..... *N. cyanomos*
1b Edge of suborbital exposed 2

2a Prolonged filaments of C blackish; faint dusky bar from P to V bases; live specimens with 3 violet spots above P ..... *N. fallax*
2b Prolonged filaments of C pale; no bar between P and V bases; live specimens without violet spots above P ..... *N. fuliginosus*

219.29 *Neopomacentrus cyanomos*
(Bleeker, 1856)
PLATE 87

Crescent damsel — Halfmaan-nooientjie

Pomacentrus cyanomos Bleeker, 1856: 89 (Djakarta). *Pomacentrus opercularis* (*non* Günther): Smith, **SFSA No. 758*.** *Pomacentrus inhacae* Smith, 1955: 894 (Inhaca Id.); 1961: 569, **No. 758.** *Pomacentrus taeniurus* (*non* Bleeker): Smith, 1960: 342*. *Neopomacentrus cyanomos:* Allen, 1975: 170*; Smith, 1980: 181.

219.29 *Neopomacentrus cyanomos:* 10 cm (N. Mozambique).

D XIII,11-12; A II,10-12; P 17; LL 17-18; total GR 21-24. Depth 2.2-2.6; head 3.0-3.2.

Attains 9 cm. Inhabits reefs to at least 30 m. Tropical Indian Ocean and Indo-Australian Archipelago; south to Kosi Bay.

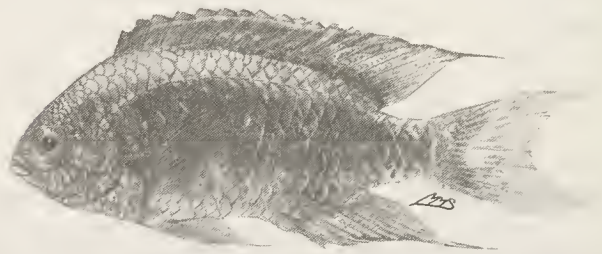
219.30 *Neopomacentrus fallax*
(Peters, 1855)

Violet damsel — Violet nooientjie

Glyphidodon fallax Peters, 1855: 266 (Mozambique). *Abudefduf fallax:* Smith, **SFSA No. 767;** 1960: 338*.

D XIII,11; A II,11-12; P 16-17; LL 16-17; total GR 19-20. Depth 2.3-2.5; head 3.2-3.5.

Body dusky dark grey with 3 bright violet spots above P. Similar spots above eye, on opercle and preopercle. Cheek and snout with violet sheen. Dark bar across P base. Edge of spinous D violet with light blue submarginal line. Juveniles bluish with a blue line from snout to eye. Attains 10 cm. Inhabits shallow protected areas along Mozambique coast north of Inhambane.



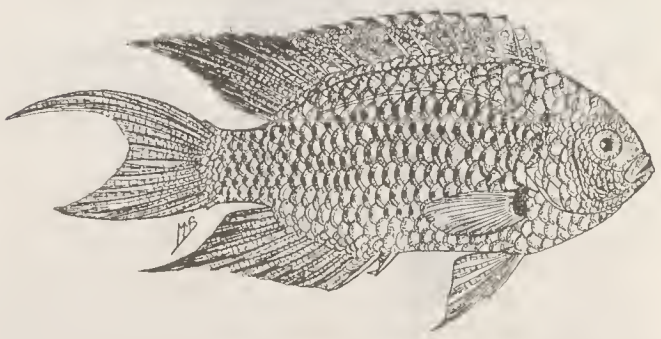
219.30 *Neopomacentrus fallax.* 7 cm (Mozambique Id.).

219.31 *Neopomacentrus fuliginosus*
(Smith, 1960)

Sooty damsel — Roet-nooientjie

Abudefduf fuliginosus Smith, 1960: 339, Fig. 6 (Mozambique Id.).

D XIII,11; A II,11-12; P 16-17; LL 16-17; total GR 20-23. Depth 2.2-2.3; head 3.3-3.5.



219.31 *Neopomacentrus fuliginosus:* 11 cm holotype (Mozambique Id.).

Generally brown with dark spots on body and light spots on head. Attains 11 cm. Inhabits protected bays and mangrove areas in 1 - 4 m, congregates around wharf piles and mooring buoys; known only from Bazaruto to Mombasa.

Genus *Paraglyphidodon* Bleeker, 1876

Eight species; 1 or 2 in our area. *Abudefduf xanthurus* (*non* Bleeker) (Smith, **SFSA No. 763***), based on a painting by Bell Marley, belongs to this genus, but without the specimen, it cannot be identified.

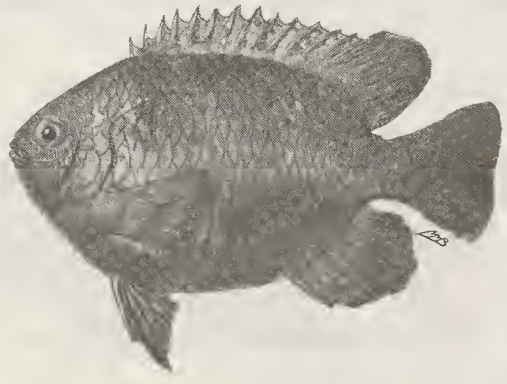
219.32 *Paraglyphidodon melas*
(Valenciennes, 1856)
PLATE 87

Zulu damsel — Zoeloe-nooientjie

Glyphisodon melas Valenciennes, *in* Cuv. & Val., 1830: 472 (Java). *Abudefduf melas:* Smith, 1960: 336*. *Abudefduf melanopus:* Smith, 1960: 336*. *Abudefduf xanthonotus:* Smith, 1961: 569, **No. 759b.** *Paraglyphidodon melas:* Allen, 1975: 183*. *Paraglyphidodon melanopus:* Allen, 1975: 183*.

D XIII,13-15; A II,12-15; P 18-19; LL 15-18; total GR 19-22. Depth 1.6-1.8; head 3.1-3.5.

Adults dark brown to black, including P. Juvenile (*melanopus* variety) see Plate. Attains 18 cm. Inhabits coral reefs about soft coral, to about 12 m. Tropical Indian Ocean and Indo-Australian Archipelago.



219.32 *Paraglyphidodon melas:* 13 cm (N. Mozambique).

Genus *Plectroglyphidodon* Fowler & Ball, 1924

Nine species; 6 in our area.

KEY TO SPECIES

1a Body depth 2.1-2.4 in SL; soft D rays 14 or 15; soft A rays usually 11; GR 10-12; body pale, head and front part greyish dorsally; peduncle and C yellow; black vertical bar across eye ..... *P. imparipennis*
1b Body depth usually 1.7-2.0 in SL; soft D rays 15-20; soft A rays 12-18; GR 12-23; colour not as in 1a 2

2a GR 20-23; tubed LL scales 18-21; colour dark brown with small blue spots (often obscure in preservative) scattered on head and back ..... *P. lacrymatus*
2b GR 12-18; tubed LL scales 20-23; colour not as in 2a 3

3a Colour entirely brown or with 1-4 pale bars on sides; P rays 20 or 21 4
3b Colour mostly pale tan to brown, without pale bars on sides; P rays 18 or 19 5

4a C peduncle with broad black bar bordered anteriorly with narrow white bar; body dark brown with 3-4 pale bars; soft D rays usually 16 or 17; A rays usually 13 or 14 ..... *P. phoenixensis*
4b C peduncle without broad black bar; body entirely dark brown or with a single pale bar below base of about 4th-6th D spines; soft D rays usually 15 (occasionally 16); A rays usually 12 (occasionally 13) ..... *P. leucozonus*

5a A rays usually 14; GR usually 16 or 17; lips not swollen; colour mostly tan to brown with black crescent-shaped bar, 4-5 scales wide, extending from anterior soft D rays to tips of anterior A rays ..... *P. dickii*
5b A rays usually 16-18; GR 12-14; lips noticeably swollen; colour either uniform tan or with diffuse dark bar on rear ½ of body ..... *P. johnstonianus*

219.33 *Plectroglyphidodon dickii*
(Lienard, 1839)
PLATE 87

Narrowbar damsel — Smalbalk-nooientjie

Glyphisodon dickii Lienard, 1839: 35 (Mauritius). *Abudefduf dickii:* Smith, 1960: 335*; 1961: 569, **No. 759a***. *Plectroglyphidodon dickii:* Allen, 1975: 195*; Smith, 1980: 181.

D XII,16-18; A II,14-16; P 18-19; LL 20-23; total GR 16-19. Depth 1.8-1.9; head 2.9-3.4.

Attains 11 cm. Inhabits coral reefs to about 12 m. Tropical Indo-West Pacific, south to Sodwana Bay.

219.34 *Plectroglyphidodon imparipennis*
(Vaillant & Sauvage, 1875)
PLATE 88

Stop-start damsel — Stop-stap-nooientjie

Glyphisodon imparipennis Vaillant & Sauvage, 1875: 279 (Honolulu). *Abudefduf imparipennis:* Smith, 1960: 338*. *Plectroglyphidodon imparipennis:* Allen, 1975: 195*.

D XII,14-15; A II,11-12; P 20; LL 19-22; total GR 10-12; head 3.0-3.2.

Attains 6 cm. Inhabits rocky shores and reef flats which are exposed to wave action in 0 - 3 m. Tropical Indo-West Pacific to Hawaiian Ids.; south to Sodwana Bay.

219.35 *Plectroglyphidodon johnstonianus*
Fowler & Ball, 1924
PLATE 88

Widebar damsel — Breëbalk-nooientjie

Plectroglyphidodon johnstonianus Fowler & Ball, 1924: 271 (Johnston Id., Pacific Ocean); Allen, 1975: 195*; Smith, 1980: 181. *Plectroglyphidodon nitidus* Smith, 1955: 892, Pl. 21, Fig. B (Aldabra); 1960: 329*; 1961: 569, **No. 758b*.**

D XII,17-19; A II,16-18; P 19; LL 21-22; total GR 11-14. Depth 1.7-1.9; head 3.0-3.2.

Attains 9 cm. Inhabits coral reefs to about 15 m. Tropical Indo-West Pacific to Hawaii, south to Sodwana Bay.

219.36 *Plectroglyphidodon lacrymatus*
(Quoy & Gaimard, 1825)
PLATE 88

Jewel damsel — Juweel-nooientjie

Glyphisodon lacrymatus Quoy & Gaimard, 1825: 388, Pl. 62, Fig. 7 (Guam). *Abudefduf lacrymatus:* Smith, **SFSA No. 764*;** 1960: 334*. *Plectorglyphidodon lacrymatus:* Allen, 1975: 198*; Smith, 1980: 181.

D XII,16-18; A II,13-14; P 19-20; LL 18-21; total GR 20- 23. Depth 1.7-1.9; head 3.0-3.2.

Often paler brown on breast and lower portion of head. Attains 10 cm. Coral reefs to about 12 m. Tropical Indo-West Pacific south to Sodwana Bay.

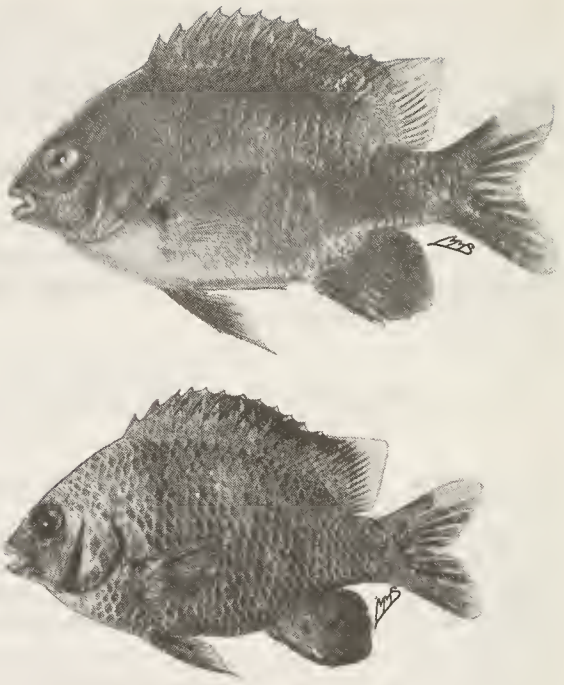
219.37 *Plectroglyphidodon leucozonus*
(Bleeker, 1859)
PLATE 88

Sash damsel — Gordel-nooientjie

Glyphisodon leucozona Bleeker, 1859: 339 (Java). *Abudefduf leucozona:* Smith, **SFSA No. 759*.** *Abudefduf cingulum* (*non* Klunzinger): Smith, 1960: 334*. *Plectroglyphidodon leucozona:* Allen, 1975: 198*.

D XII,15-17; A II,12-13; P 19-21; LL 20-21; total GR 15-18. Depth 1.7-2.0; head 3.0-3.2.

Generally brown with pale crossbar often missing in mature specimens. Upper C lobe frequently pale and dark spot at base of upper P rays. Attains 12 cm. Inhabits rocky shores and reef flats exposed to wave action in 0 - 4 m. Tropical Indo-West Pacific south to the Transkei; common in vicinity of Durban. A separate subspecies, *P. leucozonus cingulum* Klunzinger, 1871 inhabits the Red Sea.



219.37 *Plectroglyphidodon leucozonus:* top: 9.5 cm (S. Mozambique); bottom: same specimen dried to show scales.

219.38 *Plectroglyphidodon phoenixensis*
(Schultz, 1943)
PLATES 84 & 89

Phoenix damsel — Phoenix-nooientjie

Abudefduf phoenixensis Schultz, 1943: 190, Fig. 15 (Enderbury Id., Phoenix Ids.). *Plectroglyphidodon phoenixensis:* Allen, 1975: 198*; Smith, 1980: 181.

D XII,16-17; A II,13-14; P 20-21; LL 21-22; total GR 14-16. Depth 1.9-2.1; head 3.0-3.3.

Generally brown with bars, C whitish, other fins brown except D reddish. Small pale spots on head and A. Attains 9 cm. Inhabits rocky shores and reef flats exposed to relatively strong wave action. Scattered localities in tropical Indo-West Pacific; Sodwana Bay.

Genus ***Pomacentrus*** Lacepède, 1802

Fifty species; 4 in our area.

KEY TO SPECIES

1a D spines 14; colour generally dark with abruptly pale C ..... *P. trichourus*
1b D spines 13; colour not as in 1a 2

2a GR on 1st arch 27-29; colour generally brown (juveniles yellowish with blue lines on upper part of head, and ocellus on D); C pale, but transition from brown colour of body gradual ..... *P. trilineatus*
2b GR 20-24; colour usually mostly blue in life 3

3a Preorbital with 1 or 2 posteriorly directed spines; suborbital serrate; GR usually 23-24 ..... *P. pavo*
3b Preorbital and suborbital smooth; GR usually 20-22 ..... *P. caeruleus*

219.39 *Pomacentrus caeruleus*
Quoy & Gaimard, 1825
PLATE 88

Blue pete — Blou piet

Pomacentrus caeruleus Quoy & Gaimard, 1825: 397, Pl. 64, Fig. 3 (Mauritius); Smith, 1960: 344, Pl. 27, Fig. B; Smith, 1980: 181. *Pomacentrus pulcherrimus* Smith, 1960: 344, Pl. 28, Fig. A (Baixo Pinda, Mozambique).

D XIII,14-15; A II,15-16; P 17-18; LL 17-19; total GR 20-23. Depth 2.4-2.8; head 3.2-3.5.

Attains 10 cm. Western Indian Ocean to the Maldives, south to Durban.

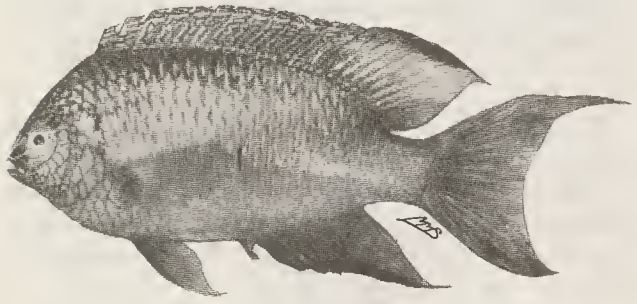
219.40 *Pomacentrus pavo*
(Bloch, 1787)
PLATE 88

Sapphire damsel — Saffier-nooientjie

Chaetodon pavo Bloch, 1787: 60 (East Indies). *Pomacentrus pavo:* Smith, **SFSA No. 757*;** 1960: 344*; Allen, 1975: 218*.

D XIII,13-14; A II,12-14; P 17; LL 16-17; total GR (6-7)+17 = 23-24. Depth 2.2-2.6; head 3.5-4.

Preserved: brown, lighter below, with blue to grey streak on each scale; dark spot pupil size near LL; spinous D brown, remainder of fin pale to dusky. Attains 85 mm SL. Feeds on plankton and filamentous algae. Tropical Indo-West Pacific south to Durban in small to large groups on sandy areas down to 16 m around coral reefs or alcyonarian growth.



219.40 *Pomacentrus pavo:* 13 cm (N. Mozambique).

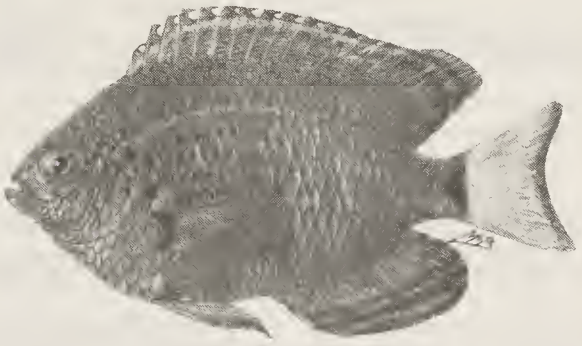
219.41 *Pomacentrus trichourus*
(Günther, 1867)
PLATE 88

Yellowtail damsel — Geelstert-nooientjie

Pomacentrus trichourus Günther, *in* Playfair & Günther, 1867: 146, Pl. 17, Fig. 5 (Zanzibar); Smith, 1960: 343*; Smith, 1980: 181.

D XIV,14-16; A II,15-17; P 16-17; LL 18-19; total GR 19-21. Depth 1.9-2.2; head 3.1-3.5.

Generally charcoal-coloured with black P base and yellow C (whitish when preserved); a cresentic black area at base of tail and several rows of small black spots above P. Attains 10 cm. Common on coral reefs in Red Sea; south to Sodwana Bay in 25 m.



219.41 *Pomacentrus trichourus:* 7.5 cm (Tanzania).

219.42 *Pomacentrus trilineatus*
Cuvier, 1830
PLATE 88

Threeline damsel — Drielyn-nooientjie

Pomacentrus trilineatus Cuvier, *in* Cuv. & Val., 1830: 428 (Red Sea). *Pomacentrus tripunctatus* (*non* Cuvier): Smith, **SFSA No. 756*;** 1960: 343* (in part).

D XIII,14-15; A II,14-16; P 17-18; LL 16-19; GR 27-29 (total). Depth 1.9-2.1; head 3.1-3.3.

Primarily brown, lighter on breast and C peduncle, with blackish spot at beginning of LL and small ocellus on dorsal edge of C peduncle; juveniles yellowish with blue lines on upper part of head and large blue-rimmed black spot at junction of spinous and soft D. Attains 10 cm.

Smith's (1960) *P. tripunctatus* actually represents a complex containing several species, most of which remain undescribed. The only one likely to occur within the area covered in this volume is *P. trilineatus,* which is found along the east African coast north of Inhaca, at Madagascar and in the Red Sea.

219.42 *Pomacentrus trilineatus:* 11 cm (N. Mozambique).

Genus ***Stegastes*** Jenyns, 1842

Thirty-four species; 2 in our area.

KEY TO SPECIES

1a D spines 12; total GR 21-25 ..... *S. nigricans*
1b D spines 13 or 14; total GR 16-20 ..... *S. fasciolatus*

219.43 *Stegastes fasciolatus*
(Ogilby, 1889)
PLATE 88

Dark damsel — Duister nooientjie

Pomacentrus fasciolatus Ogilby, 1889: 16 (Lord Howe Id.). *Pomacentrus luteobrunneus* Smith, 1960: 343, Pl. 26, Fig. F (Astove Id.). *Pomacentrus craticulus* Smith, 1965: 31, Pl. 7, Fig. B (Durban). *Eupomacentrus fasciolatus:* Allen, 1975: 139*. *Stegastes fasciolatus:* Smith, 1980: 181.

D XIII-XIV,15-17; A II,13-14; P 19-20; LL 20; total GR 16-20. Depth 1.9-2.4; head 3.1-3.5.

Juveniles (*craticulus* variety) lighter brown with yellow C. Anterior D spines of juveniles mainly black except yellow at margin. Attains 12 cm. Rocky shores and reefs, 1 - 4 m, exposed to at least mild wave action. Tropical Indo-Pacific, between Kenya and Durban.

219.43 *Stegastes fasciolatus:* 11.5 cm holotype of *Pomacentrus luteobrunneus* (Astove Id.).

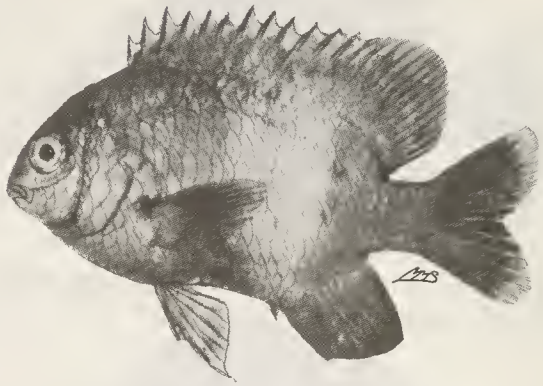
219.44 *Stegastes nigricans*
(Lacepède, 1803)
PLATE 88

Black damsel — Swart nooientjie

Holocentrus nigricans Lacepède, 1803: 332 (no locality). *Pomacentrus nigricans:* Smith, 1960: 342*; 1961: 569, **No. 754b.** *Eupomacentrus nigricans:* Allen, 1975: 142*.

D XII,15-17; A II,12-14; P 18-20; LL 18-20; total GR 21-25. Depth 1.8-2.0; head 3.0-3.2.

Generally tan to dark brown, frequently with broad lighter area on middle of sides. Attains 14 cm. Inhabits reefs, frequently among branches of staghorn (*Acropora*) coral, to about 10 - 12 m. Tropical Indo-West Pacific; south to Inhaca.



219.44 *Stegastes nigricans:* 11 cm (N. Mozambique).

Genus ***Teixeirichthys*** Smith, 1953

One species; widespread in the Indo-Pacific.

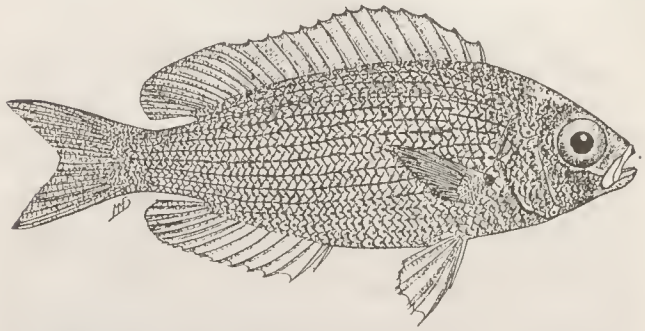
219.45 *Teixeirichthys jordani*
(Rutter, 1897)

Spotted damsel — Gespikkelde nooientjie

Pomacentrus jordani Rutter, 1897: 77 (Swatow, China). *Teixeirichthys mossambicus* Smith, 1953: 14, Fig. 1 (Mozambique Channel); 1953: 529, **No. 758a***. *Teixeirichthys obtusirostris* (*non* Günther): Smith, 1960: 321*.

D XIII,13; A II,12; P 18; LL 29-31; total GR 27. Depth 2.4-2.8; head 3.3-3.6.

Generally blue or brown, a narrow dark stripe on each scale row and blue spots on head. Attains 12 cm. Known in our area from a single specimen trawled in the Mozambique Channel (25°S, 35°E) in 60 fms. Common over sand at Eilat, Red Sea in 4 - 6 m; also known from Australia, China and Japan.



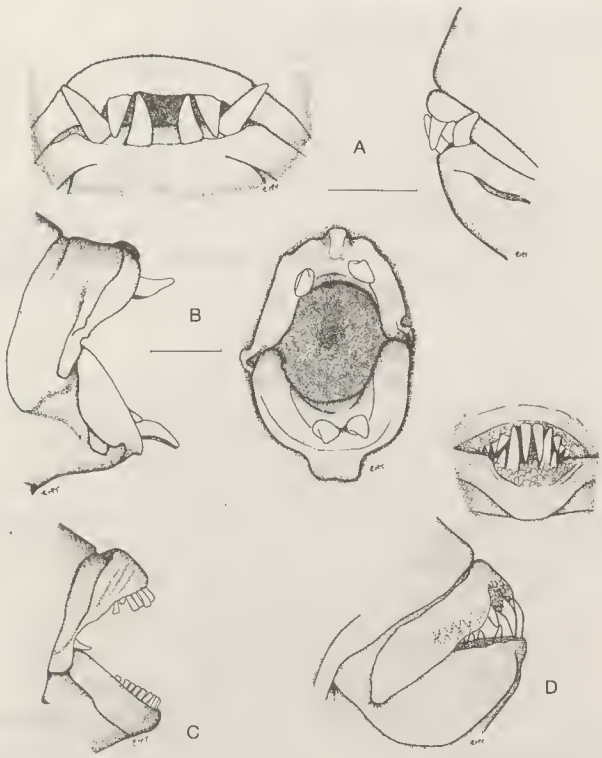
219.45 *Teixeirichthys jordani:* 11.5 cm holotype of *T. mossambicus* (S. Mozambique).

Family No. 220: LABRIDAE

by J.E. Randall

Wrasses **Lipvisse**

A very large family (second in number of species within the Indo-Pacific region only to the Gobiidae) and the most diverse in size and form. Body shape varies from oblong to elongate and slightly to strongly compressed. Size varies from the slender little *Minilabrus striatus* Randall & Dor, 1980 of the Red Sea (45 mm) to the wide-ranging giant humphead wrasse, *Cheilinus undulatus* (2 m). Dorsal fin continuous (except for some species of *Xyrichtys*), with 8-21 spines and 6-21 soft-rays (D VIII-XIII, 7-14 for species in our area); anal fin with 2 or 3 spines (4-6 in the European *Acantholabrus* and *Ctenolabrus*) and 7-14 soft-rays; pelvic fin I,5. Scales cycloid; head often naked or cheeks and opercles scaled; lateral line continuous or interrupted. Vertebrae 23-41 (higher numbers in temperate species of Labrinae). Branchiostegal rays 5 or 6. Mouth small to moderate, protractile, and terminal (or with lower jaw projecting, as in some *Cheilinus*); lips often fleshy; teeth in jaws conical, usually some canines anteriorly (but specialised incisiform teeth in *Anampses* and *Pseudodax*); a canine may be present at corner of mouth; no teeth on palate (except rarely on vomer of a few species); paired upper pharyngeal bones and single lower pharyngeal plate (triangular or Y- or T-shaped) with conical, nodular or molariform teeth.



Teeth of (A) *Choerodon robustus*; (B) *Anampses caeruleopunctatus*; (C) *Stethojulis strigiventer*; (D) *Novaculichthys taeniourus*.

Most species very colourful, some with complex patterns; juveniles often differ in colour from adults, and many species exhibit sexual dichromatism, generally associated with a change in sex from female to male. The first colour form of those species with sex reversal is termed the initial phase, usually less colourful than the terminal male phase. Terminal males tend to establish sexual territories and maintain a harem of females within these territories. They reproduce with a single female at a time, typically following a rapid upward spawning rush. Those species with both females and males in the initial phase usually spawn in aggregations (thus a species may have two different styles of reproduction). A few temperate labrid fishes build nests in seaweed, but the great majority of wrasses lay numerous tiny pelagic eggs.

Labrids are shallow-water fishes, though some species of *Bodianus* and *Decodon* occur in moderately deep water (200 m or more). Most live on coral reefs or rocky substrate; exceptional are the razorfishes (*Xyrichtys* and *Cymolutes*), which are found over open stretches of sand into which they dive with the approach of danger. Carnivorous; some species, such as *Cirrhilabrus* and *Pseudocoris*, feed on zooplankton, but most prey upon a great variety of invertebrate animals, especially hard-shelled molluscs, sea urchins and crustaceans, which they crush with their pharyngeal teeth; a few wrasses prey heavily on small fishes. The species of *Labroides* and the young of some other wrasses feed on crustacean ectoparasites and mucus of other fishes. The species of *Labropsis*, *Labrichthys* and *Larabicus* are among those which clean other fishes as juveniles; as adults they feed mainly on coral polyps. Diurnal; most species bury themselves in sand at night to sleep. Numerous genera and species; 26 genera and 66 species known from our area. The 4 genera listed in square brackets in the following key are not yet represented in our area but species of these genera might be expected in southern Africa.

KEY TO GENERA

1a Posterior margin of preopercle serrate 2
1b Posterior margin of preopercle smooth (except lower part of margin of *Pseudocheilinus hexataenia*) 8

2a LL complete; pupil normal (except in *Pteragogus*) 3
2b LL interrupted (a long dorsoanterior part separated from a short midlateral peduncular portion); pupil divided into 2 equal adjoining parts 7

3a LL sharply deflected downward below rear of D to midlateral peduncular portion; LL 22-25; D spines 9-11 ..... *Pteragogus*
3b LL gradually sloping to midlateral peduncular portion; LL 26-52; D spines 11-13 4

4a D XI to XIII,9-11; A III,10-13 5
4b D XII or XIII,6-8; A III,8-10 ..... *Choerodon*

5a D spines 13; 1st 3 D spines and associated membranes longer and nearly separate from rest of spinous portion of fin; LL 50-52; lips very thick and fleshy; no canine tooth posteriorly on upper jaw ..... *Anchichoerops*
5b D spines 11 or 12; 1st 3 D spines and membranes not longer and not nearly separate from rest of spinous portion of fin; LL 26-46; lips not very thick and fleshy; a canine tooth posteriorly on upper jaw (at corner of mouth) 6

6a D spines 11; LL 26-28; scales dorsally on head extending anterior to nostrils; preopercle completely scaled ..... *Decodon*
6b D spines 12; LL 29-46; scales dorsally on head not extending anterior to nostrils (usually not anterior to eyes); preopercle not completely scaled ..... *Bodianus*

7a D XI,9 ..... *Cirrhilabrus*
7b D IX,11 ..... [*Paracheilinus* Fourmanoir, 1955]

8a LL complete 9
8b LL interrupted (see 2b above) 24

9a LL sloping gradually as it passes from upper end of gill opening to midbase of C; gill membranes of each side not attached to isthmus but form a free fold 10
9b LL abruptly deflected downward below rear of D to midlateral part on C peduncle; gill membranes joined to isthmus 11

10a A pair of spatulate incisiform teeth anteriorly in each jaw forming a beak-like structure (a 2nd smaller sickle-shaped incisor in lower jaw);D XI,12; A III,14; LL 32; body not elongate, the depth 2.5-2.7 in SL ..... *Pseudodax*
10b Front teeth in jaws caniniform; D IX,13; A III,11-12; LL 45-49; body very elongate, the depth 5.5-8.0 in SL ..... *Cheilio*

11a D VIII 12
11b D IX 13

12a Snout of adults very long and tubular, 1.7-2.0 in head; 2 pairs of canines anteriorly in jaws ..... *Gomphosus*
12b Snout not long and tubular, 2.5-3.4 in head; 1 pair of canines anteriorly in upper jaw and 1 or 2 pairs in lower ..... *Thalassoma*

13a Preopercular margin covered by scales (no free edge); top of head scaled to nostrils, and lower part of head scaled anterior to eye ..... *Labrichthys*
13b Preopercular margin not covered by scales (at least part of margin free); scales on head not extending anterior to eye, either dorsally or ventrally 14

14a Lips very thick and fleshy, plicate internally and externally, forming a tubular structure when mouth closed; adults with no teeth on side of upper jaw between anterior canines and canine at corner of mouth (some species of *Anampses* lack teeth on side of jaws but they also lack canines); visible A spines 2 (dissection or radiograph needed to reveal the presence of tiny 1st A *spine)* ..... *[Labropsis* Schmidt, 1930]
14b Lips not as in 14a; teeth present on side of upper jaw; visible A spines 3 (some *Stethojulis* have a tiny 1st A spine that may require dissection to detect) 15

15a Lower lip distinctly bilobed, the 2 lobes separated by a U-shaped notch ..... *Labroides*
15b Lower lip not distinctly bilobed 16

16a LL 91-118 (our species 97-112) ..... *Hologymnosus*
16b LL 25-86 (except the extralimital *Coris sandageri* Phillipps, 1927, with LL 88-95; our *Coris* species with LL 49-80) 17

17a A pair of forward-projecting incisiform teeth anteriorly in each jaw, the upper pair broader, usually with upcurved pointed tips; remaining jaw teeth minute or absent (none at corner of mouth) ..... *Anampses*
17b Canine teeth at front of jaws; distinct conical teeth along sides of jaws (except in *Pseudojuloides*); a canine tooth often present at corner of mouth 18

18a LL 49-86 19
18b LL 25-29 20

19a Canine teeth of upper jaw laterally curved; C emarginate (may be truncate in juveniles), sometimes with lobes produced; no enlarged molariform teeth on pharyngeal bones ..... [*Pseudocoris* Bleeker, 1862]
19b Canine teeth of upper jaw not laterally curved; C truncate to rounded (usually slightly rounded); some enlarged molariform teeth on pharyngeal bones ..... *Coris*

20a No canine teeth at front of jaws; scales on chest as large as those of rest of body ..... *Stethojulis*
20b Canine teeth at front of jaws; scales on chest distinctly smaller than those of rest of body 21

21a Lips very thick and fleshy, the lower split in median line; a near-vertical band of small scales on preopercle, commencing behind eye; body depth 2.4-2.7 in SL ..... *Hemigymnus*
21b Lips not very thick and fleshy, the lower not split in median line; no near-vertical band of small scales on preopercle (except *Halichoeres hortulanus*); body depth 2.3-5.6 in SL 22

22a Side of jaws with small, chisel-like, incisiform teeth; body elongate, depth 3.8-5.6 in SL ..... *Pseudojuloides*
22b Side of jaws with conical teeth; body depth 2.3-4.6 in SL 23

23a Posterior free margin of preopercle short, not reaching level of lower edge of eye (usually not above level of mouth); ventral margin extending little beyond the rounded corner; lower pharyngeal plate with a huge posterior molar flanked by only 1-3 small teeth and preceded by 4-9 small teeth ... *Macropharyngodon*
23b Posterior free margin of preopercle not short, reaching or extending above level of lower edge of eye; ventral margin reaching below or anterior to front of eye; lower pharyngeal plate with one or more large molars (but none of such a large size as that of *Macropharyngodon*), flanked on each side by 8 or more small teeth and preceded by 10 or more small teeth ..... *Halichoeres*

24a LL 48-68+15-22 ..... *Cymolutes*
24b LL 13-22+5-9 25

25a Mouth extremely protractile, the lower jaw very long, its posterior end behind gill membranes; no free preopercular margin (scaled over); body depth 2.0-2.2 in SL ..... *Epibulus*
25b Mouth not very protractile, and lower jaw not long, not extending posterior to front edge of eye; preopercular margin free (except *Wetmorella*); body depth 2.2-3.9 in SL 26

26a D IX, 12-14; A 1II,12-14; anterior LL 19-22; head naked except for small scales below and sometimes behind eye 27
26b D IX-X,8-11; A 1II,8-9; anterodorsal LL 13-18; cheek and postorbital head covered with moderate to large scales 28

27a Dorsal profile of snout very steep, nearly vertical in some species; eye nearer dorsal profile of head than mouth; front of head ending in a fleshy keel ..... *Xyrichtys*
27b Dorsal profile of snout not steep, sloping at an angle of about 45-60°; eye nearer mouth than dorsal profile of head; front of head not ending in a fleshy keel ..... *Novaculichthys*

28a P 13-16; 2nd A spine longer than 3rd; pupil divided into 2 approximately equal parts ..... *Pseudocheilinus*
28b P 11-12; 3rd A spine longer than 2nd; pupil not divided into 2 parts 29

29a Dorsal and lower side of snout scaled; no free preopercular margin scaled over ..... [*Wetmorella* Fowler & Bean, 1928]
29b Snout not scaled; preopercular margin free ..... *Cheilinus*

Genus ***Anampses*** Quoy & Gaimard, 1824

Indo-Pacific; 13 species, 3 recorded from our area. *A. twistii* Bleeker, 1856 might be expected from our region, and is therefore included in the key.

KEY TO SPECIES

1a LL 27; body depth 2.3-3.0 in SL; body of initial phase brown with a dark-edged blue spot on each scale; head reddish brown with blue lines radiating from eye; terminal male olive green with a vertical blue line on each scale, often with a broad light green bar on side beneath P; head with irregular narrow dark-edged blue bands ..... *A. caeruleopunctatus*
1b LL 26; body depth 3.0-3.4 in SL; colour not as in 1a 2

2a C truncate (initial phase) to emarginate (terminal male); GR 18-20; initial phase dark brown with small white spots on head, body and D and A; C uniform bright yellow; terminal males dark brown with a dark-edged blue spot or line on each scale; C dull orange with dark-edged blue spots and a whitish posterior crescent ..... *A. meleagrides*
2b C rounded; GR 14-19; colour not as in 2a 3

3a GR 14-16; body orangish brown with narrow dark-edged light blue-green stripes passing along middle of scale rows; basal two-fifths of C white, the rest of fin black with a posterior hyaline margin ..... *A. lineatus*
3b GR 16-19; body brown with scattered, dark-edged blue dots; shading to yellow on lower head, chest and abdomen; C light red with small dark-edged blue spots and a light blue posterior margin ..... [*A. twistii*]

220.1 *Anampses caeruleopunctatus*
Rüppell, 1829
PLATE 93

Bluespotted tamarin — Blougespikkelde tamarin

Anampses caeruleopunctatus Rüppell, 1829: 42, Pl. 10, Fig. 1 (Red Sea). *Anampses diadematus* Rüppell, 1835: 21, Pl. 6, Fig. 3 (Red Sea); Smith, **SFSA No. 785***. *Anampses caeruleopunctatus*: Smith, **SFSA No. 786***; Randall, 1972: 160*; 1983: 122*.

D IX,12; A III,12; P 13; LL 27; GR 18-21. A single pair of forward-projecting incisiform teeth in jaws, the uppers broader (usually with upcurved pointed tips), the lowers downcurved and nearly conical; remaining teeth tiny to imperceptible; C rounded in juveniles, slightly rounded to truncate in adults. Body of initial phase olive brown with a dark-edged blue spot on each scale; head reddish brown with narrow dark-edged blue bands, many radiating from eye; median fins with dark-edged blue spots and blue margins. Terminal males olive green with a blue vertical line on each scale, often with a broad light green bar on side centered on 6th D spine, and irregular dark-edged blue bands on head, the broadest across anterior interorbital space; fins reddish with blue bands, D with a middle zone of tiny blue spots or irregular markings.

Largest specimen examined, 40 cm. Indo-Pacific from Red Sea and South Africa to Easter Id.; juveniles reach Algoa Bay. An inshore species of exposed coral reefs or rocky coasts.

220.2 *Anampses lineatus*
Randall, 1972
PLATE 89

Lined tamarin — Gestreepte tamarin

Anampses melanurus lineatus Randall, 1972: 172, Fig. 7 (Gulf of Aqaba, Red Sea). *Anampses lineatus*: Randall, 1983: 123*.

D IX,12; A III,12; P 13; LL 26; GR 14-16; dentition as in *A. caeruleopunctatus*. C rounded. Body orange-brown, with longitudinal pale blue-green lines (or rows of dashes) following scale rows; head with irregular light blue-green lines; a black spot on opercular flap; C white with a broad black bar covering most of rear ½ of fin.

220.2 *Anampses lineatus:* 8 cm SL male holotype (after Randall, 1972).

Reaches 12 cm. Red Sea and Indian Ocean, south to Natal. Rare in less than 20 m. Closely related to *A. melanurus* Bleeker, 1862 of the Pacific.

220.3 *Anampses meleagrides*
Valenciennes, 1840
PLATES 89 & 93

Yellowtail tamarin — Geelstert-tamarin

Anampses meleagrides Valenciennes, *in* Cuv. & Val., 1840: 12 (Mauritius); Smith, 1961: 569, **No. 786a*;** Randall, 1972: 166*; 1983: 123*. *Anampses amboinensis* Bleeker, 1857: 80 (Ambon).

D IX,12; A III,12; P 13; LL 26; total GR 18-20; dentition as in *A. caeruleopunctatus;* C of small juveniles rounded, of adults truncate to emarginate. Females dark brown, becoming reddish anteriorly on snout, with small round white spots (one per scale on body); C abruptly bright yellow; males dark orange-brown with a blue spot (may be vertically elongate) on each scale of body; head with irregular narrow blue bands, D and A dull orange, narrowly striped with blue; C orange with small dark-edged blue spots and a whitish crescent, edged anteriorly in blue, at rear of fin.

Attains 22 cm. Western Pacific to Red Sea and east Africa; south to Sodwana Bay.

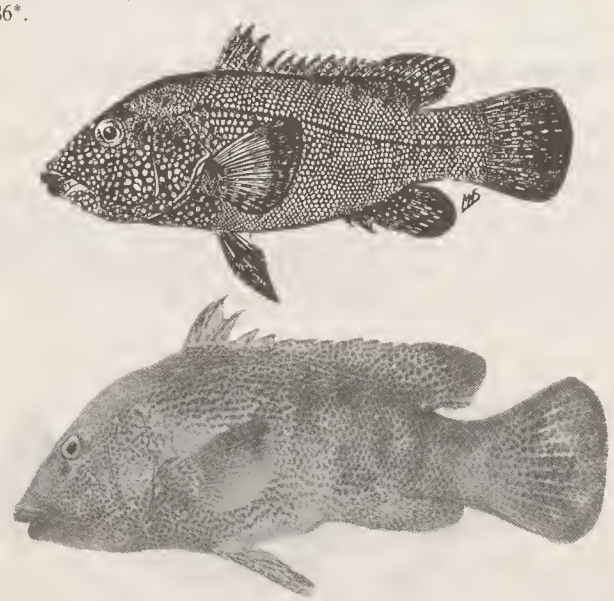
Genus ***Anchichoerops*** Barnard, 1927

A single species known only from South Africa.

220.4 *Anchichoerops natalensis*
(Gilchrist & Thompson, 1908)
PLATE 93

Natal wrasse — Natalse lipvis

Choerops natalensis Gilchrist & Thompson, 1908: 259 (Natal). *Anchichoerops natalensis*: Smith, **SFSA No. 771*;** van der Elst, 1981: 186*.



220.4 *Anchichoerops natalensis:* top: 42.5 cm; bottom. ?60 cm (both Natal; photo by Romer Robinson).

D XIII,9, the first 3 spines longer than remaining spinous portion and almost separate from rest of fin; A III,10-11; P 17; LL 50-52, evenly curved; postorbital head and cheek with small scales; preopercular margin naked; basal scaly sheath well developed posteriorly on D and A; jaws with 2 prominent canines anteriorly on each side; granular teeth on side of jaws more or less coalesced; lips very thick and fleshy; C rounded. Colour variable: either reddish with yellow to orange spots, or orange-yellow to brown with darker spots; dark bars may be present on body in life.

Attains 75 cm. Found around rocky reefs of Natal and the Transkei, down to 55 m. Seldom takes a hook; protected by law from being shot by spearfishermen.

Genus ***Bodianus*** Bloch, 1790

Thirty species: 23 Indo-Pacific, 5 Atlantic, 2 eastern Pacific; 6 in our area. *Cossyphus* Cuvier & Valenciennes and *Lepidaplois* Gill are synonyms. *B. bimaculatus* Allen, 1973; *B. opercularis* (Guichenot, 1847), *B. tanyokidus* Gomon & Madden, 1980 and *B. macrourus* (Lacepède, 1801) are included in the Key because they are known from east Africa, Madagascar or Mauritius, and may be found in our area. Data on *Bodianus* here are largely derived from Martin F. Gomon (MS).

KEY TO SPECIES

1a Scales dorsally on head not reaching anterior to eye 2
1b Scales dorsally on head reaching anterior to eye 8

2a LL 36-46; a prominent black spot on opercle 3
2b LL 29-32; no black spot on opercle (except *B. bimaculatus*) 4

3a LL 40-46; head and body with 3 broad red stripes alternating with white; black opercular spot subcircular ..... [*B. opercularis*]
3b LL 36-40; body yellow, with 1 or 2 midlateral broken orange-red lines anteriorly; black opercular spot distinctly higher than broad ..... [*B. tanyokidus*]

4a V of adults short, not approaching anus; C slightly rounded (at least when fully spread); a blackish spot at C base 5
4b V reaching to or beyond anus; C of adults emarginate or double emarginate, of juveniles truncate; no blackish spot at C base 6

5a A prominent black spot on opercle; no black spots on A and V; yellow to orange, with 1 or more longitudinal red lines; body depth 3.6-4.0 in SL; smallest species of genus (maximum length 10 cm) ..... [*B. bimaculatus*]
5b No black spot on opercle; 2 black spots on A and a large one on V; adults with reddish brown head, the body dull yellow with brown-rimmed scales; 3 pale yellow spots in a row along back and small black spots (1 per scale) posterodorsally on body; juveniles reddish brown with numerous white spots; body depth 3.0-3.3 in SL; attains 25 cm ..... *B. diana*

6a Scales present (though may be embedded) on lower jaw anterior to preopercle; V black; a broad black bar encircling body posteriorly ..... [*B. macrourus*]
6b Scales absent on lower jaw anterior to preopercle; V pale; no black bar posteriorly on body of adults (but present on juveniles) 7

7a Juveniles with a broad black bar encircling posterior part of body and extending into D and A; adults with a large oval black spot dorsoposteriorly on body below rear base of D and broadly onto C peduncle, but not extending into fin (spot may be obsolete in terminal males); no whitish bar on body and base of D ..... *B. bilunulatus*
7b Juveniles with a black spot (preceded by a whitish bar) covering most of soft portion of D and extending broadly onto side of body (but not onto C peduncle), black spot and whitish bar regress in subadults, the white becoming a short pale yellowish bar or spot and the black diffuse (pigment mainly on edges of scales) on back ..... *B. perditio*

8a Head obtuse, the dorsal profile of snout greater than 45°; C of adults deeply emarginate, of juveniles, lunate; head and anterior body reddish brown, shading to whitish posteriorly with scattered blackish spots; upper and lower edges of C blackish ..... *B. anthioides*
8b Head pointed, the dorsal profile of snout less than 45°; C truncate to slightly rounded; colour not as in 8a 9

9a Two prominent black spots on D and 1 on A; no longitudinal red or blackish lines on body; juveniles and initial phase dark brown to black with 9 large white spots on head and body ..... *B. axillaris*
9b No black spots on D or A; 4 or 5 longitudinal red or blackish lines or broken lines on body ..... *B. leucostictus*

220.5 *Bodianus anthioides*
(Bennett, 1830)
PLATE 93

Lyretail hogfish — Lierstert-varkvis

Crenilabrus Anthioïdes Bennett, 1830: 167 (Mauritius). *Lepidaplois anthioides*: Smith, 1953: 520, **No. 774a***; 1957: 101. *Bodianus anthioides*: Randall, 1980: 111.

D XII,9 or 10; A III,10-12; P 15-17; total GR 16; LL 30-31; LL a gradual curve (true of other *Bodianus*); scales dorsally on head extending anterior to nostrils; preopercular margin coarsely serrate; snout short; 2 prominent canines anteriorly on each side of jaws and 1 or 2 posteriorly on upper jaw (true of other *Bodianus*); C deeply emarginate (large and lunate in juveniles). Orange-brown anteriorly, white with dark markings posteriorly.

Attains 21 cm. Indo-Pacific, Red Sea south to Sodwana Bay; rare at most localities.

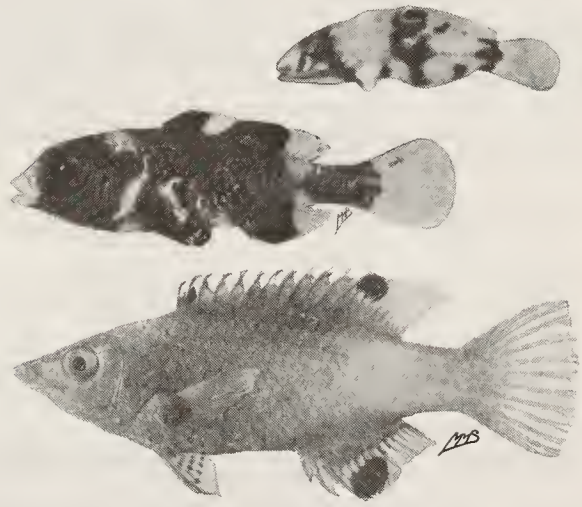
220.6 *Bodianus axillaris*
(Bennett, 1831)
PLATES 89 & 93

Turncoat hogfish — Weerhaan-varkvis

Labrus axillaris Bennett, 1831: 166 (Mauritius). *Cossyphus octomaculatus* Sauvage, 1891: 454 (Mauritius). *Lepidaplois axillaris*: Smith, SFSA **No. 775***; 1957: 101*. *Lepidaplois albomaculatus* Smith, 1957: 101* (on Pike's illustration, Mauritius). *Bodianus axillaris*: Smith, 1980: 181; Randall, 1983: 110.

D XII,10; A III,12-13 (usually 12); P 15-17; LL 29-30 (rarely 29); total GR 15-18; scales dorsally on head extending in front of nostrils; scales on cheek reach below nostrils; basal scaly sheath of D and A 2½ to 3 scales in height; V usually reaching or nearly reaching anus; C truncate (slightly rounded in small juveniles). Juveniles and initial stage dark brown to black with 9 large white spots (1 at front of head, 3 dorsally and 3 ventrally on body and 2 at C base). A small black spot also present anteriorly on D. Terminal males lose the white spots; they are reddish brown on head and anteriorly on body, becoming whitish posteriorly.

Attains 20 cm. Indo-Pacific, south on east African coast to Natal. Juveniles are cave-dwellers and have been seen "cleaning" other fishes. In the Pacific, the dark, white-spotted phase appears to be confined to the juvenile stage.



220.6 *Bodianus axillaris:* to show juvenile to adult livery: 0.6 cm; 1.8 cm (both Natal); adult: 12.5 cm female (N. Mozambique).

220.7 *Bodianus bilunulatus*
(Lacepède, 1801)
PLATES 89 & 94

Saddleback hogfish — Saalrug-varkvis

Labrus bilunulatus Lacepède, 1801: 454, Pl. 31, Fig. 2 (Indian Ocean). *Cossyphus albo-taeniatus* Valenciennes, *in* Cuv. & Val., 1839: 141 (Hawaiian Ids.). *Lepidaplois hirsutus* (*non* Lacepède): Smith, **SFSA No. 773***. *Bodianus bilunulatus*: Smith, 1980 181; van der Elst, 1981: 187*.

D XII,10; A III,12-13 (usually 12); P 16-17 (usually 16); LL 30-32; total GR 17-21; scales dorsally on head forward to rear edge of eyes; scales on cheek reaching slightly anterior to corner of mouth; scales on interopercle not extending anterior to preopercle; basal scaly sheath of D and A usually 2½ to 3 scales in height; V nearly reaching or just reaching anus (sometimes extending slightly beyond). C of juveniles truncate, of adults emarginate to double emarginate, with lobes moderately produced in large individuals. Adults red dorsally, the centres of scales whitish, shading to white ventrally with a large, oblong, black spot below rear base of D and extending onto C peduncles, a large whitish band on cheek bordered above and below by purplish red; a black spot on 2nd D membrane; juveniles with a broad blackish bar around posterior part of body and extending onto D and A.

Reaches at least 55 cm. Indo-Pacific but distribution not continuous; south to Durban on Natal coast.

220.8 *Bodianus diana*
(Lacepède, 1801)
PLATE 94

Diana's hogfish — Diana se varkvis

Labrus diana Lacepède, 1801: 450, Pl. 32, Fig. 1 (Indian Ocean). *Lepidaplois diana*: Smith, **SFSA No. 774***. *Lepidaplois aldabrensis* Smith, 1955: 932, Pl. 24A (Aldabra). *Bodianus diana*: Smith, 1980: 181; van der Elst, 1981: 188*.

D XII, 10; A III,12; P 15-17; LL 30; total GR 15-18; scales dorsally on head extending anteriorly to above middle of eyes; cheek scales to corner of mouth; a basal scaly sheath of D and A 2½ scales high at its greatest depth; V not approaching anus in adults (relatively longer in juveniles, but not reaching anus); C truncate, slightly rounded in juveniles. Adults reddish to purplish brown on head, shading to dull yellow on body, the scales rimmed with brown except 3 rows above LL posteriorly on body where each scale has a blackish spot; a longitudinal row of 3 pale yellow spots along back; a small black spot centred at base of C; 2 black spots on soft A, the anterior one large, and a large black spot on V; a blackish spot anteriorly on D; juveniles reddish brown with longitudinal rows of white blotches and small spots in addition to black spots in fins.

Attains 25 cm. Indo-Pacific, south to Transkei.

220.9 *Bodianus leucostictus*
(Bennett, 1831)
PLATE 94

Lined hogfish — Gestreepte varkvis

Labrus leucostictus Bennett, 1831: 166 (Mauritius). *Lepidaplois trilineatus* Fowler, 1934: 492, Fig. 47 (Natal coast); Smith, **SFSA No. 772***. *Lepidaplois luteopunctatus* Smith, 1957: 102, Pl. 1A (Delagoa Bay); 1961: 569, **No. 772a***. *Lepidaplois bourboni* Fourmanoir & Guézé, 1961: 7, Fig. 1 (Réunion). *Bodianus trilineatus*: Smith, 1980: 181; van der Elst, 1981: 190*. *Bodianus luteopunctatus*: Smith, 1980: 181.

D XII,10; A III,12; P 16; LL 30; total GR 17-19; scales dorsally on head extending to anterior nostrils; cheek scales reaching before corner of mouth; basal scaly sheath of D and A low; V approaching anus in large adults (shorter in small fish); C truncate to slightly rounded. Orange-yellow shading to white or pale yellow ventrally with 4 or 5 red, or red and black lines on body, the upper 3 of which extend to eye (lines may be broken into segments or the black part may be a series of spots or dashes superimposed on the red); a black spot at P base present or absent (appears to be reduced to a small red spot or disappears with age); black or red dots on body in irregular rows between the lines (also seem to disappear with age).

Attains at least 27 cm. Mauritius, Réunion, Somalia, Mozambique, Natal and southern Japan. Usually found at moderate depths (about 50 m). The placement of *trilineatus* in the synonymy of *leucostictus* is provisional; more specimens are needed to ascertain if the colour and V length differences mentioned above are changes with age and growth of a single species as here presumed.

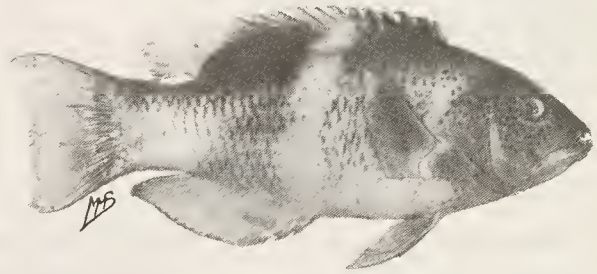
220.10 *Bodianus perditio*
(Quoy & Gaimard, 1834)
PLATE 90

Goldsaddle hogfish — Goudsaal-varkvis

Labrus perditio Quoy & Gaimard, 1834: 702, Pl. 20, Fig. 4 (Tongatapu). *Cossyphus nigromaculatus* Gilchrist & Thompson, 1908: 197 (Natal). *Chaeropsodes pictus* Gilchrist & Thompson, 1909: 260 (Durban market). *Lepidaplois perditio*: Smith, **SFSA No. 776***. *Bodianus perditio*: Smith, 1980: 181; van der Elst, 1981: 189*.

D XII,10; A III,12; P 17; LL 30-31; total GR 19-23; scales dorsally on head reaching rear edge of eyes; interorbital area naked; cheek scales extending slightly anterior to corner of mouth; basal scaly sheath of D and A well developed; V nearly reaching anus in juveniles and extending beyond in large adults; C of juveniles truncate, the lobes prolonged in adults. Yellowish to reddish (smaller individuals more yellow, the large adults primarily red with small yellow spots on head); a large blackish spot below D and extending onto fin, this spot becoming diffuse (restricted to edges of scales) in larger individuals; black spot preceded by a pale yellow bar or spot on upper side; an extensive blackish area anteriorly in D; C red basally, shading to yellow distally; juveniles yellow with a large black area covering most of soft portion of D and extending broadly onto side, this spot preceded by a long whitish bar.

Attains 80 cm. Anti-tropical in distribution; known from islands of southern Oceania, eastern Australia, Japan, Mauritius, Réunion, St. Brandon Shoals, and northern Mozambique to Natal. Large specimens common at Sodwana Bay.



220.10 *Bodianus perditio:* 28 cm (Natal).

Genus ***Cheilinus*** Lacepède, 1802

Fifteen species; 6 known from our area. The broadly distributed *C. fasciatus* Seale, 1908 may occur in our area and is thus included in the key.

KEY TO SPECIES

1a D X,9; body brown to dark olive with small pale spots (whitish to pink in life); head with small orange-red spots (may be a few short irregular lines); median fins and V with whitish dots ..... *C. chlorourus*

1b D IX,9-11; colour not as in 1a 2

2a Adults with a prominent fleshy hump on forehead; greenish yellow with vertical dark green markings on scales (except nape and chest); head with a highly irregular reticulum of orangish and blue-green; 2 black lines extending posteriorly from eye; attains enormous size (over 2 m) ..... *C. undulatus*

2b Adults without prominent hump on forehead; colour not as in 2a; maximum length 40 cm 3

3a Dorsal profile of head from mouth to above eye concave; C always rounded; a pair of prominent dark brown spots anteriorly on upper lip; no bars on body ..... *C. oxycephalus*
3b Dorsal profile of head from mouth to above eye straight or convex; C rounded, truncate or double emarginate; no prominent dark brown spots anteriorly on upper lip; bars on body present or absent 4

4a Body depth 2.3-2.6 in SL; C rounded, becoming trilobed in adult males (a broad rounded central lobe and filamentous upper and lower lobes); body olivaceous with a vertical red line on each scale; head and chest with numerous small red spots and red lines radiating anteriorly from eye ..... *C. trilobatus*
4b Depth of body 2.6-3.3 in SL; C variable in shape, but not trilobed; colour not as in 4a 5

5a C of adults emarginate, the lobes of large fish prolonged; body blackish with narrow whitish bars; adults with a broad orange-red zone on rear of head and anteriorly on body; C with a transverse blackish bar, the posterior margin broadly blackish ..... [*C. fasciatus*]
5b C of adults rounded (though may have prolonged lobes), truncate, or slightly double emarginate; colour not as in 5a 6

6a C strongly rounded in juveniles; in large adults, upper and some median C rays elongated, giving ragged effect; small dark spot behind eye and a large diffuse one on side of body behind P; orange-red lines radiating from eye; a small species, reaching about 15 cm ..... *C. bimaculatus*
6b C slightly rounded to slightly emarginate; no dark spots on head or body; diagonal red to maroon lines on lower cheek; attains 35 cm ..... *C. digrammus*

220.11 *Cheilinus bimaculatus*
Valenciennes, 1840
PLATE 90

Two-spot wrasse — Tweekol-lipvis

Cheilinus bimaculatus Valenciennes, *in* Cuv. & Val., 1840: 96 (Hawaiian Ids.); Smith, **SFSA No. 815*.**

D IX,9-11; A III,8; P 12-13; LL (14-16)+(5-7); head scaled dorsally to above middle of eyes; body depth 2.7-3.0 in SL; dorsal profile of head convex (snout nearly straight, nape more convex); mouth terminal or with lower jaw slightly projecting; a single canine tooth anteriorly on each side of jaws, with a row of conical teeth on side of jaws; no posterior canine (dentition comparable in other *Cheilinus*); C strongly rounded in juveniles, the upper and some middle rays prolonged in adults. V short. Yellowish brown to greenish, the young with a broad, dark, lateral stripe which breaks into blotches in adults, the largest above distal part of P; a small dark spot behind eye; irregular orange-red spots and short lines on head, many radiating from eye; median fins with an orange, lace-like network; a dark brown spot on 1st interspinous membrane of D.

Attains about 15 cm. Indo-Pacific south to Sodwana Bay. Often found on substrata of thick algal growth or in seagrass beds.

220.12 *Cheilinus chlorourus*
(Bloch, 1791)
PLATE 94

Floral wrasse — Blommetjie-lipvis

Sparus chlorourus Bloch, 1791: 24, Pl. 260 (Japan). *Thalliurus chlorurus*: Smith, **SFSA No. 818*.**

D X,9; A III,8; P 12; LL 15+(5-8); head scaled dorsally to above front of eyes; body depth 2.3-2.8 in SL; dorsal profile straight on snout, becoming convex on rest of head and nape; mouth terminal or with lower jaw slightly projecting; C strongly rounded, the upper and to a lesser extent the lower rays prolonged in large adults; V of adults with 1st ray elongate, reaching posterior to anus. Body brown to olivaceous, sometimes faintly dark-blotched, with numerous, small whitish to orange-pink spots; head with small orange-red spots or short irregular lines (may be dark-edged); median fins and V with numerous whitish dots; a dusky blotch on first 2 interspinous membranes of D; juveniles with dark lines around eye and scattered small black spots on body.

Largest examined, 36 cm. Indo-Pacific south to Sodwana Bay.

220.13 *Cheilinus digrammus*
(Lacepède, 1801)
PLATE 94

Cheeklined wrasse — Streepwang-lipvis

Labrus digramma Lacepède, 1801: 448, 517, Pl. 1, Fig. 2 (Indian Ocean). *Cheilinus diagrammus*: Smith, **SFSA No. 817*.**

D IX,10; A III,8; P 12; LL (15-16)+(7-8); head scaled dorsally to above middle of eyes; body depth 2.8-3.3 in SL; profile of head slightly concave to above eye, then convex; lower jaw projecting; C slightly rounded to truncate or slightly double emarginate; V short. Colour reddish brown to olivaceous, sometimes with broad stripes on body; a series of parallel diagonal red to maroon lines on lower posterior part of operculum; orange-red lines extending from eye (except ventrally); C peduncle and C often green.

Reaches 35 cm. Central Oceania to Red Sea and south to Natal. A striking and easily identified coral-reef species; feeds in part on small fishes.

220.14 *Cheilinus oxycephalus*
Bleeker, 1853
PLATE 94

Snooty wrasse — Snob-lipvis

Cheilinus oxycephalus Bleeker, 1853: 349 (Ambon); Smith, 1957: 109 (Mozambique).

D IX,10; A III,8; P 12; LL (15-16)+(6-7). Head scaled to above middle of eyes; dorsal profile from mouth to above eyes concave; body depth 2.4-3.0 in SL; mouth terminal or with lower jaw slightly projecting; C rounded in all stages. Brownish red, mottled with small whitish spots; a dark brown spot anteriorly on each side of upper lip; often 2 dark lines diverging posteriorly from eye; a row of 3 small dark spots midlaterally on rear half of body on juveniles and subadults; dark brown spot on 1st 2 D membranes.

Reaches 17 cm. Indo-Pacific, south to Natal. A wary and secretive species of coral reefs.

220.15 *Cheilinus trilobatus*
Lacepède, 1801
PLATES 90 & 95

Tripletail wrasse — Driestert-lipvis

Cheilinus trilobatus Lacepède, 1801: 526, 529, 537, Pl. 4, Fig. 3 (Réunion, Mauritius and Madagascar); Smith, **SFSA No. 816*.**

D IX,10; A III,8; P 12; LL (14-16)+(7-8); GR 10-11; head scaled dorsally to above middle of eyes; body depth 2.3-2.6 in SL; dorsal profile of head straight to above eye, then slightly convex; mouth terminal or with lower jaw slightly projecting; C rounded, the upper and lower rays of adult males prolonged, giving the fin a trilobed shape; posterior D and A of large adults elongate, extending beyond base of C; V of adults long, reaching beyond anus. Olivaceous with a vertical red line on each body scale; head and chest with numerous small red spots and short irregular lines; red lines radiating anteriorly from eye.

Attains 40 cm. Indo-Pacific; not once reported south of Sodwana Bay. The report by Smith (1964: 296) of 2 juveniles from a depth of 405 m off Durban is probably based on erroneous locality data. Found on coral reefs and adjacent habitats near reefs. Feeds principally on small fishes, crustaceans and molluscs.

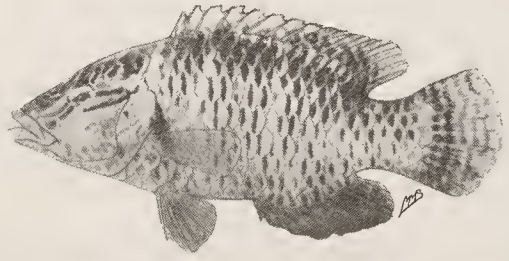
220.15 *Cheilinus trilobatus:* 40 cm (N. Mozambique).

220.16 *Cheilinus undulatus*
Rüppell, 1835
PLATE 95

Humphead wrasse — Ramkop-lipvis

Cheilinus undulatus Rüppell, 1835: 20, Pl. 6, Fig. 2 (Red Sea); Smith, **SFSA No. 817a*;** Randall, 1983: 112*.

D IX,10; A III,8; P 12; LL (14-16)+(7-8); body depth 2.3-2.7 in SL; dorsal profile of head straight to eye, then becoming convex; adults develop a large, fleshy hump on forehead; mouth terminal; C rounded; posterior part of D and A of adults elongate, extending beyond C base; V of adults reaching past anus. Juveniles pale greenish with elongate dark spots on scales of body tending to form bars; 2 black lines posteriorly from eye; adult body with irregular greenish yellow and greenish grey vertical lines, each grey line posterior to P broadening to a vertical spindle-shaped band on each scale; head with a highly irregular reticulum of dull orange and green; median fins finely banded; the posterior margin of C broadly pale yellowish.



220.16 *Cheilinus undulatus:* 17.5 cm (N. Mozambique).

Reported to reach a length of 2.29 m and weigh 190 kg. Indo-Pacific, south to Inhaca Id. Feeds on a variety of molluscs, sea urchins and other echinoderms, crustaceans and fishes, including sand-dwelling types.

Genus ***Cheilio*** Lacepède, 1801

A single wide-ranging Indo-Pacific species.

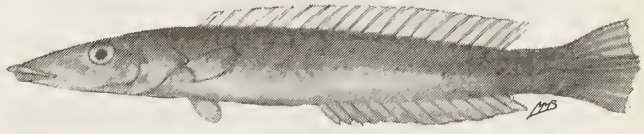
220.17 *Cheilio inermis*
(Forsskål, 1775)
PLATE 95

Cigar wrasse — Sigaar-lipvis

Labrus inermis Forsskål, 1775: 34 (Red Sea). *Cheilio inermis:* Smith, **SFSA No. 770*;** Randall, 1983: 125*.

D IX,12-14; A III,11-12; P 12; LL 45-59, gently curved; head naked except for 1 row of scales on preopercle and a few on upper part of opercle; body very elongate and little compressed, depth 5.5-8.0 in SL; snout length about 2.3 in head; a pair of canine teeth anteriorly in jaws followed by a row of small conical teeth; C rounded. Colour variable, from yellowish to green or brown, often with a midlateral dark stripe; males with a few small orange to pink and often black spots in a group dorsally on side of body in region of P.

Attains 50 cm. Indo-Pacific from Easter Id. to Red Sea, south to Transkei. Typically found in seagrasses or dense beds of algae.



220.17 *Cheilio inermis:* 25 cm (N. Mozambique; plain yellow with dark spots as shown).

Genus ***Choerodon*** Bleeker, 1847

This genus consists of 25 species, all Indo-Pacific; 1 in our area.

220.18 *Choerodon gymnogenys*
(Günther, 1867)
PLATE 94

Purplelined wrasse — Perslyn-lipvis

Xiphochilus gymnogenys Günther, *in* Playfair & Günther, 1867: 85, Pl. 12, Fig. 4 (Zanzibar). *Peaolopesia gymnogenys:* Smith, **SFSA No. 776a*;** 1953: 520*. *?Peaolopesia matthaei:* Smith, 1957: 101; 1961: 569, **No. 776a*.**

D XII,8; AIII,10; P14-15; LL 29, gently curved; large scales on opercle but small scales on preopercle; body depth about 3.0 in SL; mouth terminal; 2 pairs of long stout canine teeth anteriorly in jaws followed by a row

of close-set conical teeth; C small, truncate, or with lobes slightly prolonged; posterior margin of P concave; V pointed, reaching anus. Colour of presumed female (from Playfair & Günther) rosy with a series of blue spots on back close to D base; 2 or 3 indistinct longitudinal series of pearly spots along sides; axil of P blue; a greenish blotch on posterior part and a broad blue patch on lower half of opercle; an indistinct blue band around orbit and continuing onto snout. Colour of presumed male with 2 longitudinal purple streaks on upper side (from Smith, **SFSA No. 776a***, see Plate).

Attains 20 cm. Known from Zanzibar and Inhambane, Mozambique. More specimens are needed to ascertain if the more colourful form illustrated by Smith is conspecific with *C. gymnogenys*.

Genus ***Cirrhilabrus*** Temminck & Schlegel, 1845

About 25 species, all Indo-Pacific, some undescribed; 1 in our area.

220.19 *Cirrhilabrus exquisitus*
Smith, 1957
PLATE 94

Exquisite wrasse — Fyn lipvis

Cirrhilabrus exquisitus Smith, 1957: 109, Fig. 4, Pl. 2, Fig. E (Pinda, Mozambique); Randall & Shen, 1978: 16*.

D XI,8-9; A III,9; P 14-16; LL (16-18)+(5-7); median predorsal scales 5; horizontal scale rows on cheek 2; GR 17-19; rear preopercular margin finely serrate; pupil of eye double; 3 pairs of canine teeth at front of upper jaw, the lateral pairs progressively larger and recurved; C of juveniles rounded, of adults double emarginate. Complexly coloured (see Plate), the dominant marking for both sexes a large oval black spot on C peduncle just above LL.

Attains 11 cm. East Africa south to Sodwana Bay, to French Polynesia, known from relatively few localities; depth range 6 - 32 m. Occurs in aggregations on reefs; feeds on zooplankton. Males maintain large harems, exhibiting brilliant hues during courtship.

Genus ***Coris*** Lacepède 1801

Twenty species; 1 eastern Atlantic, the rest Indo-Pacific (4 still undescribed). Four species occur in our area. *C. variegata* (Ramsay & Ogilby, 1886) may eventually be found here so is included in the Key below.

KEY TO SPECIES

1a LL 49-55 2
1b LL 61-80 3

2a First D spine longest; 2nd spine longer than 3rd; P rays 13; a large, diffuse blackish spot at C base; no black behind eye; LL 49-53 ..... *C. caudimacula*
2b First and 2nd D spines shorter than remaining spines; P rays 14; no large blackish spot at C base; a vertically elongate small black spot on head behind eye; LL 51-55 ..... [*C. variegata*]

3a LL 61-66; a hump on forehead of adults (slight on females, large on males); P 14; juveniles whitish with small black spots on head and anterior body and 2 large semicircular orange-red spots on back; mature females greenish with red spots anteriorly; adult males dark blue-green, often with 1 or 2 pale green bars on sides ..... *C. aygula*
3b LL scales 70-80; no hump on forehead; P 13; colour not as in 3a; juveniles bright orange with black-edged white wedges dorsally on head and body 4

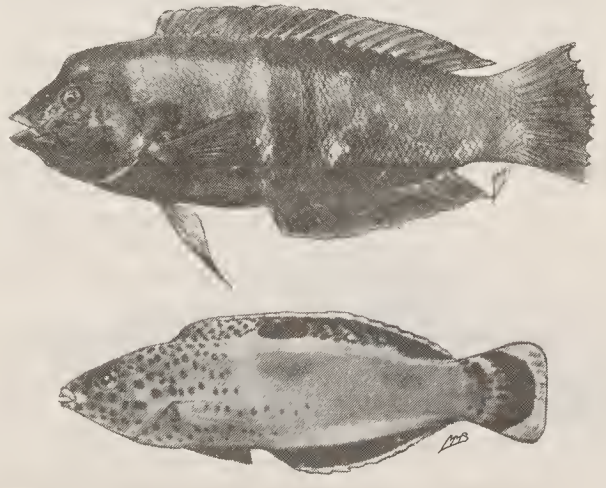
4a A narrow scaleless zone mid-dorsally on nape; a broad scaleless area anteroventrally on chest; body and base of C and D with small blackish spots (initial-phase adult) or body with dark bars (terminal male phase); no broad near-horizontal bands across lower half of head ..... *C. formosa*
4b No scaleless zone dorsally on nape; no scaleless area on chest; no black spots or dark bars on body or fins; head green with 2 broad, curved near-horizontal dark reddish or purple bands across cheek and lower operculum ..... *C. gaimard africana*

220.20 *Coris aygula*
Lacepède, 1801
PLATE 96

Clown coris — Nar-coris

Coris aygula Lacepède, 1801: 96, Pl. 4, lower Fig. (no locality). *Coris angulatus* Lacepède, 1801: 97, Pl. 4, middle Fig. (no locality). *Labrus cingulum* Lacepède, 1801: 517, Pl. 28, Fig. 1 (Mauritius). *Coris angulata*: Smith, **SFSA No. 806***.

D IX,12; A III,12; P 14; LL 61-66, sharply deflected downward below posterior D (all *Coris*); head naked except nape (true of other *Coris*); body depth 3.0-3.3 in SL; adults developing a hump on forehead which becomes very pronounced on large males; mouth terminal; jaws anteriorly with a pair of strong protruding canines followed by a row of conical teeth with an inner row of small nodular teeth and 1 or 2 teeth at corner of mouth of adults (dentition comparable on other *Coris*); D spines flexible; 1st 2 D spines of adults closer together than remaining spines; C rounded in young and females, nearly truncate in males with exserted rays. Juveniles whitish with small black spots on head and anterior body and 2 large semicircular orange-red spots on back with a large ocellated black spot above each in D; adult females greenish, the head and anterior body



220.20 *Coris aygula*: top: 40 cm (Kenya); bottom: 12 cm (Natal).

paler with red spots; adult males deep green to blue green (may appear black underwater), often with 1 and sometimes 2 pale greenish bars on side of body.

A large species reaching 120 cm. Broadly distributed in the Indo-Pacific, south to Transkei. This and other large *Coris* turn over rocks with their jaws to expose such invertebrates as crabs and brittle stars hiding underneath.

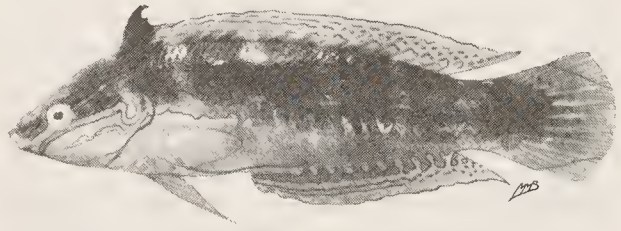
220.21 *Coris caudimacula*
(Quoy & Gaimard, 1834)
PLATE 90

Spottail coris — Kolstert-coris

Julis caudimacula Quoy & Gaimard, 1834: 710, Pl. 15, Fig. 2 (Mauritius). *Coris caudimacula*: Smith, **SFSA No. 807*.** *Coris multicolor*: Smith, **SFSA No. 808.**

D IX,12; A III,12; P 13; LL 49-53; body depth 3.4-4.2 in SL; D spines somewhat sharp except 1st which is moderately prolonged in adults; 2nd D spine longer than 3rd; space between 1st 2 D spines not clearly broader than spaces between remaining spines; C rounded; V not reaching A origin (V of other *Coris* herein reaching A origin at least in large adult males). A large diffuse blackish spot at base of C; 4 salmon pink stripes on body, the lowermost broken into irregular spots posteriorly; broad dark bars may be present on upper side; head with irregular bands and a black spot edged posteriorly with yellow on opercular flap; outer part of first 2 interspinous membranes of D blackish.

Maximum length 20 cm. Indian Ocean including Red Sea, south to East London. A common reef species.



220.21 *Coris caudimacula*: 17.5 cm (N. Mozambique).

220.22 *Coris formosa*
(Bennett, 1834)
PLATES 91 & 96

Queen coris — Koningin-coris

Labrus formosus Bennett, 1834, Pl. 16 (Ceylon). *Coris frerei* Playfair & Günther, 1867: 101, Pl. 13 (Zanzibar); Smith, 1957: 120*. *Coris gaimard* (*non* Quoy & Gaimard): Smith, SFSA Pl. 58 (middle figure). *Coris formosa*: Smith, 1957: 119*; 1961: 567, **No. 809a*.**

D IX,12; A III,12; P 13; LL 71-78; a narrow naked zone middorsally on nape; no naked area anteroventrally on chest; body depth 2.7-3.5 in SL; 1st 2 D spines of adults greatly elongate (slightly prolonged on large juveniles) and space between them notably less than between remaining spines; C rounded, becoming truncate in large males; V reach to or beyond A origin. Juveniles orange, shading to dark brown anteriorly on head and ventrally on body with 3 large, vertically elongate, broadly black-edged, white spots dorsally on body (the 2 anterior ones extending into D) and 2 similar but small elongate spots dorsally on head; a large oval black spot near middle of D. Initial phase grey to greyish brown with small black spots; head yellowish dorsally and anteriorly with 2 long diagonal blue stripes which pass through eye; unscaled C bright red on basal half and white on outer half. Terminal males (*frerei* phase) reddish to lavender on body and C with numerous small, dark-edged, blue-green spots (except posterior margin of C which is light orange-red).

Reported to attain 60 cm. Indian Ocean, south to Durban.

220.23 *Coris gaimard africana*
Smith, 1957
PLATE 96

African coris — Afrikaanse coris

Julis Gaimard Quoy & Gaimard, 1824: 265, Pl. 54, Fig. 1 (Maui, Hawaiian Ids.). *Julis greenovii* Bennett, 1829: 37 (Hawaiian Ids.). *Coris gaimard*: Smith, **SFSA No. 809*.** *Coris gaimard africana* Smith, 1957: 119, Pl. 1 A, Pl. 2 A (Mahé, Seychelles). *Coris africana*: Smith, 1961: 569, **No. 809*.**

D IX,12; A III,12; P 13; LL 70-80; no naked zone middorsally on nape or venteroanteriorly on chest; body depth 3.3-3.8 in SL; first 2 D spines of adults greatly prolonged and close together; C rounded; V of adults reaching to or beyond A origin. Juveniles coloured much like those of *C. formosa* but lack large black spot in D, and 1st white body wedge does not reach ventral surface. Adults reddish on body, each scale with a narrow green mark at base; head green with broad reddish bands, the most conspicuous from corner of mouth across lower preopercle to edge of subopercle and interopercle, and one above and approximately parallel to it from snout through lower part of eye to edge of opercle. Males develop a light green bar on body above A origin.

Attains at least 35 cm. This subspecies occurs only in the western Indian Ocean (to 30°S in South African waters); *C. gaimard gaimard*, a more colourful form with brilliant blue spots on the body and a bright yellow C, occurs in the eastern Indian Ocean and the western and central Pacific.

Genus ***Cymolutes*** Günther, 1861

Three species as diagnosed by Schultz and collaborators, 1960; 1 in our area.

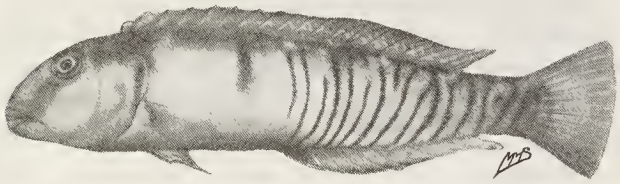
220.24 *Cymolutes praetextatus*
(Quoy & Gaimard, 1834)
PLATE 96

Knife wrasse — Mes-lipvis

Julis praetextata Quoy & Gaimard, 1834: 712, Pl. 15, Fig. 4 (Mauritius). *Cymolutes lecluse* (*non* Quoy & Gaimard): Smith, **SFSA No. 820*.**

D IX,13; A III,12; P 11-13; branched C rays 10; LL (48-68)+(15-22); dorsal profile of head steep, 60° or more; body depth 3.6-3.7 in SL; mouth terminal or with lower jaw slightly projecting; a pair of long canines anteriorly in each jaw; no posterior canine; D spines progressively longer posteriorly; V short; C truncate to slightly rounded; pale with vertical dark brown lines on posterior two-thirds of body connected by a dark brown stripe.

Attains 20 cm. Indo-Pacific; south to Natal. Lives over open stretches of sand bottom and dives head-first into sand with the approach of danger.



220.24 *Cymolutes praetextatus*: 11 cm (N. Mozambique).

Genus ***Decodon*** Günther, 1861

Four species in the genus (1 Atlantic, 1 eastern Pacific and 2 Indo-West Pacific); 1 in our area.

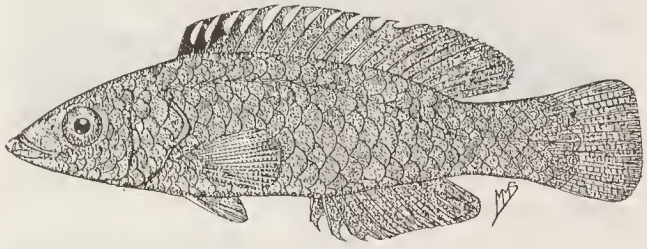
220.25 *Decodon grandisquamis*
(Smith, 1968)

Largescale wrasse — Grootskub-lipvis

Lepidaplois (Pariolanthus) grandisquamis Smith, 1968: 343, Figs. 1 & 2 (off Ponta da Barra Falsa, Mozambique).

D XI,9; A III,10; P 16; LL 26, gently curved; GR 17; body depth 3.7 in SL; 2 prominent canine teeth anteriorly on each side of jaws, the 2nd flaring strongly outward; 1-3 canines at corner of mouth; posterior preopercular margin serrate; scales dorsally on head extending anterior to nostrils; no scales basally on D and A; V short; C rounded.

Pale in preservative, with a blackish area anteriorly on D; life colour not recorded. Known from a single specimen, 185 mm in total length, taken in 200 m off Mozambique at 23°S.



220.25 *Decodon grandisquamis*: 18.5 cm (S. Mozambique).

Genus ***Epibulus*** Cuvier, 1815

Two Indo-Pacific species (1 undescribed); 1 species in our area.

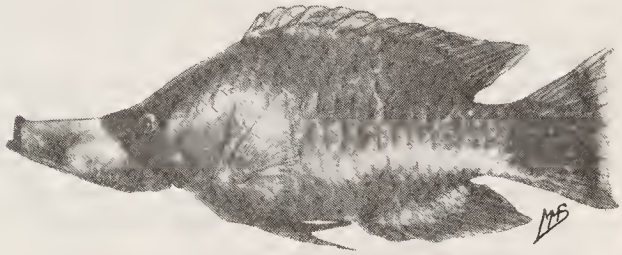
220.26 *Epibulus insidiator*
(Pallas, 1770)
PLATE 96

Slingjaw — Gooibek

Sparus insidiator Pallas, 1770: 41, Pl. 5, Fig. 1 (Java). *Epibulus insidiator*: Smith, 1961: 520, **No. 817b*.**

D IX,10; (rarely IX,11 or X,9); A III,8-9 (rarely 9); P 12; LL (14-15)+(6-8); a prominent canine tooth anteriorly on each side of jaws, the uppers forward-projecting; mouth oblique, the jaws extremely protractile, the lower jaw extending posterior to lower edge of opercle; scales dorsally on head reaching to above eyes; no free preopercular margin (covered by scales); V of adults extending beyond A origin; posterior D and A of adults prolonged; C of adults truncate centrally, the lobes prolonged. Females occur in 2 phases, brown or yellow; males have a pale grey head with a black line through eye; body orange-red anterodorsally, brown with dark green-edged scales elsewhere, often with a broad yellow bar on side at P tip. Small juveniles are brown with white bands radiating from eye, a narrow white bar on thorax, 3 on body, and 1 on C base.

Reaches at least 35 cm. Indo-Pacific; south to Delagoa Bay. Capable of extremely rapid protrusion of jaws when feeding; preys mainly on small fishes, crabs and shrimps.



220.26 *Epibulus insidiator*: 20 cm, with mouth extended (N. Mozambique).

Genus ***Gomphosus*** Lacepède, 1801

Two species; 1 in our area.

220.27 *Gomphosus caeruleus*
Lacepède, 1801
PLATE 97

Birdfish — Voëlvis

Gomphosus caeruleus Lacepède, 1801: 101, Pl. 5, Fig. 1, Pl. 6, Fig. 1 (Mauritius). *Gomphosus coeruleus*: Smith, **SFSA No. 783*.** *Gomphosus varius* (*non* Lacepède): Smith, **SFSA No. 784*.**

D VIII,13; A III,11; P 15; LL 25-26, (+2 on C base), deflected downward below posterior D; head naked; snout of adults very elongate and tubular, its length about half head length; V short; C truncate to slightly emarginate (initial phase) or with lobes prolonged (terminal male). Initial phase yellowish, with a blackish spot on each scale except on chest and lower abdomen; 2 or 3 rows of elongate blackish spots on head behind eye; C with a narrow yellow rear margin and a broad blackish submarginal band. Terminal males deep blue-green; outer part of D and A and a large posterior crescent in C light yellowish green.

220.27 *Gomphosus caeruleus*: 12.5 cm female (N. Mozambique).

Reaches 28 cm. Indian Ocean, south to southern Natal. The Red Sea population represents a different subspecies, *G. caeruleus klunzingeri* Klausewitz, 1962.

Genus ***Halichoeres*** Rüppell, 1835

About 55 species (9 western Atlantic, 5 eastern Pacific, the rest Indo-Pacific); 8 in our area. *H. zeylonicus* (Bennett, 1832), *H. pelicieri* Randall & Smith, 1982 and *H. trispilus,* Randall & Smith, 1982 occur at Mauritius and are included in the key below.

KEY TO SPECIES

1a Isolated patch of small scales on upper part of opercle; LL 26 2
1b No scales on opercle; LL 27 or 28 3

2a A near-vertical band of small scales behind eye; suborbital pores of adults 20-40; no dark stripe on body; adults with a series of square black-edged, white spots following scale rows; a yellow spot on body at base of 4th and 5th D spines, followed by a large black blotch ..... *H. hortulanus*
2b No band of scales behind eye; suborbital pores 9-11; a dark stripe from eye to upper base of C (zigzag on body of adults); no yellow spot or black spot at base of D ..... *H. scapularis*

3a D IX,13-14; ground colour of head and body dark brown to blackish ..... *H. marginatus*
3b D IX,11-12 (rarely 13 for *iridis*); ground colour of head and body not dark brown or blackish (except body of *iridis* mostly dark brown) 4

4a P usually 15 (occasionally 14); membranes between 2nd and 5th D spines elevated above rest of fin; a prominent triangular dark spot at upper P base .... *H. dussumieri*
4b P 12-14 (rarely 15) membranes between 2nd and 5th D spines not elevated above rest of fin; no triangular dark spot at upper P base (*zeylonicus* and *pelicieri* with a very small black spot at this location) 5

5a P usually 14 (rarely 13 or 15); females with a large pink area on abdomen; (reduced in size or lost in males); males with a black spot on opercle ..... *H. nebulosus*
5b P 12 or 13 (usually 13); no pink area on abdomen; no black spot on opercle 6

6a Anterior LL scales with 1 pore; a small black spot at upper P base; a distinct yellow, blackish or pink stripe on upper side of body in life; 7
6b Anterior LL scales with 2-5 pores; no black spot at upper P base; no stripe on side of body 8

7a C of male double emarginate and a large black spot on upper side; males without a broad blackish stripe in D ..... [*H. zeylonicus*]
7b C of male rounded and no black spot on side; males with a broad median blackish stripe in D ..... [*H. pelicieri*]

8a Median dorsal region of nape and median ventral region of chest scaleless; 3rd and 4th D spines slightly longer than 5th and 6th; females with 3 longitudinal rows of large dark brown spots on side of body (faint on males except a black one larger than eye behind upper end of gill opening) ..... *H. lapillus*
8b Median dorsal region of nape and median ventral region of chest scaled (though scales mid-dorsally on nape may be embedded); 3rd and 4th D spines shorter than 5th and 6th; no large dark spots on side of body 9

9a D and A soft-rays 11; body with alternating stripes of bluish grey to green and salmon pink to yellow; ..... *H. cosmetus*
9b D and A soft rays 12; colour not as in 9a 10

10a Body brown with a broad red band along back; head orange-yellow with greenish bands and a dark spot behind eye ..... *H. iridis*
10b Body pale pink with a horizontal row of 3 dark dots dorsally (1 on nape and 2 beneath spinous portion of D); upper part of head finely striped with light red and white ..... [*H. trispilus*]

220.28 *Halichoeres cosmetus*
Randall & Smith, 1982
PLATE 91

Adorned wrasse — Tooi-lipvis

Halichoeres cosmetus Randall & Smith, 1982: 15, Pl. 6C, Pl. 7, Figs. A, B (Maldive Ids.).

D IX,11; A III,11; P 12-14; LL 26-28, abruptly bent downward beneath posterior part of D (true of all *Halichoeres*); anterior LL scales with 2-4 (usually 3) pores; GR 17-20; a canine tooth (sometimes 2) at corner of mouth (found in all *Halichoeres*, at least as adults); head naked; scales on chest smaller than those of rest of body (true of other *Halichoeres*); suborbital pores 8-11; body with alternating stripes of bluish grey or green and salmon pink and green; a blackish spot behind eye.

Attains more than 11 cm. Western Indian Ocean to Aliwal Shoal south of Durban. A beautiful wrasse common around coral reefs and rocky substrata in about 5 - 30 m. Related to *H. ornatissimus* (Garrett, 1863) of the Cocos-Keeling Ids. and islands of Oceania.

220.29 *Halichoeres dussumieri*
(Valenciennes, 1839)
PLATE 92

Bubblefin wrasse — Bobbelvin-lipvis

Julis Dussumieri Valenciennes, *in* Cuv. & Val., 1839: 478 (coast of Malabar, India). *Halichoeres dianthus* Smith, 1947: 802 (Inhaca Id., Mozambique); **SFSA No. 789***. *Halichoeres nigrescens*: Smith, **SFSA No. 791***. *Halichoeres dussumieri*: Randall & Smith, 1982: 6*.

D IX,12; A III,12; P 14-15; LL 27, anterior scales with 2-5 pores; GR 18-22; head naked; suborbital pores 8-12; membranes between 2nd and 5th D spines higher than rest of fin. Light greenish dorsally, shading to white ventrally, with 6 or 7 irregular reddish brown bars on upper two-thirds of body (the 2nd and 4th in approximate X-shape), resulting from

dark spots on scales; irregular pink bands on head; a triangular black spot at upper P base; median fins with pale, bubble-like spots.

Attain 14 cm. Indo-West Pacific, south to Durban, abundant in Delagoa Bay; a shallow-water species of rocky or weedy bottoms along shores of continents and large islands. Often identified as *H. nigrescens* (Bloch & Schneider), but this name cannot be convincingly linked to any known species of *Halichoeres*.

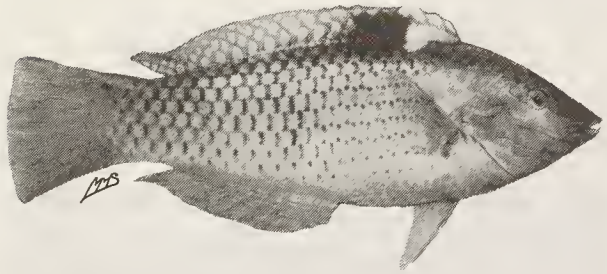
220.30 *Halichoeres hortulanus*
(Lacepède, 1801)
PLATES 91 & 92

Checkerboard wrasse — Geruite lipvis

Labrus hortulanus Lacepède, 1801: 449, 518, Pl. 29, Fig. 2 (Indian Ocean). *Labrus centriquadrus* Lacepède, 1801: 437, 493 (Madagascar, Mauritius and Réunion). *Halichoeres centriquadrus*: Smith, **SFSA No. 793***. *Halichoeres hortulanus*: Smith, 1980: 181; Randall & Smith, 1982: 4*.

D IX,11; A III,11; P 14 (rarely 13); LL 26, anterior LL scales with 1 pore; GR 20-25; a near-vertical band of small scales behind eye; scales dorsally on head extending to or slightly anterior to a vertical at rear edge of eye; suborbital pores increasing with age from 12 in juveniles (3-4 cm) to 40 in adults. Body of females white, each scale with a black bar connected longitudinally at upper and lower edges (except ventrally) to produce an effect of a series of white squares edged in black; a large yellow spot centred at base of 4th and 5th D spines, followed by a large black blotch; head green with pink bands; C yellow. Males similar, but ground colour of body light blue-green and C orange-red with yellow spots. Juveniles broadly marked with white and black with a large yellow-edged black spot in middle of D.

Attains 26 cm. Indo-Pacific; south to Sodwana Bay.



220.30 *Halichoeres hortulanus:* 23 cm (N. Mozambique).

220.31 *Halichoeres iridis*
Randall & Smith, 1982
PLATE 92

Rainbow wrasse — Reënboog-lipvis

Halichoeres iridis Randall & Smith, 1982: 3, 17, Pl. 7, Figs. C, D, E (Mauritius).

D IX,12; (rarely 13); A III,12; P 13 (rarely 14); LL 27, anterior scales with 3-5 pores; GR 15-19; head naked; scales dorsally on nape nearly reaching a vertical at rear edge of eye (anterior scales may be embedded); suborbital pores 9-12. Body brown, the females with a red band on back; head orange-yellow with irregular greenish bands and a black spot behind eye. Juveniles with 3 black spots in D.

Largest specimen, 11 cm. East African coast to Natal (30°S), Madagascar, Seychelles and Chagos Archipelago. Recorded from 6 to 43 m; usually found at depths greater than 20 m.

220.32 *Halichoeres lapillus*
Smith, 1947
PLATES 92 & 97

Jewelled wrasse — Juweel-lipvis

Halichoeres lapillus Smith, 1947: 801 (Inhaca Id., Mozambique); **SFSA No. 790***; Smith, 1980: 181; Randall & Smith, 1982: 14*.

D IX,11; A III,11; P 13; LL 27, anterior scales with 2-5 pores; GR 17-21; median dorsal zone of nape scaleless, the scales on each side extending forward to a vertical from upper end of preopercle margin; median ventral region of chest naked; suborbital pores 7-10; 3rd and 4th D spines slightly longer than 5th and 6th. Females olive brown on back, shading to reddish brown, with small white spots dorsally and larger white spots ventrally which tend to join to form irregular longitudinal bands; dark brown spots in approximately 3 rows on lower two-thirds of body; head olive dorsally, soon shading to white, with 5 diagonal reddish bands. Males dusky red-orange with rows of dark-edged green spots, those on ventral half of body large and irregular; a large black spot flecked with yellow on side of body just behind upper end of gill opening; head orange-red with diagonal green bands.

Attains 14 cm. Known from Mauritius, Madagascar and southern Mozambique to Natal. Usually found on rocky bottom or reefs dominated by algae in about 5 to 15 m.

220.33 *Halichoeres marginatus*
Rüppell, 1835
PLATES 97 & 99

Dusky wrasse — Donker lipvis

Halichöres marginatus Rüppell, 1835: 16 (Red Sea). *Julis notopsis* Valenciennes, *in* Cuv. & Val, 1839: 485 (Guam). *Halichoeres notopsis*: Smith, 1957: 106; 1961: 569, **No. 792b** (initial phase). *Halichoeres marginatus*: Randall & Smith, 1982: 5*.

D IX,13-14 (usually 13); AIII,12-13 (usually 12); P 14-15 (rarely 15); LL 27-28 (rarely 28), the anterior scales with 2-4 pores; GR 17-20; head naked; scales dorsally on nape extending to a vertical at rear edge of eye; suborbital pores 10-14; V of terminal males long, reaching beyond A origin. Initial phase dark brown, usually with darker brown lines along scale rows; C whitish; 2 yellow-edged black spots in D, a small one anteriorly and a large one in middle. Terminal males orange-brown with a blue-edged green spot on each scale forming longitudinal lines; unscaled part of C greenish yellow with a blue-edged orange-red crescent containing small blue spots; no black spots in D. Juveniles black with narrow yellow stripes.

Attains 18 cm. Indo-Pacific; south to Inhaca Id.

220.34 *Halichoeres nebulosus*
(Valenciennes, 1839)
PLATES 97 & 99

Picture wrasse — Prent-lipvis

Julis nebulosus Valenciennes, *in* Cuv. & Val., 1839: 461 (Bombay). *Halichoeres margaritaceus* (*non* Valenciennes): Smith, **SFSA No. 792***.

Halichoeres kawarin (*non* Bleeker): Smith, **SFSA No. 792a***. *Halichoeres nebulosus*: Kuiter & Randall, 1981: 15*; Randall & Smith, 1982: 10*.

D IX,11; (rarely 12); A III,11; P 14 (rarely 13 or 15); LL 27, anterior scales with 1-3 pores; GR 17-21; head naked; narrow median zone of nape naked except for a few embedded scales anterior to D; scales on side of nape not reaching posterior edge of eye; suborbital pores 10-14; V of males nearly or just reaching anus. Females with large irregular interconnected dark bars on body (broadest and darkest dorsally), a large light red area on abdomen containing 2 or more white lines; a vertically elongate small black spot behind eye, a larger but less distinct one on opercle, a small one anteriorly on D and a large yellow-edged one anteriorly in outer part of soft portion of fin. Males primarily green, the red area on abdomen reduced or absent, the black spots less defined or absent except one on opercle.

Maximum length 11 cm. Indo-West Pacific; entire coast of east Africa to Algoa Bay. A common inshore species; juveniles live in sandy areas, adults on exposed rocky bottoms.

220.35 *Halichoeres scapularis*
(Bennett, 1831)
PLATES 97 & 99

Zigzag sandwrasse — Sigsag-sandlipvis

Julis scapularis Bennett, 1831: 167 (Mauritius). *Halichoeres scapularis*: Smith, **SFSA No. 795***; Randall & Smith, 1982: 5*.

D IX,11; A III,11; P 14; LL 26, anterior scales with 1 pore; GR 17-21; head naked except for a patch of 9-12 small scales dorsally on opercle; no median naked zone on nape, the scales extending forward to rear edge of eyes; suborbital pores 9-11. Initial-phase adults with a dark brown stripe from eye along upper side (where often zigzag) to upper C base; body above stripe greenish, below white. Terminal males retain the zigzag stripe on body, though broader and suffused with pink; ground colour green with blue-edged pale pink spots following scale rows on sides; head green with irregular blue-edged pink bands and spots.

Maximum length nearly 20 cm. Indo-West Pacific, common from Red Sea (where terminal males differ slightly in colour) to Natal. Typically found in bays or lagoons on sand, rubble or seagrass substrata near reefs or rocky areas.

Genus ***Hemigymnus*** Günther, 1861

Two Indo-Pacific species; both found in our area.

KEY TO SPECIES

1a Body black with 5 narrow white bars; total GR 22-24 ... *H. fasciatus*
1b Body pale anteriorly, blackish behind a line between origins of D and A; total GR 26-29 ..... *H. melapterus*

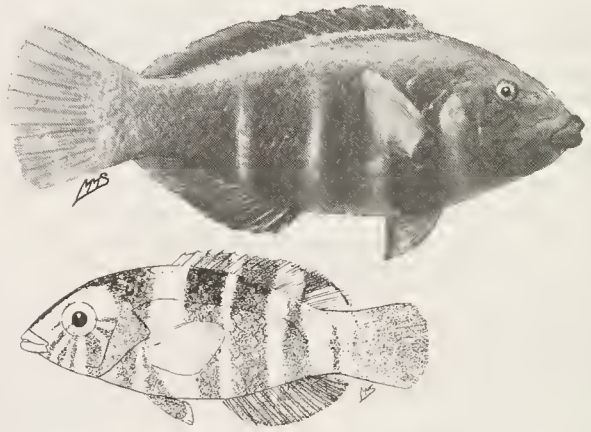
220.36 *Hemigymnus fasciatus*
(Bloch, 1792)
PLATE 98

Barred thicklip — Balk-dikbek

Labrus fasciatus Bloch, 1792: 6, Pl. 290 (Japan). *Hemigymnus fasciatus*: Smith, **SFSA No. 787***.

D IX,11; AIII,11; P 14; LL 25, sharply deflected downward below rear of D; GR 22-24; body depth 2.4-2.6 in SL; head naked except for a narrow band of small scales passing from behind to well below eye; lips very thick and fleshy, the lower deeply incised in median line; a single pair of strongly projecting canine teeth anteriorly in each jaw, followed by a row of small blunt conical teeth. C slightly rounded. Body black with 5 narrow white bars (the 1st on nape); chest white; P base black; head pale yellowish or light green with broad, irregular, blue-edged, pink bands (head blackish in juveniles with narrow white bands radiating from eye); C blackish or dark yellowish.

Reported to lengths as great as 80 cm, but the author has observed none longer than 40 cm. Indo-Pacific, south to Inhaca Id. Feeds on a variety of invertebrates, especially crustaceans, molluscs and echinoids; most prey animals very small.



220.36 *Hemigymnus fasciatus:* top: 22 cm (Seychelles); bottom: 4 cm (Inhaca Id.).

220.37 *Hemigymnus melapterus*
(Bloch, 1791)
PLATE 98

Blackeye thicklip — Swartoog-dikbek

Labrus melapterus Bloch, 1791: 137, Pl. 285 (Japan). *Hemigymnus melapterus:* Smith, **SFSA No. 788***.

D IX,11; A III,11; P 14; LL 25, sharply deflected downward below rear of D; GR 26-29; body depth 2.4-2.7 (smaller fish deeper bodied); head naked except for a narrow band of small scales passing from behind to well below eye; lips very thick and fleshy, the lower deeply incised in median line; dentition as in *H. fasciatus*; C truncate to slightly rounded. Body posterior to a diagonal demarkation between D and A origins blackish with a blue or blue-green line on each scale, shading to pale grey anteriorly; head light yellowish grey, darker dorsally, with broad blue-edged, dusky red bands radiating from eye; often a large blackish spot behind eye. Juveniles with a broad white bar from front of D to anterior abdomen; head and body anterior to bar light grey, posterior black; C and adjacent C peduncle bright yellow.

Reported to 90 cm. Central Pacific to Indian Ocean, south to Inhaca Id. Observed feeding by ingesting sand, rising above bottom for a few moments, then expelling sand. Stomach contents reveal crustaceans, molluscs, worms,

brittle stars, foraminifera, etc. of very small size, evidently sorted from the sand within the mouth.

Genus ***Hologymnosus*** Lacepède, 1801

Four Indo-Pacific species; 1 undescribed (Randall, 1982); 1 recorded from southern Africa. The wide-ranging *H. annulatus* (Lacepède, 1801), (*H. semidiscus* (Lacepède, 1801) is a synonym) occurs from the Red Sea and east Africa to French Polynesia and the Pitcairn Group; although not yet recorded from southern Africa, it probably occurs here and is thus included in the Key below.

KEY TO SPECIES

1a P 1.65-1.9 in head; C emarginate, maximum C concavity of large males about 5 in head; juveniles yellow on back with a reddish line, the lower side with a very broad dark brown stripe; initial-phase adults olive brown with dark brown bars on bady and a whitish crescent posteriorly in C; terminal males blue-green with purplish red bars on side of body and without a broad pale bar in P region (pale bar, if present, centred above origin of A) ..... [*H. annulatus*]

1b P 1.9-2.15 in head; C double emarginate, the maximum C concavity of large males about 11 in head; juveniles white with 3 narrow orange-red stripes; initial-phase adults light-coloured with dark bars and without a conspicuous whitish crescent posteriorly in C; terminal males light blue-green to light red with lavender blue bars and a broad pale zone in P region bordered by purple ..... *H. doliatus*

220.38 *Hologymnosus doliatus*
(Lacepède, 1801)
PLATE 98

Ringed wrasse — Geringde lipvis

Labrus doliatus Lacepède, 1801: 429, 473, Pl. 6, Fig. 3 (Indian Ocean). *Hologymnosus fasciatus* Lacepède, 1801: 556, 557, Pl. 1, Fig. 3 (Indian Ocean). *Hologymnosus semidiscus* (*non* Lacepède): Smith, **SFSA No. 810***. *Hologymnosus doliatus*: Smith, 1980: 181; Randall, 1982: 16*.

D IX,12; A III,12; P 13; LL 97-112, deflected sharply downward below 9th D soft ray; GR 18-22; body elongate, the depth 3.7-5.4 in SL (larger individuals deeper bodied); head naked; jaws with 2 pairs of canine teeth anteriorly, the 1st pair largest and more projecting; no canine tooth at corner of mouth; C of juveniles and small initial-phase fish rounded, becoming double emarginate in large adults, the maximum C concavity in large males about 11 in head. Juveniles white with 3 narrow orange-red stripes. Initial phase pale greenish, bluish or pinkish with 20-23 orangish brown bars on body. Terminal males light blue-green to light red with lavender blue bars and a pale zone in pectoral region of body bordered by purple; head blue to blue-green with irregular pink to orange bands.

Largest examined, 38 cm; recorded to 50 cm. Central Pacific to east Africa, south to southern Natal. Feeds mainly on fishes and crustaceans.

Genus ***Labrichthys*** Bleeker, 1854

A single Indo-Pacific species (Randall & Springer, 1973).

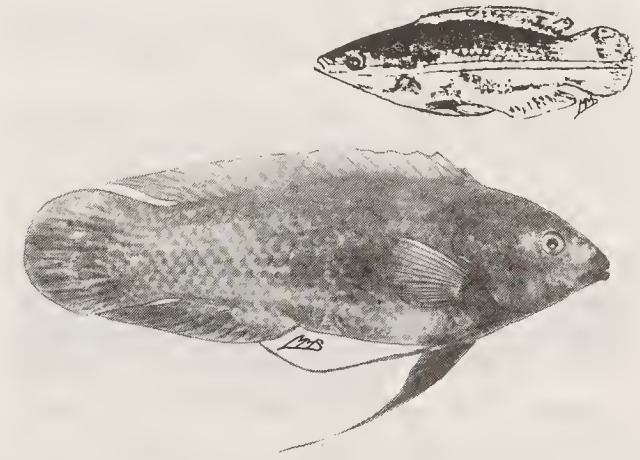
220.39 *Labrichthys unilineatus*
(Guichenot, 1847)
PLATE 100

Tubelip wrasse — Buis-lipvis

Cossyphus unilineatus Guichenot, 1847: 284 (Guam). *Labrichthys cyanotaenia*: Bleeker, 1854: 331 (Flores); Smith, 1957: 103; 1961: 569, **No 788a.** *Labrichthys unilineatus*: Randall & Springer, 1973: 284*.

D IX,11 (rarely 12); A III,10 (rarely 11); P 14-15 (usually 14); LL 25-27, sharply bent downward below rear of D; total GR 9-10, small, all on lower limb; body depth 2.6-3.2 in SL; lips thick, fleshy, strongly plicate, forming a short tube when mouth closed; upper jaw with 2 pairs of incurved canine teeth at the front, a large canine posteriorly, but no intervening teeth; lower jaw with single pair of canines anteriorly followed by 3-5 small teeth; V short in juveniles and females, but very long in males; C rounded. Small juveniles brown with 2 thin, bluish white stripes (1 lateral, 1 ventral); larger fish lose the lower stripe, and the lateral one becomes yellowish. Females yellowish brown with a dull blue line along centre of each scale row of body, faint irregular blue bands on head, and a yellow mouth; males dark olive with bright blue longitudinal lines on body, bright blue reticulum on head, and a broad light yellow bar (sometimes diffuse) on side of body in P region.

Largest specimen 17.5 cm. Marshall Ids. and Samoa Ids. to Africa; south to Bazaruto (21°S). Feeds on coral polyps.



220.39 *Labrichthys unilineatus*: top: 5 cm juvenile (N. Mozambique); bottom: 16 cm adult (Seychelles).

Genus ***Labroides*** Bleeker, 1851

Five Indo-Pacific species; 2 in our area.

KEY TO SPECIES

1a LL 52-54; adults light blue with a black stripe (wider posteriorly); juveniles black with a narrow bright blue stripe dorsally ..... *L. dimidiatus*

1b LL 28; posterior body and C of adults pale yellow with a black crescent in hind part of fin; juveniles black with a bright yellow stripe dorsally ..... *L. bicolor*

220.40 *Labroides bicolor*
Fowler & Bean, 1928
PLATES 98 & 100

Bicoloured cleaner wrasse Tweekleur-skoonmakertjie

Labroides bicolor Fowler & Bean, 1928: 224, Pl. 18 (Philippines); Randall, 1958: 334*; Smith, 1980: 181.

D IX,11; A 1II,10; P 13; LL 26 (+2 on C base), bent downward below rear of D; body depth 3.7-4.5 in SL; cheek and opercle scaled, rest of head naked; lips and dentition as in *L. dimidiatus;* P short; C slightly rounded. Females dark grey to blackish with a black lateral stripe anteriorly, whitish to yellowish posteriorly, with curved submarginal band in hind part of C. Males with head deep blue, body black anteriorly, becoming yellow posteriorly; C with a subterminal black crescent, green anterior and posterior to this marking. Juveniles largely black with narrow bright yellow stripe on back which continues dorsally onto head.

Attains 14 cm; Indo-Pacific south to Natal. Food habits as in *L. dimidiatus,* but more inclined to rove in quest of host fishes.

220.41 *Labroides dimidiatus*
(Valenciennes, 1839)
PLATE 100

Bluestreak cleaner wrasse Bloustreep-skoonmakertjie

Cossyphus dimidiatus Valenciennes, *in* Cuv. & Val., 1839: 136 (Mauritius) (on *Labrus latovittatus* (*non* Lacepède): Rüppell, 1835; Gulf of Suez). *Fissilabrus dimidiatus*: Smith, **SFSA No. 805*.** *Labroides dimidiatus*: Randall, 1958: 329*; van der Elst, 1981: 191*.

D IX,11; A III,10; P 13; LL 50-52 (+2 on C base), bent downward beneath posterior part of D; body depth 4.1-4.7; small scales on cheek and operculum, the rest of head naked; lips thick, the lower strongly bilobed; a single pair of curved canine teeth anteriorly in each jaw and a canine posteriorly on upper jaw; sides of jaws with several rows of small teeth; V small; C truncate to slightly rounded. Adults light blue, shading to pale yellowish or white anteriorly, with a black stripe from snout through eye to rear edge of C, this stripe progressively broader posteriorly. Juveniles largely black with a narrow bright blue stripe on back which continues onto dorsal part of head.

Attains 11.5 cm. Indo-Pacific; south to Algoa Bay. Feeds mainly on crustacean ectoparasites and mucus of other fishes, even entering the mouths and gill chambers of some of the larger host fishes. Establishes "cleaning" stations on the reef to which host fishes come for its services.

220.41 *Labroides dimidiatus:* 8 cm (N. Mozambique).

Genus ***Macropharyngodon*** Bleeker, 1861

Ten species, all Indo-Pacific; 3 in our area. A single specimen from Delagoa Bay reported by Smith (1957: 104; 1961: 569, **No. 795a**) as *M. meleagris* (Valenciennes) may be *M. ornatus* Randall, 1978 from Mauritius. Additional material of *M. ornatus* should be obtained to confirm the presence of this species in southern Africa.

KEY TO SPECIES

1a Anterior LL scales with 8-18 pores; last D and A rays longest; a large dark brown or black spot above and behind upper end of gill opening ..... *M. vivienae*
1b Anterior LL scales with 2-3 pores; last D and A rays not the longest; no dark brown spot above and behind gill opening 2

2a Brown to brownish yellow with a blue spot on each scale of body and irregular blue lines on head; C of females white, of males coloured like body ..... *M. cyanoguttatus*
2b Colour not as in 2a 3

3a Body of females orange with white spots except a large black area over abdomen and chest containing a coarse blue reticulum; males dull orange-red with diagonal dark-edged green bands on head which continue horizontally onto front of body, becoming irregular and disappearing in middle of body; a pale yellow to orange area on body below soft portion of D and dorsally on C peduncle; below this a row of blue-edged reddish black blotches forming a broken lateral band ..... *M. bipartitus*
3b Females reddish anteriorly, shading to blackish posteriorly, with greenish yellow spots edged in blue and black (1 per scale) on body and similar spots and irregular bands on head; males similar in colour but less blackish ..... [*M. ornatus*]

220.42 *Macropharyngodon bipartitus*
Smith, 1957
PLATES 98 & 109

Divided wrasse Verdeelde lipvis

Macropharyngodon bipartitus Smith, 1957: 104, Pl. 2 B, text-fig. 2 (Pinda, Mozambique); Smith, 1980: 181. *Macropharyngodon varialvus* Smith, 1957: 104, Pl. 2 A, text-fig. 3 is the female (Pinda, Mozambique). *Macropharyngodon bipartitus bipartitus*: Randall, 1978: 756*.

D IX,11; A III,11; P 12; LL 27, angling sharply downward below posterior D (true of other *Macropharyngodon*); anterior LL scales with 2 or 3 pores; body depth 2.6-3.05 in SL; head naked; no median predorsal scales (small scales on side of nape); 2 pairs of canine teeth anteriorly in jaws; the first pair of upper jaw strongly projecting, the second recurved, and a large canine at corner of mouth; small teeth on side of jaws in 1 row; pharyngeal bones dominated by a few very large molariform teeth; ventral free preopercle margin very short, extending little beyond rounded corner (true of other species of the genus); 5th or 6th D soft rays usually longest; C rounded. Females orange on body with white spots of variable size except for a very large black area over chest and abdomen containing a coarse network of bright blue; head orange-yellow with black-edged orange or pale blue spots behind and above eye. Males dull orange-red with dark-edged green diagonal bands on head which continue to middle of body where they break up to irregular spots; a large light yellow to

orange area beneath soft portion of D and onto C peduncle; a series of blue-edged dark reddish blotches forming an irregular band posterolaterally on body.

Reaches about 11 cm. Western Indian Ocean, south to Natal. The Red Sea population has been named a different subspecies, *M. b. marisrubri* Randall, 1978, based on fewer GR and a more spotted colour pattern on the body of the male.

220.43 *Macropharyngodon cyanoguttatus*
Randall, 1978
PLATE 109

Bluespotted wrasse — Blouspikkel-lipvis

Macropharyngodon cyanoguttatus Randall, 1978: 746, 749, Fig. 3 C, D (Mauritius); Smith, 1980: 181.

D IX,11; A III,11; P 12; LL 27, the anterior scales with 2 or 3 pores; body depth 2.6-2.9 in SL; head naked; no median predorsal scales; dentition as in *M. bipartitus*; 7th to 9th D soft rays longest. Body of females brown with a round blue spot on each scale; snout, dorsal part of head and nape yellow, the rest of head brownish yellow with irregular dark-edged blue bands; unscaled part of C white. Body and C of males brownish yellow with dark-edged blue spots; head dull orange-yellow with dark-edged blue bands forming a reticulum.

Largest specimen, 11.5 cm. Known only from Mauritius, Réunion and the north coast of Natal.

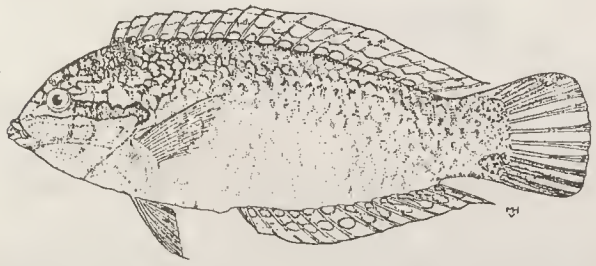
220.44 *Macropharyngodon vivienae*
Randall, 1978
PLATE 109

Madagascar wrasse — Madagaskar-lipvis

Macropharyngodon vivienae Randall, 1978: 746, 764, Fig. 6 (Madagascar); Smith, 1980: 181.

D IX,11; A III,11; P 12; LL 27, the anterior scales with 8-12 pores; body depth 2.8-2.9 in SL; head naked; no median predorsal scales; dentition as in preceding species; last D and A rays longest; C rounded. Females red, with a large black spot narrowly edged in blue above and behind gill opening; salient colour markings of males are a large black spot in humeral region containing irregular light blue markings, a bright yellow spot nearly as large as eye dorsally on opercular flap, and 2 large oval dark red spots, one above the other, on C base.

Attains at least 11 cm. Known only from Madagascar and the Natal coast south to Durban.



220.44 *Macropharyngodon vivienae:* 8.5 cm SL male holotype (after Randall, 1978).

Genus ***Novaculichthys*** Bleeker, 1861

Three Indo-Pacific species, 2 in our area.

KEY TO SPECIES

1a P 12; body depth 3.4-3.9 in SL; 1-3 oblique rows of small scales on cheek; green to brownish yellow, usually with dark blotches in a midlateral row on body ..... *N. macrolepidotus*

1b P 13; body depth 2.8-3.1 in SL; no rows of small scales on cheek; adults dark grey with a curved black band beneath basal part of P and a small orange spot at upper base of fin ..... *N. taeniourus*

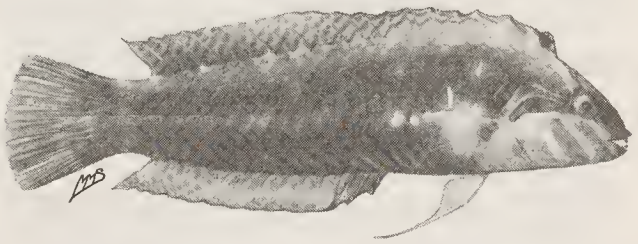
220.45 *Novaculichthys macrolepidotus*
(Bloch, 1791)
PLATES 100 & 102

Seagrass wrasse — Groen lipvis

Labrus macrolepidotus Bloch, 1791: 135, Pl. 284, Fig. 2 (locality not given). *Novaculichthys macrolepidotus*: Smith, **SFSA No. 813*.**

D IX,12-14; A III,12-14; P 12; LL (19-20)+(4-6); body depth 3.4-3.9 in SL; dorsal profile of head about 45°; head naked except for 1-3 oblique rows of small scales extending to well below eye; 2 pairs of canine teeth anteriorly in each jaw; no canine posteriorly on upper jaw; origin of D above posterior margin of preopercle; longest D soft ray more than twice height of shortest D spine; C rounded. Green to brownish yellow with dark blotches in a midlateral row on body (often only posteriorly); dark bands radiating posteriorly from eye and one passing from front of upper lip to eye; a black spot edged anteriorly in white on 1st D membrane.

Western Pacific to east Africa and Red Sea; south to Durban. Lives in seagrasses (for which its usual green colour provides perfect camouflage) or dense beds of algae.



220.45 *Novaculichthys macrolepidotus:* 13 cm (N. Mozambique).

220.46 *Novaculichthys taeniourus*
(Lacepède, 1801)
PLATE 102

Rockmover wrasse — Rotsskuiwer-lipvis

Labrus taeniourus Lacepède, 1801: 488, 518, Pl. 29, Fig. 1 (Indian Ocean). *Novaculichthys taeniourus*: Smith, **SFSA No. 814*.** *Novaculichthys bifer*: Smith, 1957: 108; 1961: 569, **No. 814a.**

D IX,12 or 13; A III,12-13; P 13; LL (19-20)+(5-6); body depth 2.8-3.1 in SL; dorsal profile of head about 45°; head naked except for a short, near-vertical row of moderate scales behind eye; 2 pairs of stout canine teeth anteriorly in each jaw, none posteriorly; origin of D above posterior

margin of preopercle; longest D soft ray more than twice length of shortest spine; 1st 2 D spines of juveniles greatly prolonged; C rounded to subtruncate. Adults grey with a small curved black band beneath basal part of P, a small orange spot at base of fin, a large red area anteriorly on abdomen; a black spot on each of 1st 2 D membranes and a whitish bar at base of C. Juveniles reddish, green, or brown with irregular black-edged white spots in about 4 rows on body and large black-edged white bands radiating from eye.

Reaches 25 cm. Indo-Pacific, south to Natal. Feeds on a wide variety of invertebrates, often obtained by turning over rocks (hence the common name rockmover wrasse). Juveniles mimic drifting algae.

220.46 *Novaculichthys taeniourus:* 19.5 cm (N. Mozambique).

Genus ***Pseudocheilinus*** Bleeker, 1861

Six Indo-Pacific species, 2 undescribed and 3 in our area.

KEY TO SPECIES

1a P 15-17; a black spot slightly smaller than pupil at upper base of C; 6 dark blue stripes on upper ⅔ of body; C green or greenish yellow ..... *P. hexataenia*

1b P 14; colour not as in 1a 2

2a Anterior LL 14-16; red, the body with numerous fine longitudinal white lines; whitish streak extending backwards from corner of mouth ..... *P. evanidus*

2b Anterior LL 16-18; yellowish, the body with 8 lavender to purplish brown stripes narrower than interspaces ..... *P. octotaenia*

220.47 *Pseudocheilinus evanidus*
Jenkins, 1901
PLATE 103

Striated wrasse — Strepie-lipvis

Pseudocheilinus evanidus Jenkins, 1901: 64 (Honolulu); Randall, 1981: 94*.

D IX,11; A III,9; P 14; LL (14-16)+(4-6); body depth 2.7-3.3 in SL; preopercular margin smooth; 3 pairs of canine teeth anteriorly in upper jaw, the lateral pair enlarged and recurved; cornea divided to form a double pupil (true of other *Pseudocheilinus*); 2nd A spine longer than 3rd. Red with whitish longitudinal lines on body and a bluish white streak extending posteriorly from mouth; edge of preopercle often purple, and a purple streak usually present on opercle (purple markings persisting as dark blue or green in preservative).

Reaches nearly 8 cm. Indo-Pacific, south to Natal. A secretive species like other members of the genus.

220.48 *Pseudocheilinus hexataenia*
(Bleeker, 1857)
PLATE 103

Sixstripe wrasse — Sesstreep-lipvis

Cheilinus hexataenia Bleeker, 1857: 4 (Ambon). *Pseudocheilinus hexataenia*: Smith, **SFSA No. 819*.**

D IX,11; A III,9; P 15-16 (rarely 17); LL (16-18)+(4-6); body depth 2.4-2.7 in SL; preopercle with a membranous flap at angle, the margin above it usually finely serrate for about half its length; 3 pairs of small canine teeth anteriorly in upper jaw followed on each side by a very large recurved canine; lower jaw with a single pair of canines at symphysis; 2nd A spine longer than 3rd. Body with 6 dark blue stripes alternating with yellow-orange; a black spot slightly smaller than pupil at upper C base; 2 small blackish spots anteriorly on lower lip; C green.

Largest specimen 10 cm. Indo-Pacific, south to Natal. A common cryptic coral-reef species.

220.49 *Pseudocheilinus octotaenia*
Jenkins, 1900
PLATE 103

Eightstripe wrasse — Agstreep-lipvis

Pseudocheilinus octotaenia Jenkins, 1900: 64, Fig. 22 (Hawaiian Ids.).

D IX,11; A III,9; P 14; LL (16-18)+(5-6); body depth 2.9-3.3 in SL; preopercle with a membranous flap at angle, the margin above smooth; 2 pairs of moderate canine teeth anteriorly in upper jaw followed on each side by a very large recurved canine; lower jaw with a single pair of canines at symphysis; 2nd A spine longer than 3rd. Body yellow with 8 lavender, magenta, or purplish brown stripes alternating with yellow (sometimes yellow intensified to form distinct dashes); head with small orange-yellow spots; C pale yellow, finely spotted with yellow-orange; D and A faintly and narrowly striped with violet and yellow.

Attains 12 cm. Indo-Pacific, south to Natal. *Pseudocheilinus margaretae* Smith (1956: 929, Fig. 2) from Aldabra illustrated here (see Pl. 000), appears to be a synonym.

Genus ***Pseudodax*** Bleeker, 1861

A monotypic Indo-Pacific genus deserving placement in its own subfamily owing to its unique dentition.

220.50 *Pseudodax moluccanus*
(Valenciennes, 1839)
PLATES 100 & 102

Chiseltooth wrasse — Beiteltand-lipvis

Odax Moluccanus Valenciennes, *in* Cuv. & Val., 1839: 395, Pl. 408, Fig. 2 (Molucca Ids.); Smith & Smith, 1963: 40*. *Pseudodax moluccanus*: Randall, 1981: 99*.

D XI,12; A III,14; P 15; LL 30-31, continuous without a sharp bend, body depth 2.5-2.9 in SL; a pair of large spatulate incisiform teeth anteriorly in jaws, the lower jaw with an adjacent smaller posterior pair,

pharyngeal teeth more like those of parrotfishes than wrasses. Grey with a reddish brown spot on each scale of body; upper lip yellow with a blue streak above it extending across cheek; C blackish with a broad pale yellowish bar across base; teeth blue. Juveniles with 2 blue stripes, 1 dorsal and 1 venral.

Attains 25 cm. Indo-Pacific; recently collected at Sodwana Bay.

Genus ***Pseudojuloides*** Fowler, 1949

Eight Indo-Pacific species; 1 known in our area, but 3 others are included in the key below as they may eventually be taken here: *P. argyreogaster* Playfair & Günther, 1867 from Zanzibar and Aldabra, *P. erythrops* Randall & Randall, 1981, from Mauritius, and *P. xanthomos* Randall & Randall, 1981, known only from a single male specimen from Mauritius. Revision by Randall & Randall, 1981.

KEY TO SPECIES

1a D soft rays 12; P 12; no median predorsal scales; dull green, the males with a horizontally elongate blackish patch on side of body between soft portions of D and A ..... [*P. argyreogaster*]
1b D soft rays 11; P 13; small median predorsal scales present; colour not as in 1a 2

2a Body depth 5.0-5.4 in SL, the width 1.5-1.7 in depth; depth of C peduncle 3.2-3.7 in head; iris red in life; C of males blackish on margins (a large pale subtriangular area in centre of fin) ..... [*P. erythrops*]
2b Body depth 3.8-4.7 in SL, the width 1.8-2.4 in depth; iris yellowish; C not blackish on margins but with a large pale area in centre 3

3a C slightly rounded to double emarginate; pores along free margin of preopercle 10-13; median predorsal scales 8-11; females light orange-red dorsally, shading to yellowish ventrally on body and whitish ventrally on head and chest; males olive green dorsally, pale blue ventrally, with a double stripe of blue and yellow midlaterally on body and a large black area edged in light blue submarginally in C ..... *P. cerasinus*
3b C truncate; free margin of preopercle with 9 pores; median predorsal scales about 12; colour of females unknown; males orangish grey, shading to yellowish ventrally, with a yellow band in shoulder region and a black spot anteriorly on D ..... [*P. xanthomos*]

220.51 *Pseudojuloides cerasinus*
(Snyder, 1904)
PLATES 100 & 102

Smalltail wrasse — Kleinstert-lipvis

Pseudojulis cerasina Snyder, 1904: 528 (Honolulu). *Pseudojuloides cerasinus*: Smith, 1980: 181; Randall & Randall, 1981: 64*.

D IX,11; A III,12; P 13; LL 27; head naked; median predorsal scales 8-11; scales on chest much smaller than those on body; body depth 3.8-4.4 in SL; a pair of strongly projecting canine teeth anteriorly in jaws; sides of jaws with chisel-like incisiform teeth. Females light orange-red dorsally, shading to yellowish ventrally on body and whitish ventrally on head and chest, fins pale yellowish; iris yellow. Males olive green dorsally, pale blue ventrally, with a double stripe of blue and yellow midlaterally on body. C greenish yellow with a large vertically elongate, blue-edged, black spot posteriorly.

Attains 12.3 cm. Indo-Pacific. 1 specimen from Sodwana Bay.

220.51 *Pseudojuloides cerasinus*: 7 cm SL male (after Randall & Randall, 1981).

Genus ***Pteragogus*** Peters, 1855

About 7 species, all Indo-Pacific, 3 in our area. *Duymaeria* Bleeker, 1856 is considered a synonym.

KEY TO SPECIES

1a D spines 9, the membrane tips filamentous in males (anterior filaments longest); 1st V ray not, or just reaching A origin ..... *P. flagellifer*
1b D spines 10 or 11, membrane tips not filamentous; 1st V ray prolonged (in males reaching well beyond A origin) 2

2a D XI,9; LL 24 (+2 on C); an ocellated black spot on opercle; no prominent dark bar below eye ..... *P. pelycus*
2b D X,10; LL 23 (+2 on C); no ocellus on opercle; a dark bar (often pale-edged) passing ventrally from eye ..... *P. taeniops*

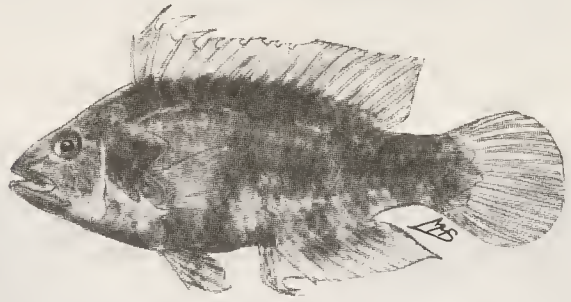
220.52 *Pteragogus flagellifer*
(Valenciennes, 1839)
PLATE 103

Cocktail wrasse — Haanstert-lipvis

Ctenolabrus flagellifer Valenciennes, *in* Cuv. & Val., 1839: 240 (no locality). *Duymaeria flagellifera*: Smith, **SFSA No. 796*.**

D IX,10-12; A III,9; P 13; LL 23, sharply deflected downward beneath rear of D; GR (4-6)+(7-9); cheeks scaled to below centre of eye; body depth 2.3-2.7 in SL; 2 pairs of canine teeth anteriorly in jaws, the more lateral pair larger, strongly recurved, and somewhat outflaring in adults; a row of conical teeth on side of jaws, those posteriorly on upper jaw enlarged; cornea modified to form a double pupil (true of all *Pteragogus*); posterior preopercular margin finely serrate; membranes from tips of D spines prolonged to filaments, progressively longer anteriorly, very long on males; 1st V ray not prolonged, not, or just, reaching A origin; C strongly rounded. A longitudinal row of large, diffuse, dark brown blotches on side of body; small blackish spots behind eye and along LL; a black spot on 1st D membrane; outer part of membranes and filaments of spinous portion of D of males blackish.

Reaches 20 cm. Indian Ocean (occurrence in Pacific uncertain); south to Natal. Generally found on substrate with heavy plant growth.



220.52 *Pteragogus flagellifer:* 10.5 cm female (Kenya).

220.53 *Pteragogus pelycus*
Randall, 1981
PLATES 100 & 103

Sideburn wrasse — Bakkebaard-lipvis

Cossyphus opercularis (*non* Guichenot): Peters, 1855: 261 (Mozambique). *Pteragogus opercularis*: Smith, **SFSA No. 797***. *Pteragogus pelycus* Randall, 1981: 82, Pl. 1, Figs. 1, 2 (new name for *Cossyphus opercularis* Peters, a homonym).

D XI,9; A III,9; P 13; LL 24, bent sharply downward below posterior D; GR (4-6)+(5-8); cheeks scaled to below centre of eye; body depth 2.5-2.9 in SL; dentition as in *P. flagellifer*; posterior preopercular margin serrate, the serrae of moderate size (increasing in number with age but not as numerous as those of *flagellifer* or *taeniops* of the same size); tips of D spine membranes not prolonged; 1st V ray prolonged (very long in males, 2.3-3.0 in SL; C strongly rounded. An oval black spot edged in yellow on opercle; small black spots on head behind eye and on nape; dark brown pigment along LL; a black spot on 1st 2 or 3 D membranes of adults (1 in juveniles).

Attains 15 cm. Western Indian Ocean, south to Durban. Occurs in seagrass beds and algal flats.

220.53 *Pteragogus pelycus:* 9.5 cm (N. Mozambique).

220.54 *Pteragogus taeniops*
(Peters, 1855)
PLATE 103

Cheekbar wrasse — Wangband-lipvis

Cossyphus taeniops Peters, 1855: 262 (Mozambique). *Pteragogus taeniops*: Smith, **SFSA No. 798***.

D X,10; A III,9; P 13; LL 23, bent sharply downward below rear of D; GR 4+(9-10); cheeks scaled to below centre of eye; body depth 2.2-2.5 in SL; dentition as in previous species; posterior preopercular margin finely serrate; D spine membrane tips not prolonged; 1st V ray prolonged, reaching well beyond A origin in males. C strongly rounded. No ocellated black spot on opercle; a dark bar (often pale edged) passing ventrally from eye; often a narrow dark band across interorbital space and one anteriorly from eye onto snout; a black spot on 1st D membrane.

Attains 15 cm. Inhaca Id. to Zanzibar, in quiet waters on weedy bottoms.

Genus ***Stethojulis*** Günther, 1862

Eight species, all Indo-Pacific (1 from Marquesas Ids. undescribed); 3 in our area. Terminal males more colourful, very different from initial phase.

KEY TO SPECIES

1a P 12-13; GR 19-23; initial phase dark above, white below, the 2 zones often separated by a blackish midlateral streak; blackish dots on lower side of body; terminal male with a narrow blue stripe posteriorly on lower side of body, not joining a short stripe on upper chest ..... *S. interrupta*
1b P 14 or 15; GR 24-30; colour not as in 1a 2

2a P usually 14; initial phase usually with 2 small pale-edged blackish spots midlaterally at C base and an orange-red spot above P base; terminal male with 2 narrow blue stripes full length lower side of body ..... *S. albovittata*
2b P usually 15; initial phase with a single small pale-edged blackish spot above midlateral line at C base; lower ½ of body whitish with dark longitudinal lines; terminal male with 1 full-length narrow blue stripe on upper side of body and 1 midlaterally on anterior ½ of body; a small black spot dorsally on opercular flap ..... *S. strigiventer*

220.55 *Stethojulis albovittata*
(Bonnaterre, 1788)
PLATE 101

Bluelined wrasse — Bloulint-lipvis

Labrus albovittatus Bonnaterre, 1788: 108; Pl. 98, Fig. 399 (no locality). *Stethojulis axillaris* (*non* Quoy & Gaimard): Smith, **SFSA No. 800*** (initial phase). *Stethojulis albovittata*: Smith, **SFSA No. 802*** (terminal male); Randall & Kay, 1974: 103.

D IX,11; A III,11; P 14-15 (usually 14); LL 25, bent downward below rear of D; total GR 25-30; body depth 3.0-3.5 in SL; head naked; no canine teeth except 1 posteriorly on upper jaw; teeth close-set, incisiform, in a single series; P base strongly oblique (all species); C slightly rounded (all species). Initial phase greenish to grey-brown, finely flecked with pale dots on upper ½ of body, whitish below, the 2 areas usually separated by a poorly defined reddish stripe; 2 small blackish spots edged in pale blue midlaterally at C base; a bright orange-red spot above P base; a common

colour phase exhibits 2 pale stripes on upper dark part of body. Terminal males with 3 continuous longitudinal blue lines on body; along base of D (extending to upper eye), midlateral from C to corner of mouth, and lower C peduncle to P axil.

Attains 13 cm. Indian Ocean, from Red Sea to Natal. Mainly a shallow-reef dweller. Like other *Stethojulis*, almost constantly in motion under pectoral power, feeding on a great variety of small invertebrates (especially crustaceans and molluscs) ingested by quick pecks at rocky bottom or by intake of sand, sorting out food organisms while swimming away.

220.56 *Stethojulis interrupta*
(Bleeker, 1851)
PLATE 103

Cutribbon wrasse — Snylint-lipvis

Julis (Halichoeres) interruptus Bleeker, 1851: 252 (Banda Neira). *Julis (Halichoeres) kallasoma* Bleeker, 1852: 289 (Ambon). *Stethojulis interrupta*: Smith, **SFSA No. 803*;** Randall & Kay, 1974: 103. *Stethojulis phekadopleura* (*non* Bleeker): Smith, **SFSA No. 804*.**

D IX,11; A III,11; P 13 (rarely 12); LL 25, deflected downward below posterior D; total GR 19-23; body depth 3.6-4.1 in SL; head naked; dentition as in *S. albovittata*. Initial phase yellowish brown to olive grey on dorsal half of body, white below with blackish dots, the 2 zones usually separated by a diffuse blackish stripe; a pale-edged, black horizontal line from beneath P to eye. Terminal male greenish to olive grey on upper half of body with a blue line on back adjacent to D (extending to upper C base), white below, with a blue line separating the 2 zones posteriorly; a short blue line on upper chest, ending at lower P base; an orange spot above P base.

Reaches 13 cm. Western Pacific to east Africa, south to Algoa Bay.

220.57 *Stethojulis strigiventer*
(Bennett, 1832)
PLATE 101

Three-ribbon wrasse — Drielint-lipvis

Julis strigiventer Bennett, 1832: 184 (Mauritius). *Julis (Halichoeres) Renardi* Bleeker, 1851: 253 (Banda Neira). *Stethojulis renardi*: Smith, **SFSA No. 799*.** *Stethojulis strigiventer*: Smith, **SFSA No. 801*;** Randall, 1955: 237.

D IX,11; A III,11; P 15 (rarely 14); LL 25, deflected sharply downward beneath posterior D; total GR 24-28; body depth 3.5-3.9 in SL; head naked; dentition as in previous species. Initial phase greenish to brownish grey dorsally with faint pale longitudinal lines; white ventrally, with dark longitudinal lines, a small blue-edged dark spot at base of C above midlateral line. Terminal males greenish to yellowish brown dorsally, white ventrally, with a blue line from snout through upper eye to middle of C, another from nape along base of D, 1 from front of snout to upper P base, separated by a red band from a blue line across upper chest at level of P base and extending to middle of body; a small black spot dorsally on opercular flap; small dark spot on C base as in initial phase, but not blue-edged.

Attains 15 cm. Central Pacific to east Africa, south to Algoa Bay. Preferred habitat, substrate with heavy benthic plant growth.

Genus ***Thalassoma*** Swainson, 1839

Twenty-two species, of which 4 occur in the Atlantic, 3 in the eastern Pacific, and the rest Indo-Pacific; 8 species occur in our area. Genus reviewed by Heiser, PhD thesis, 1981.

KEY TO SPECIES

1a No scales dorsally on opercle; initial phase with a broad blackish stripe from snout through eye to C base; terminal male with green head and chest, broad yellow zone dorsoanteriorly on body, the rest reddish with vertical green lines ..... *T. amblycephalum*
1b Small patch of scales dorsally on opercle; colour not as in 1a 2

2a Body with 6 black bars which are progressively shorter posteriorly, the 1st passing beneath P to abdomen, the last a saddle-like spot on C peduncle ..... *T. hardwicke*
2b Body without a series of black bars 3

3a Adults with a yellow bar from below front of D, passing beneath P to abdomen; head yellowish with narrow blue bands, the most evident a long semicircular one on cheek and one parallel to it posteriorly from eye ..... *T. hebraicum*
3b Colour not as in 3a 4

4a P usually 15; body forest green with vertical red to purplish red lines; head green to blue with irregular pink to violet bands; adults with large yellow crescent posteriorly in C and blue P with a large elongate pink area in upper part; juveniles with a large blackish spot in middle of D and a large diffuse blackish spot at base of C ..... *T. lunare*
4b P usually 16; colour not as in 4a 5

5a Body of initial phase dark brown dorsally, shading to yellowish on C peduncle and greenish ventrally, with a vertical red line on each scale; head dark reddish on dorsal half, mainly yellowish on cheek; terminal males with a broad black longitudinal band on upper ½ of body, shading to yellow dorsoanteriorly and abruptly yellow on posterior C peduncle; lower ½ of body blue-green; head blackish above, light blue-green below eye, shading to pale yellow posteriorly ..... *T. genivittatum*
5b Upper ⅔ of body pink to orange with 2 longitudinal rows of vertically elongate (often rectangular) green to blue-green spots which may be partially joined to form stripes 6

6a Head rose pink with 4 narrow blue to green bands radiating from eye and a long, narrow, semicircular blue or green band on cheek; unscaled part of C yellow to orange with a blue or green-edged rose band in each lobe ..... *T. quinquevittatum*
6b Head not coloured as in 6a; C either longitudinally streaked with green or blue or solid blue 7

7a Total GR 21-25 (modally 23); initial phase with a vertical dark red line below front of eye, usually with a branch to front of snout; head of terminal male blue-green with broad irregular pink bands; C of terminal male solid blue ..... *T. purpureum*

7b Total GR 18-23 (modally 20); initial phase with a diagonal dark red line below front of eye; head of terminal male orange-brown without bands; C of terminal male brownish to greenish, shading distally to pink, the posterior third of rays blue ..... *T. trilobatum*

220.58 *Thalassoma amblycephalum*
(Bleeker, 1856)
PLATE 104

Twotone wrasse — Tweekleur-lipvis

Julis amblycephalus Bleeker, 1856: 83 (Java, Celebes). *Julis melanochir* Bleeker, 1857: 77 (Ambon). *Thalassoma melanochir*: Smith, 1961: 569, **No. 780a.** *Thalassoma amblycephalus*: Smith, 1961: 569, **No. 782a.**

D VIII,13; A III,11; P 15; LL continuous, sharply deflected downwards below posterior D (true of all *Thalassoma*); total GR 16-19; head naked; scales of chest about ½ size of those of rest of body (all species); jaws with a single pair of canine teeth anteriorly, followed by a row of progressively shorter conical teeth; no canine at corner of mouth (dentition essentially the same for all species of this genus); body depth 3.8-4.2 in SL. C truncate to slightly emarginate, becoming lunate in large males. Initial phase with a broad blackish stripe from snout through eye to upper C base; head and body above stripe greenish, below white; C whitish with a broad orange-red band in each lobe; a small black spot at upper base of P (found on most *Thalassoma*). Terminal males reddish with green vertical lines on body; the nape and body below 1st 4 or 5 D spines yellow, chest blue-green; head green to blue-green with 2 oblique golden lines on cheek and opercle; one passing posteriorly from corner of mouth and the other from lower part of eye; an elongate blue-green spot, broadly edged in black, on upper outer part of P.

Attains 16 cm. Indo-Pacific, south to Transkei coast. Feeds on zooplankton well above the substrate, often in small aggregations.

220.59 *Thalassoma genivittatum*
(Valenciennes, 1839)
PLATE 101

Redcheek wrasse — Rooiwang-lipvis

Julis genivittatus Valenciennes, *in* Cuv. & Val., 1839: 416 (Mauritius). *Julis commersoni* Valenciennes, *in* Cuv. & Val., 1839: 418 (Madagascar and Mauritius). *Julis bicolor* Günther, 1862: 184, 508 (locality unknown). *Thalassoma commersoni*: Smith, **SFSA No. 781.**

D VIII,13; A III,11; P 16; LL 25; total GR 19-22; head naked except for patch of small scales dorsally on opercle; body depth 3.2-3.8 in SL. C truncate or with lobes slightly produced in initial phase, to lunate in terminal males. Initial phase dark brown dorsally, shading to yellowish on C peduncle and to greenish ventrally, with a vertical red line on each scale; dorsal ½ of head dark reddish, yellowish on cheek, with a broad reddish bar passing ventrally from snout to join reddish ventral part of head; a black spot on 2nd D membrane; P with a broad blackish band; C dusky basally shading to whitish distally, with a dull orange-red band in each lobe. Terminal males with a broad blackish band covering all of back, shading to yellow anterior to base of 4th D spine and onto nape; C peduncle mainly yellow except where dorsal black band extends into middle portion; ventral ½ of body blue-green; the upper part faintly showing light red vertical lines on scales; head with same basic pattern as initial phase but more blackish dorsally and with blue-green on edges of cheek.

Attains 20 cm. Mauritius and Natal, where it is known at Aliwal Shoal south of Durban.

220.60 *Thalassoma hardwicke*
(Bennett, 1828)
PLATE 104

Sixbar wrasse — Sesbalk-lipvis

Sparus hardwickii Bennett, 1828: Pl. 12 (Ceylon). *Thalassoma hardwicke*: Smith, **SFSA No. 780*.**

D VIII,13; A III,11: P 16; LL 25; total GR 22-25; head naked except for patch of small scales dorsally on opercle; body depth 2.9-3.2 in SL. C truncate in juveniles, to emarginate in adults. Green with 6 black bars on body which are progressively shorter posteriorly, the 1st passing from below front of D, beneath P to abdomen, slightly below level of P base, and the last a saddle-like spot dorsally on C peduncle; a midlateral pink stripe on posterior ½ of body; head with broad irregular rose pink bands; nape with 2 black bands.

Reaches 18 cm. Indo-Pacific, south to Bashee River; not common in South Africa.

220.61 *Thalassoma hebraicum*
(Lacepède, 1801)
PLATES 101 & 104

Goldbar wrasse — Goudstaaf-lipvis

Labrus hebraicus Lacepède, 1801: 526, PL. 29, Fig. 3 (Mauritius). *Thalassoma hebraicum*: Smith, **SFSA No. 778*;** van der Elst, 1981: 192*. *Thalassoma schwanfeldi:* Smith, 1957: 103; 1961: 569, **No. 778a** (juvenile).

D VIII,13; A III,11; P 15-16; LL 25; total GR 20-23; head naked except for patch of small scales dorsally on opercle; body depth 3.2-3.8 in SL. C varying with age from truncate to lunate. Initial phase blackish (consisting of vertical blackish lines alternating with grey), with 2 staggered longitudinal rows of large diffuse yellowish spots (still crossed by blackish lines) and a yellow bar from base of 3rd D spine under P to belly, preceded by parallel black and blue lines; chest with 2 diagonal blue lines and P base with a black and deep blue line; head yellowish with 2 long narrow, curved, blue bands (one broadly semicircular on cheek, and one extending posteriorly from eye) and 3 short ones; C yellowish with a diffuse blackish bar at base. Terminal males with light yellow and bluish vertical lines over the broad middle part of the body, a bright yellow band from below front of D to abdomen very broadly bordered posteriorly by a dark bluish bar and anteriorly by a band of scales which are half black and half blue; posterior C peduncle and base of C crossed by a broad dark bluish bar; rest of fin light yellow; head yellow with same banding as initial phase.

Largest specimen examined, 23 cm. Indian Ocean south to Algoa Bay.

220.62 *Thalassoma lunare*
(Linnaeus, 1758)
PLATE 104

Crescent-tail wrasse — Maanstert-lipvis

Labrus lunaris Linnaeus, 1758: 283 (India). *Thalassoma lunare*: Smith, **SFSA No. 777*.**

D VIII,13; A III,11; P 15; LL 25; total GR 18-20; head naked except for patch of small scales dorsally on opercle; body depth 3.1-3.7 in SL. C varying from truncate in juveniles to very lunate in large males. Green with vertical red to purplish red lines on body; head green to blue with irregular rose pink to red bands; adults with a large crescentic yellow area posteriorly in C and blue-edged rose band in each lobe; P blue with a large elongate pink spot in upper centre. Terminal males more blue in colour overall, particularly the head (dark in preservative). Juveniles with a large blackish spot in middle of D and a large diffuse blackish spot at C base.

Attains 25 cm. Indo-Pacific, south to Algoa Bay. A bold, opportunistic fish which preys mainly on benthic invertebrates and small fishes.

220.63 *Thalassoma purpureum*
(Forsskål, 1775)
PLATE 104

Surge wrasse — Branders-lipvis

Scarus purpureus Forsskål, 1775: 27 (Red Sea). *Julis semicoeruleus* Rüppell, 1835: 10, Pl. 3, Fig. 1 (Red Sea). *Julis umbrostygma* Rüppell, 1835: 11 (Red Sea). *Thalassoma purpureum*: Smith, **SFSA No. 779*;** van der Elst, 1981: 194*. *Thalassoma semicaeruleus*: Smith, 1961: 569, **No. 779a*.**

D VIII,13; A III,11: P 16 (rarely 15 or 17); LL 25; GR 20-25 (modally 23); head naked except for patch of small scales dorsally on opercle; body depth 3.0-3.4 in SL. C of initial phase slightly rounded to truncate, of terminal males slightly double emarginate with lobes a little produced (particularly the upper). Initial phase with 2 longitudinal series of vertically elongate, subrectangular, close-set green spots, these rows separated by light red stripes; rows of green spots separated by maroon lines which extend into the red stripes; head and ventral part of body green; upper ⅔ of head with numerous maroon spots and short irregular lines, one below front of eye vertical, with a branch to front of snout. Terminal males green, shading ventrally to blue-green, with 3 narrow pink stripes with irregular margins; head blue-green with broad irregular pink bands dorsally and 1 extending diagonally downward from eye toward P base, branching as it crosses preopercle; paired fins and C blue.

Attains 43 cm. Indo-Pacific; south to Algoa Bay. Juveniles very common, found on exposed rocky shores in surprisingly shallow water; an active swimmer, almost constantly on the move, feeds mainly on crabs, sea urchins, brittlestars and small fishes.

220.64 *Thalassoma quinquevittatum*
(Lay & Bennett, 1839)
PLATE 104

Fivestripe wrasse — Vyfstreep-lipvis

Scarus quinquevittatus Lay & Bennett, 1839, 66, Pl. 19, Fig. 3 (Loo Choo Ids.). *Thalassoma quinquevittatus*: Smith, 1961: 596, **No. 782b.**

D VIII,13; A III,11; P 16 (rarely 15 or 17); LL 25; total GR 21-25; head naked except for a patch of small scales dorsally on opercle; body depth 3.2-3.6 in SL. C truncate or with lobes slightly prolonged, becoming deeply emarginate in large males. Upper ⅔ of body with alternating green and rose pink stripes, the uppermost along back and D base green; 2nd green stripe a series of close-set vertically elongate green spots which merge to a solid band posteriorly; 3rd green stripe grading to lighter green of lower part of body; chest and anterior abdomen at level of P base with 2 highly oblique rose bands alternating with green or blue; head rose with 4 narrow green to blue bands radiating from eye and a long semicircular narrow green or blue band on cheek, the upper convex part approaching eye; a black spot on 1st 2 D membranes, unscaled part of C yellow to orange with a narrow green to blue-edged band in each lobe. Juveniles with a row of small black spots along D base and 2 larger black spots in fin.

Attains 17 cm. Indo-Pacific south to Transkei (32°S).

220.65 *Thalassoma trilobatum*
(Lacepède, 1801)
PLATE 105

Ladder wrasse — Leer-lipvis

Labrus fuscus (*non* Gmelin): Lacepède, 1801: 437, 493 (Mauritius). *Labrus trilobatus* Lacepède, 1801: 454, 526, Pl. 4, Fig. 3 (Mauritius). *Thalassoma fuscus*: Smith, **SFSA No. 782*.** *Thalassoma fuscum*: van der Elst, 1981: 193*.

D VIII,13; A III,11; P 16 (rarely 15 or 17); LL 25; total GR 18-24; head naked except for patch of small scales dorsally on opercle; body depth 3.1-3.4 in SL. C of initial phase slightly rounded to truncate, of terminal males truncate to very slightly double emarginate. Initial phase coloured like that of *T. purpureum*, except the dark red line below front of eye is diagonal, not vertical. Body of terminal males salmon pink to orange with 2 longitudinal rows of close-set, vertically elongate, subrectangular green to blue-green spots on side; 4 green spots of upper row with dorsal extensions linking to irregular green band at base of D; head and chest orange-brown without markings; C greenish to brownish orange, shading distally to pink, the outer ⅓ of rays blue.

Attains 30 cm. Indo-Pacific, south to Transkei. Like *T. purpureum,* an active shallow-water fish of exposed rocky shores, but tends to occur in slightly deeper water on the average than *T. purpureum.*

Genus ***Xyrichtys*** Cuvier, 1815

About 20 species, of which 6 occur in the Atlantic, 1 in the eastern Pacific, and the rest in the Indo-Pacific region; 2 species known from our area and one record of a 3rd species needs confirmation. The genus is in need of revision. Species have often been placed in *Hemipteronotus* Lacepède, but this genus is invalid, based on a drawing of *Naucrates ductor* (Bauchot in CLOFNAM, 1973). *Iniistius* Gill is a synonym of *Xyrichtys*.

KEY TO SPECIES

1a First 2 D spines much longer than other D spines and completely separate from rest of fin; adults grey dorsally, pale yellowish ventrally, with 4 broad diffuse dark bars on body (the last at C base) and a small blue-edged black spot just above LL below base of 6th D spine ..... *X. pavo*

1b First 2 D spines not notably longer than other D spines, joined by membrane to rest of fin; colour not as in 1a 2

2a Deep notch between 2nd and 3rd D spines; about 8 vertical rows of small scales on cheek extending to below mouth; females with a diffuse blackish blotch between P tip and LL and a red-orange dot on many scales of body; males with a less distinct blackish spot and a series of about 5 red spots behind eye and along front of LL ..... *X. pentadactylus*

2b No notch between 2nd and 3rd D spines; a diagonal row of small scales from behind to below eye (sometimes a few scales form a 2nd row); no blackish spot on side of body (instead a red bar on side of adults); a vertical light blue line on each body scale ..... *X. novacula*

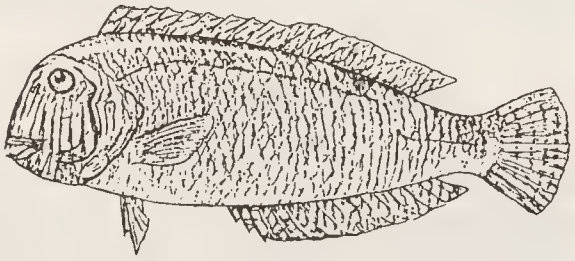
220.66 *Xyrichtys novacula*
(Linnaeus, 1758)

Pearly razorfish — Pêrel-skeermesvis

Coryphaena novacula Linnaeus, 1758: 262 (Mediterranean Sea). *Coryphaena psittacus* Linnaeus, 1766 (Charleston, South Carolina). *Xyrichthys argentimaculata* Steindachner, 1861: 134 (Cape of Good Hope). *Hemipteronotus novacula*: Randall, 1965: 489.

D IX,12; A III,12; P 12; LL 20+6; a diagonal row of small scales from behind to below eye; 1st 2 D spines not elongate; body depth 2.8-3.3 in SL; C rounded. Pale greenish with a vertical light blue line on each scale; adults with a slightly diagonal reddish bar just posterior to P; alternating vertical lines of light blue and light orange-yellow on head.

Attains 22 cm. Both sides of Atlantic; 1 doubtful record from Cape of Good Hope by Steindachner. Lives on open sand bottoms; dives into sand with the approach of danger; feeds on molluscs and crustaceans.



220.66 *Xyrichtys novacula:* 20 cm (after Bini, 1968).

220.67 *Xyrichtys pavo*
Valenciennes, 1840
PLATE 105

Peacock wrasse — Pou-lipvis

Xyrichthys pavo Valenciennes, *in* Cuv. & Val., 1840: 61, Pl. 394 (Mauritius). *Xyrichthys pavoninus* Valenciennes, *in* Cuv. & Val., 1840: 63 (Hawaiian Ids.). *Iniistius pavo*: Smith, SFSA No. 811*.

D II+VII,12; A III,12; P 12; LL (20-22)+(4-5); 1 or 2 short rows of small scales from behind to below eye; 1 or 2 scales dorsally on opercle; body depth of adults 2.4-2.7 in SL (of juveniles, 2.8-3.3 in SL); dorsal profile of head of adults very steep, approaching the vertical, the leading edge sharp; a pair of long curved canine teeth anteriorly in jaws, followed by a row of strong conical teeth and 2 or 3 inner rows of nodular teeth. 1st 2 D spines well separated from rest of fin, originating over posterior part of eye, these spines flexible and elongate, the 1st more than twice length of remaining spines in adults (much longer in juveniles). C small, rounded; adults grey on back shading to yellowish white below with 3 indistinct broad dark bars on body and a 4th on C base; a small blue-edged black spot just above LL centred below base of 6th D spine.

Attains about 35 cm. Indo-Pacific, from northern Red Sea to Natal. Lives on open sandy areas and dives into sand with approach of danger; juveniles extend the elongate 1st D forward over the head and mimic a drifting leaf.

220.68 *Xyrichtys pentadactylus*
(Linnaeus, 1758)
PLATE 101

Fivefinger wrasse — Vyfvinger-lipvis

Coryphaena pentadactyla Linnaeus, 1758: 261 (India). *Hemipteronotus pentadactylum*: Barnard, 1927: 768; Smith, SFSA No. 812 (not illustration).

D IX,12; A III,12; P 12; LL 20+(4-5); about 8 vertical rows of small scales on cheek from below eye to below level of mouth; a few scales dorsally on opercle; body depth of adults 2.8-3.0 in SL; shape of head and dentition as in *X. pavo*; 1st 2 dorsal spines and associated membranes at most slightly longer than rest of fin; a deep notch in membrane separating 2nd & 3rd spines (extending about ⅔ distance to base of fin); C small, rounded. Females pale, with a large dusky spot on upper side between LL and tip of P; most scales of body with a red-orange dot; often a concentration of orange-red markings on scale edges forming a large patch below end of P. Males with a less distinct blackish spot on upper side and a series of several (usually 5 or 6) red spots nearly as large as eye behind eye and along anterior LL.

Reaches 25 cm. Western Pacific, to Red Sea and east Africa, south to Natal.

Family No. 221: SCARIDAE

by J.E. Randall

Parrotfishes — **Papegaaivisse**

This group of fishes is aptly named the parrotfishes, as they possess beak-like jaws and many of the species are gaudily coloured. Body oblong to moderately elongate, somewhat compressed; snout generally bluntly rounded. A single continuous dorsal fin with 9 slender, often flexible spines and 10 soft-rays; anal fin with 3 spines and 9 soft-rays; pectoral rays 13-16; pelvic fins I,5. Scales large, cycloid,

those of lateral line with arborescent tubes; lateral line following contour of back to below rear of dorsal fin, then dropping one scale row and continuing midlaterally on caudal peduncle, the number of pored scales usually 18+6; head naked except for scales on cheek. Fins naked, though median fins may have a basal row of scales. Mouth small, terminal, not protractile; teeth fused to form beak-like dental plates which are separated by a median suture (except the genus *Calotomus*, with a bony ridge in the jaws covered by imbricate flattened conical teeth); small, often recurved, conical teeth (generally called canines) may be present at corner of mouth on outside of dental plates; pharyngeal dentition unique, the interlocking upper pharyngeal bones with 1-3 rows of molariform teeth on a convex surface which bear against molariform teeth on the concave surface of the single lower pharyngeal bone. Vertebrae 24 or 25. Caudal fin varying from rounded to strongly lunate, often becoming more emarginate with growth.

Juveniles usually differ in colour from adults, and adults of most species exhibit striking sexual dichromatism. Initial-phase fish (only females for some species but both sexes for others) are generally drab, often brown, reddish, or grey. Terminal males, mostly a result of sex change, are usually brightly and complexly coloured, with green frequently dominant. Initial-phase fish tend to spawn in aggregations, typically with several males making the upward spawning rushes with a single female. Terminal males maintain sexual territories and spawn with single females within their territories.

Parrotfishes are herbivorous, though a few of the larger species feed in part on live coral. With their strong dental plates, scarid fishes scrape benthic algae from dead coral rock (leaving characteristic grooved scrape marks on the surface); they also may feed on algal films on compacted sand substrata or on seagrasses. The rock fragments and sand are ground to fine sediment with the plant material in their pharyngeal mill, thus rendering the plants more digestible. This pulverising of coral rock fragments and coarse sand is of enormous importance in sand production in and around reefs. Parrotfishes are abundant on coral reefs, along rocky shores, and in seagrass beds (the preferred habitat for a few small species, but the nursery area for the young of many others); often they are the largest component of the fish biomass.

Two subfamilies are recognised, the Sparisomatinae (5 genera) with a single row of cheek scales, 13 pectoral rays, 9 abdominal and 15 caudal vertebrae, and the Scarinae (4 genera) with 2-4 rows of cheek scales, 13-17 pectoral rays, 10-12 abdominal and 13-15 caudal vertebrae. The western Indian Ocean Scarinae were reviewed by Randall & Bruce (1983) and the Indo-Pacific Sparisomatinae revised by Bruce & Randall (in press). Parrotfishes have evolved from labrid stock; some recent authors prefer to combine the two families into one, the Labridae.

Subfamily SPARISOMATINAE

KEY TO GENERA

1a Teeth fused to form dental plates; lower jaw plate overlapping upper when mouth closed; body depth 2.9-3.8 in SL ..... *Leptoscarus*

1b Outer teeth separate, incisiform (not fused to form dental plates); teeth of upper jaw overlapping lower when mouth closed; body depth 2.2-3.1 in SL ..... *Calotomus*

Teeth of *Calotomus spinidens*.

Genus ***Calotomus*** Gilbert, 1890

Five species; 2 in our area.

KEY TO SPECIES

1a Incisiform teeth on outer surface at front of upper jaw in a single irregular row; C rounded, rear margin not whitish; anus not blackish ..... *C. spinidens*

1b Incisiform teeth on outer surface at front of upper jaw in 2-6 overlapping rows (except small juveniles); C slightly rounded to truncate in juveniles, double emarginate with prolonged lobes in large males; C with narrow white rear margin; anus blackish ..... *C. carolinus*

221.1 *Calotomus carolinus*

(Valenciennes, 1840)

PLATE 109

Christmas parrotfish — Kersfees-papegaaivis

Callyodon carolinus Valenciennes, *in* Cuv. & Val., 1840: 291 (Caroline Ids.). *Calotomus carolinus*: Bruce & Randall, in press.

Median predorsal scales 4 (rarely 3); 1 row of cheek scales; P 13; teeth incisiform, somewhat pointed, imbricate. Adults with 1 or 2 curved canine teeth posteriorly on side of upper jaw. Colour: initial phase greyish to reddish brown with fine whitish markings on body scales, shading to light reddish brown ventrally; dark bar at P base conspicuous in juveniles, but lost in terminal males. Body of terminal male a mixture of bluish green and reddish brown, the scale edges dull salmon dorsally, breaking up to spots ventrally; head bluish green with salmon bands radiating from eye; median fins bluish green with irregular orange bands and spots.

Attains 54 cm. Eastern Pacific to Natal; not in Red Sea.

221.1 *Calotomus carolinus*: top: initial phase, 22 cm; bottom: terminal phase, 23 cm (after Randall, 1984).

221.2 *Calotomus spinidens*
(Quoy & Gaimard, 1824)
PLATE 105

Spinytooth parrotfish — Stekeltand-papegaaivis

Scarus spinidens Quoy & Gaimard, 1824: 289 (Waigeo Id.). *Cryptotomus spinidens*: Smith, **SFSA No. 827*;** Smith & Smith, 1963: 40*. *Calotomus spinidens*: Bruce & Randall, in press.

Median predorsal scales 4; 1 row of cheek scales; P 13; body depth 2.7-3.1 in SL. Colour: initial phase mottled reddish to greyish brown, sometimes with faint broad stripes and often with 3 longitudinal rows of whitish spots; C upper and lower edges with small dusky spots; terminal males develop faint small orangish spots on body, small orange spots and short lines on head (the most conspicuous being 2 lines from posterior upper lip to eye), a blackish bar at base of P, and a broad dark border on A.

Attains 19 cm. Western Pacific to east Africa, south to Delagoa Bay. Can change colour rapidly, thus adept at hiding in seagrass beds or on weedy bottoms. Some authors, such as Schultz (1969), have confused *spinidens* with *C. carolinus*.

Genus ***Leptoscarus*** Swainson, 1839

A single species.

221.3 *Leptoscarus vaigiensis*
(Quoy & Gaimard, 1824)
PLATE 105

Marbled parrotfish — Marmer-papegaaivis

Scarus vaigiensis Quoy & Gaimard, 1824: 288 (Waigeo Id.). *Leptoscarus coeruleopunctatus*: Smith, **SFSA No. 825***. *Leptoscarus vaigiensis*: Smith, **SFSA No. 826***; Smith & Smith, 1963: 40*; Day, 1974: 96; Bruce & Randall, in press.

Median predorsal scales 4; 1 row of cheek scales; P 13; body depth 2.9-3.8 in SL; adult males with canine teeth at rear of upper dental plate; C rounded. Colour: mottled dark olive, shading to dull yellow ventrally; fins yellowish; males with many small blue spots on head, body and C.

Reported to 35 cm. Easter Id. to east Africa, south to the Transkei. A resident of shallow seagrass beds or bottoms with dense growth of algae. Unusual for a parrotfish in not undergoing sex change (females remain females throughout life).

Subfamily SCARINAE

Cetoscarus is not known from southern Africa, but the single species of this genus, *C. bicolor* (Rüppell) may be found in our area. It is reported to 15°S on the east African coast. See Plates 107 & 108 for an illustration of *C. bicolor*.

KEY TO GENERA

1a Outer surface of dental plates granular; each upper pharyngeal bone with 3 rows of molariform teeth, those of the lateral row rudimentary; GR 16-24; posterior nostril notably larger than anterior (up to 4 times larger) 2

1b Outer surface of dental plates smooth; each upper pharyngeal bone with 1 row of large molariform teeth, with or without a rudimentary lateral row; GR 38-81; posterior nostril not notably larger than anterior (except *Scarus ghobban*) 3

2a Head with a hump anterodorsal to eye (evident on specimens as small as 20 cm SL), becoming very large in adults; body deep, the depth 2.05-2.5 in SL; snout 1.65-1.7 in head; median predorsal scales 2-5 (usually 4); 1 row of scales on interopercle; GR 16-18 ..... *Bolbometopon*

2b Dorsal profile slightly and evenly convex; body depth 2.5-2.8 in SL; snout 1.8-2.2 in head; median predorsal scales 5-7; 2 rows of scales on interopercle; GR 20-24 ..... [*Cetoscarus*]

3a Dental plates narrow, their height about 1.5-2.0 in eye diameter; head moderately pointed; eye near dorsal profile, interorbital space not strongly convex; cheek scales small, in a nearly isolated, subtriangular patch ..... *Hipposcarus*

3b Dental plates not narrow, their height usually greater than eye diameter; head not pointed; eye not near dorsal profile, interorbital space strongly convex; cheek scales not small and not in an isolated patch ..... *Scarus*

Genus ***Bolbometopon*** Smith, 1956

Represented by a single species, the largest of the Scaridae.

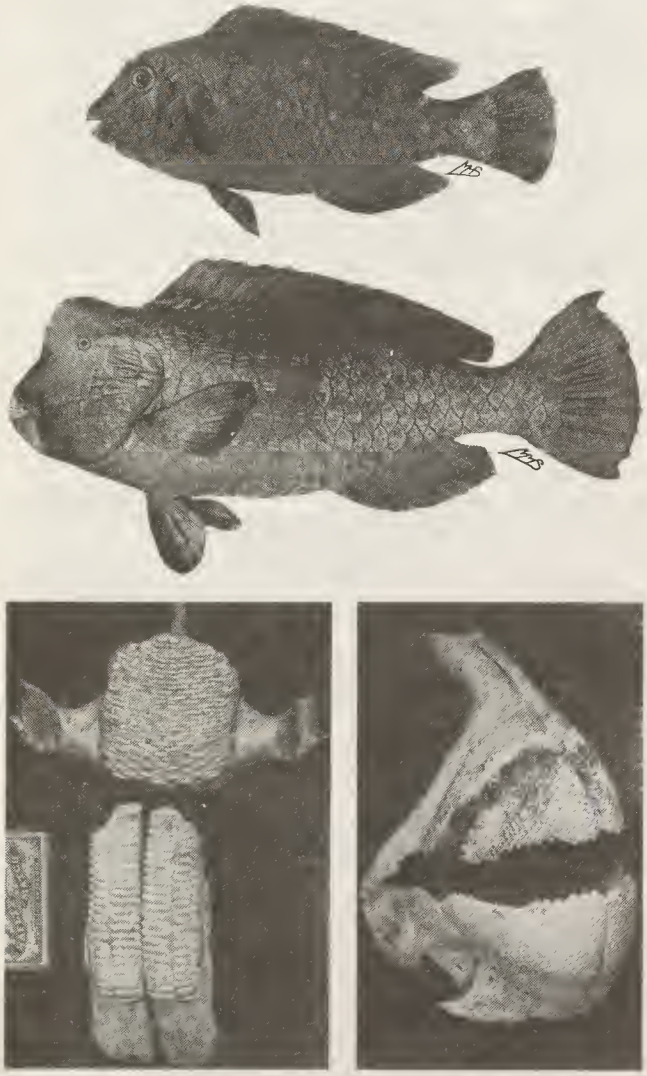
221.4 *Bolbometopon muricatum*
(Valenciennes, 1840)
PLATE 106

Humphead parrotfish — Ramkop-papegaaivis

Scarus muricatus Valenciennes, *in* Cuv. & Val., 1840: 208, Pl. 402 (Java). *Callyodon muricatus*: Smith, 1953: 621*. *Bolbometopon muricatus* Smith, 1956: 8*; 1959: 269*, 278*; 1962: 509; Smith & Smith, 1963: 40*; Smith, 1965: 33*. *Bolbometopon muricatum* Randall & Bruce, 1983: 6.*

Median predorsal scales 2-5; scale rows on cheek 3, the lower row with 1 or 2 scales; 1 row of scales on interopercle; P 15-16; GR 16-18; dorsal profile of head with a hump anterodorsal to eye (evident on specimens as small as 20 cm SL), becoming very large in adults; body depth 2.05-2.5 in SL. Young brown, with 2 longitudinal rows of white spots on dorsal half of body; adults dull green, the anterior part of hump, snout, and chin pink.

Attains 120 cm. Red Sea and Indo-Pacific south to Bazaruto, Mozambique. Feeds on live coral and benthic algae.



221.4 *Bolbometopon muricatum*: top: 25 cm; middle: 75 cm; bottom: pharyngeal teeth and "beak" or fused teeth (all Kenya).

Genus ***Hipposcarus*** Smith, 1956

This genus consists of 2 species; only *H. harid* occurs in southern Africa.

221.5 *Hipposcarus harid*
(Forsskål, 1775)
PLATES 108 & 109

Longnose parrotfish — Langneus-papegaaivis

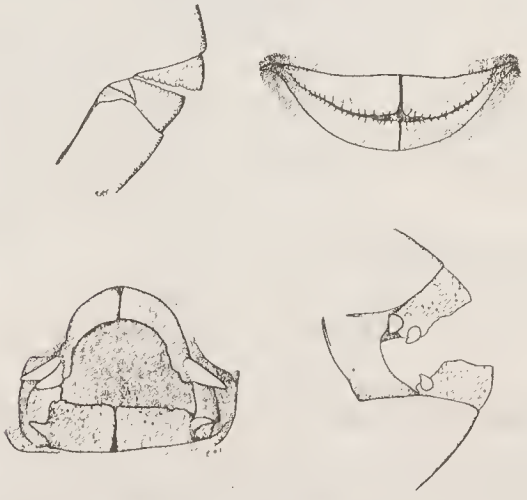
Scarus harid Forsskål, 1775: x, 30 (Arabia). *Hipposcarus harid* Smith, 1956: 17; Randall & Bruce, 1983: 7.

Median predorsal scales 3 or 4, the second clearly largest; cheek scales small, especially anteriorly, forming a nearly isolated subtriangular patch, the scales in 3 (sometimes 4) rows; P 15; head pointed; dental plates narrow, the height of upper plate about 1.5-2.0 in orbit diameter; C progressively more emarginate with age, the lobes of large males strongly produced. Initial phase tan, shading to white ventrally; D and A pale yellowish with light blue margins; C pale yellowish, the rays streaked with light blue. Terminal male light green, the scales edged in pale orange dorsally and on flanks; edges of lips orange with a submarginal band of blue, the orange continuing as a band across cheek; head above band green, below pale green; C blue with orange longitudinal bands.

Reported to 75 cm, but rarely exceeds 55 cm. Indian Ocean and Red Sea; south on east African coast to Bazaruto. Generally found in protected waters, often over sand flats near reefs. Usually encountered in small groups.

Genus ***Scarus*** Forsskål, 1775

Of the 60 valid species in this genus, 14 occur in southern African waters; 5 others are known from northern Mozambique and are likely to be found in our area (these 5 species are illustrated and included in the Key).



Teeth of *Scarus russelii* (top) and *S. viridifucatus* (bottom).

KEY TO SPECIES (ADULTS)

1a Median predorsal scales 3; adults with a prominent hump above eye, the snout profile concave; C slightly rounded; head and front of body deep blue, the rear part green with scale edges and fins dark blue; margins of median fins and lateral edge of V bright blue ..... *S. cyanescens*

1b Median predorsal scales 4-7; dorsal profile of head and colour not as above; C varying from slightly rounded to lunate 2

2a Head profile rising steeply from mouth to level of eye, then curving sharply to nearly straight for rest of head; no rudimentary lateral row of teeth on upper pharyngeal bones; initial phase reddish except dorsally and on side of body, which is yellowish grey with narrow blackish edges on scales and short blackish markings; fins mainly red; terminal male green dorsally, suffused with purplish, yellowish on sides and pale blue-green ventrally; upper lip narrowly salmon with a broad blue-green band above; lower lip broadly blue-green at margin; chin salmon, crossed by a blue-green band joining that of lip to pass below eye ..... *S. rubroviolaceus*

2b Snout not shaped as in 2a; a row of rudimentary teeth laterally on each upper pharyngeal bone; colour not as in 2a 3

3a P 16 or 17 (rarely 15); scale rows on cheek 3, usually with 5-7 scales in 3rd row; dorsal profile of initial phase strongly convex, of terminal male very steep from mouth to above level of eye, then curving sharply to slightly convex for remainder of head; initial phase primarily red; terminal male green on body, the scale edges pink or orange; dorsal part of head greenish to violet; edges of lips blue-green; corner of mouth orange; dental plates blue-green; a large crescentic blue-green area posteriorly in C ..... [*S. gibbus* Rüppell, 1828]

3b P 13-15 (rarely 16); cheek scales in 2 or 3 rows, the 3rd usually with no more than 4 scales (except *S. tricolor*); colour and dorsal profile of head not as in 3a 4

4a Median predorsal scales usually 4; 2 or 3 rows of cheek scales 5

4b Median predorsal scales usually 5-7; 3 rows of cheek scales 12

5a P usually 14; lips cover half or more of dental plates; 2 or 3 rows of cheek scales 6

5b P usually 15; lips cover less than half of dental plates; 2 rows of cheek scales 9

6a Scale rows on cheek 2; no pair of laterally adjoining scales anterior to 1st median predorsal scale 7

6b Scale rows on cheek 3; a pair of small laterally adjoining or slightly overlapping scales anterior to first median predorsal scale 8

7a C of initial phase slightly emarginate, of terminal male deeply emarginate; maximum C concavity 3 in head; median predorsal scales subequal; dark brown spot basally at front of 1st interspinous membrane of D (more readily seen on preserved specimens); initial phase reddish brown without dark bars; lips without bands of green or orange; terminal male not abruptly darker on front of body; dorsal part of snout of terminal male lavender grey (lavender to violet in life) ..... *S. psittacus*

7b C of initial phase slightly rounded, becoming double emarginate with lobes prolonged in terminal male; maximum C concavity 5.5 in head; 1st and 2nd median predorsal scales largest; initial phase reddish brown, often with 5 dark bars on body; lips with transverse bands of dull green and orange; terminal male abruptly darker anterior to a line from base of 9th D spine to A origin; dorsal part of snout blue-green ..... *S. russelii*

8a Dorsal profile of head strongly and evenly convex; C of terminal male slightly to moderately emarginate, maximum C concavity 4.2 in head; terminal male with a large patch of bright blue-green on side of head anterior to eye . [*S. viridifucatus* (Smith, 1956)]

8b Dorsal profile of head with prominence anterodorsal to eye; C of terminal male lunate, maximum C concavity about 1.4 in head; large adults with 2 vertical green or blue-green bands across interorbital space ..... *S. festivus*

9a P about 1.4 and V about 1.7 in head; head profile of large adults with a break in contour anterodorsal to eye; C of adults emarginate, C concavity about 5.8 in head; not sexually dichromatic; head and body mostly green; streak of orange at corner of mouth and narrow circle of lavender pink around eye ..... *S. enneacanthus*

9b P 1.45-1.65 and V 1.85-2.15 in head; dorsal profile of head evenly convex; C slightly rounded to slightly emarginate; colour not as in 9a 10

10a First 2 median predorsal scales notably wider than last 2; GR 42-51; initial phase dark brown, becoming red around mouth, sometimes with 2 rows of whitish spots on side; terminal male with green cheek and C green with longitudinal streaks of salmon pink ..... *S. sordidus*

10b First 2 median predorsal scales not notably wider than last 2; GR 49-61; initial phase reddish brown with an orange bar on each scale and 4 pale pink bars on body; C and rear part of peduncle pale pink, P yellow; terminal male pale green with a salmon pink bar on each scale, a narrow blue-green band from upper lip beneath eye to opercular flap, a similar band extending anteriorly and posteriorly from upper part of eye and one posteriorly from middle of eye; head pale below lower blue-green band; median fins light orange, bordered with blue 11

11a Least depth of C peduncle 13-14%, longest D spine 11-12% SL; terminal male with dark blue crescent (black in preservative) in C and green band across cheek at level of mouth ..... *S. atrilunula*
11b Least depth of C peduncle 14-16%, longest D spine 12-14% SL; terminal male without dark crescent in C and lacking green band across cheek ..... [*S. japanensis* (Bloch, 1788)]

12a Median predorsal scales usually 7; P 14; 13
12b Median predorsal scales usually 5 or 6 (more often 6); P 14-16 14

13a Dental plates blue-green; initial phase reddish brown, scales of side of body grey with brown spots and short lines; head with dull green bands on lips, chin and extending anteriorly and posteriorly from eye; terminal male dark green, scales edged with dark reddish; head with the same green bands except for a broad irregular one from upper edge of eye to a greenish yellow spot at upper end of gill opening; penultimate A ray prolonged in terminal male, 1.5-1.6 in head ..... *S. niger*
13b Dental plates white; initial phase yellow to light reddish brown with 5 dark brown stripes on side of body; no green markings on head; terminal male green on lower half of head and body posterior to a vertical at base of 5th D ray; rest of head and body green with numerous small orange spots and short irregular lines; penultimate A ray not prolonged, its length about 2 in head . [*S. frenatus* Lacepède, 1802]

14a Median predorsal scales usually 5; P 14; initial phase brown to greyish brown with 3 whitish stripes on abdomen following centres of scale rows; terminal male green with an orange bar on each scale except on abdomen, where green is arranged in 3 stripes, and anterodorsally, where green is broken into small spots; salmon pink stripe edged in blue-green from front of snout through eye, and narrow blue-green bands radiating dorsally from eye; a blackish spot at or near base of 4th D spine ..... *S. globiceps*
14b Median predorsal scales usually 6; P 14-16; colour not as in 14a 15

15a P nearly always 14 16
15b P 15 (rarely 16) 17

16a Scales in 3rd row on cheek 1-4; no canine teeth on dental plates; upper part of body of initial phase yellowish with 4 dark grey bars or blotches; lower part of body light yellowish to pinkish white; terminal male green, the edges of scales salmon pink, except body anterior to demarcation from base of 8th D spine and dorsal part of head, which are dark grey; edge of upper lip narrowly salmon pink; a broad band of blue-green above this, joined at corner of mouth with a similar band on lower lip and extending across upper cheek to edge of operculum ..... *S. scaber*
16b Scales in 3rd row on cheek 3-6; terminal males and occasional large initial-phase fish with 1 or 2 canine teeth at rear of upper dental plate; initial phase dark purplish to blackish, shading on side to blue with black edges on scales and ventrally to orange-yellow, the truncate to emarginate C light red; terminal male green, the edges of scales salmon pink; head lavender dorsally with 2 narrow blue-green stripes, 1 through dorsal part of eye and 1 passing from base of upper lip ventral to eye; broadly lunate C blue with a salmon pink crescent, the ends of which pass into lobe tips ..... *S. tricolor*

17a Posterior nostril oval, 2-5 times larger than anterior; 3rd row of scales on cheek, when present, usually with 1 scale; initial phase yellow, the centres of scales blue, often with 5 blue bars on body; terminal male light green, the scales edged with salmon pink (green dominating dorsally and pale salmon ventrally); a broad irregular band of green across lower cheek (below scales); dental plates pale salmon ..... *S. ghobban*
17b Posterior nostril at most slightly larger than anterior; 3rd row of cheek scales with 1-4 scales; colour not as in 17a; dental plates of terminal male blue-green 18

18a P 1.4-1.55 in head; GR 51-55; initial phase dark reddish brown on head and body anterior to 8th D spine; rest of body light red with 3 dark reddish brown bars; terminal male with broad purplish grey bar dorsally on body anterior to base of 6th D spine, gradually shading to dull orange on head; rest of body blue-green, the scales edged in salmon dorsally, soon yielding on side to pale salmon; a broad dark blue-green band above upper lip, narrowing abruptly as it passes to front edge of orbit; a dark blue-green band along edge of lower lip and another on chin ..... *S. caudofasciatus*
18b P 1.2-1.45 in head; GR 55-65; initial phase dark olive grey, shading to red on abdomen, chest and ventrally on head, with scattered small whitish spots on body (more numerous posteriorly); terminal male dull blue-green, the scales narrowly edged in reddish, with a very broad blue-green band beginning anteriorly on head (except area of orange around mouth), covering all of cheek, continuing on upper chest, and narrowing as it passes on side of abdomen and along base of A to lower edge of C peduncle; ventral part of head and body orange below blue-green band ..... [*S. falcipinnis* Playfair, 1867]

221.6 *Scarus atrilunula*

Randall & Bruce, 1983

PLATES 107, 108 & 110

Blue moon parrotfish Bloumaan-papegaaivis

Callyodon capistratoides (*non* Bleeker): Smith, 1956: 6*; 1959: 268, Fig A. *Scarus atrilunula* Randall & Bruce, 1983: 9, Pl. 4, Figs. A & B (Shimoni, Kenya).

Median predorsal scales 4; scale rows on cheek 2; P 15; GR 50-59; dental plates broadly exposed; C of initial phase slightly rounded, of terminal males slightly emarginate. Initial phase dark brown with 4 irregular narrow whitish bars, the scales with a vertically elongate orange spot; C and rear of peduncle pale pink; P yellow. Terminal males green, the anterior part of each body scale salmon pink, shading to whitish posteriorly and on C base; a dark blue crescent posteriorly in C; a broad green-edged pale zone across head from mouth to end of opercle.

Attains 30 cm. Known at present only from Kenya to Natal. Closely related to *S. japanensis* (Bloch), of which *S. capistratoides* Bleeker is a junior synonym.

221.7 *Scarus caudofasciatus*
(Günther, 1862)
PLATES 107 & 109
Redbarred parrotfish — Rooibalk-papegaaivis

Pseudoscarus caudofasciatus Günther, 1862: 238 (Mauritius). *Callyodon rubrofasciatus:* Smith, 1956: 10, Pl. 43, Fig. 1 (Kenya); 1959: 279*; Smith & Smith, 1963: 41*. *Scarus rubrofasciatus*: Smith, 1965: 33*. *Scarus caudofasciatus*: Randall & Bruce, 1983: 12*.

Median predorsal scales 5-7; scale rows on cheek 3, the lower row with 2-4 scales; P 15-16; GR 51-55; lips cover ½ or more of dental plates; C of initial phase deeply emarginate, of terminal males lunate with lobes produced. Terminal male blue-green dorsally, head salmon with dark blue-green bands on snout and chin; dental plates dark blue-green; C blue with a large salmon pink crescentic region centrally and basally, the attenuate ends extending into C lobes.

Attains at least 50 cm. Western Indian Ocean, south to Sodwana Bay.

221.8 *Scarus cyanescens*
Valenciennes, 1840
PLATE 110
Blue humphead parrotfish — Blou ramkop-papegaaivis

Scarus cyanescens Valenciennes, *in* Cuv. & Val., 1840: 254 (Mauritius); Randall & Bruce, 1983: 13*. *Xanothon chloromelas:* Smith, 1956: 6.

Median predorsal scales 3; scale rows on cheek 2; P 15; GR 44-47; dental plates broadly exposed (less than ½ covered by lips); adults with a convex, fleshy protuberance above eye. Head and body anterior to a line from about base of 5th D spine curving back to origin of A deep blue; body posterior to this line green; spinous portion of D has a narrow submarginal blue band which becomes marginal on soft portion; dental plates dull white.

Attains 50 cm. A rare species; known only from Mauritius, Madagascar, Zanzibar and Natal to 30° S. A relative of *S. oedema* (Snyder, 1909) and *S. ovifrons* Temminck & Schlegel, 1846.

221.9 *Scarus enneacanthus*
Lacepède, 1802
Captain parrotfish — Kaptein-papegaaivis

Scarus enneacanthus Lacepède, 1802: 6 (Mauritius); Randall & Bruce, 1983: 14*. *Callyodon enneacanthus*: Smith, **SFSA No. 823.**

Median predorsal scales 4; scale rows on cheek 2; P 14-15; GR 54-61; body depth 2.6-2.9 in SL; C slightly rounded to truncate in subadults, emarginate in adults. Head and body green, the edges of scales in middle and rear part of body narrowly and faintly lavender pink; dental plates greenish; unscaled part of C violet with blue upper and lower margins, green posterior margin, and a pink streak in each lobe. No obvious difference in colour with sex.

Attains 45 cm. Rare; specimens available only from Mauritius, Mozambique, Chagos Archipelago and Maldive Ids.

221.10 *Scarus festivus*
Valenciennes, 1840
PLATES 107 & 110
Lunate parrotfish — Halfmaan-papegaaivis

Scarus festivus Valenciennes, *in* Cuv. & Val., 1840: 282 (locality not given); Randall & Bruce, 1983: 16*. *Margaritodon verwayi:* Smith, 1956: 15*. *Callyodon (Margaritodon) lunula:* Smith, 1959: 280*.

Median predorsal scales 4 or 5; 2nd scale largest; cheek scale rows 3, the lowest row with 1-3 scales; P 13-14; GR 38-46; lips cover more than ½ of dental plates; marked convexity in dorsal profile of head most pronounced on large males; C emarginate to lunate, maximum C concavity of large males 1.4 in head. Colour: green, the edges of scales orange; some fish with a large light yellow area on side of C peduncle; snout and dorsal part of head greenish to violet; 2 vertical blue-green bands crossing interorbital space, the posterior one broadest; dental plates white; apparently not sexually dichromatic.

Attains 45 cm. Not common; ranges from French Polynesia to east Africa. Observed off Sodwana Bay.

221.11 *Scarus ghobban*
Forsskål, 1775
PLATES 107, 108 & 110
Bluebarred parrotfish — Bloubalk-papegaaivis

Scarus ghobban Forsskåal, 1775: 28 (Red Sea); Randall & Bruce, 1983: 20*. *Pseudoscarus natalensis* Gilchrist & Thompson, 1909: 259 (Natal). *Callyodon guttatus*: Smith, **SFSA No. 824*.** *Callyodon ghobban*: Smith, 1956: 10*; 1959: 278*; 1961: 569, **No. 824*;** Smith & Smith, 1963: 40*. *Callyodon apridentatus*: Smith, 1956: 14, Pl. 44 F (Kenya); 1959: 279*; 1962: 509; 1965: 34*.

Median predorsal scales 6 (rarely 5), the 4th usually largest; cheek scale rows usually 3, with a single scale in 3rd row; P 15-16; GR 45-53; lips cover more than ½ of dental plates; C slightly emarginate in small initial-phase fish to lunate in large terminal males, maximum C concavity 2.3 in head. Colour: initial-phase body scales bluish, becoming whitish or pale reddish ventrally, edges yellow to orange-yellow; 5 body bars often present, caused by intensification of blue on scales within the bars; head yellowish with blue bands. Terminal male light green dorsally on head and body, the scales narrowly edged in salmon pink; side of body with progressively less green ventrally and more salmon (in life there may be a faint irregular blackish bar in middle of body and a short fainter one passing ventrally from D origin); a broad irregular green band from corner of mouth across lower cheek linking to a narrow blue-green band along edge of lower lip and a broader one across chin; C green with a salmon pink band in each lobe; a dusky spot on upper edge of P base.

Attains 74 cm. The most wide-ranging parrotfish, occurring from eastern Pacific to the Red Sea and south to Algoa Bay; prefers shallow reefs and adjacent sandy areas of lagoons and bays; more inclined to penetrate silty, murky environments than other scarid fishes. The species is coloured somewhat differently in the Pacific Ocean. Has been given 20 different scientific names.

221.12 *Scarus globiceps*
Valenciennes, 1840
PLATES 108 & 110
Roundhead parrotfish — Rondekop-papegaaivis

Scarus globiceps Valenciennes, *in* Cuv. & Val., 1840: 242 (Tahiti); Randall & Bruce, 1983: 23*. *Callyodon globiceps* Smith, 1956: 14*; 1959: 279*.

Median predorsal scales 4-6 (3rd or 4th largest); rows of scales on cheek 3, the lower row with 1-4 scales; P 14; GR 46-49; lips covering or nearly covering dental plates; C slightly rounded to double emarginate. Initial phase grey-brown with 3 whitish stripes on abdomen. Terminal males green with an orange bar on each scale, the green anterodorsally on body usually broken into spots; head with a green-edged orange band from front of snout through eye to end of opercle; blackish spot at base of 4th D spine; a dark bar across base of P, broadest and darkest dorsally; C green with a submarginal orange band in each lobe.

Reaches 27 cm. Indo-Pacific, south to Sodwana Bay. The record of "*Callyodon dubius*" from a depth of 405 m off Durban (Smith, 1964: 297) may have been based on a specimen of *S. globiceps,* but the stated depth is surely erroneous.

221.13 *Scarus niger*
Forsskål, 1775
PLATES 107 & 108
Dusky parrotfish — Donker papegaaivis

Scarus niger Forsskål, 1775: 28 (Red Sea); Randall & Bruce, 1983: 24*. *Callyodon niger*: Smith, 1956: 13*; 1959: 279*; 1962: 509; Smith & Smith, 1963: 41*. *Callyodon madagascariensis:* Smith, 1956: 11*; 1959: 279* (initial phase).

Median predorsal scales 6-8 (the 5th largest); cheek scale rows 3, lower row with 2-5 scales; P 13-15; GR 44-50; lips covering ¾ or more of dental plates; 7th and 8th A rays of males prolonged; C slightly rounded to double emarginate, the lobes of males prolonged. Colour: see Key above and illustration; C dark salmon pink in some males.

Attains 40 cm. Indo-Pacific, south to Sodwana Bay. Appears to be monandric (i.e. initial phase fish are all females, terminal phase all secondary males).

221.14 *Scarus psittacus*
Forsskål, 1775
PLATES 106 & 111
Palenose parrotfish — Witneus-papegaaivis

Scarus psittacus Forsskål, 1775: 29 (Red Sea); Randall & Ormond, 1978: 242, Fig. 1A (neotype description); Randall & Bruce, 1983: 27*. *Xanothon parvidens* Smith, 1956: 7, Pl. 45 E (Bazaruto, Mozambique). *Xanothon bataviensis* (*non* Bleeker): Smith, 1956: 6*; 1959: 278*; Smith & Smith, 1963: 41*.

Median predorsal scales 3-5; cheek scale rows 2; P 13-14; GR 40-50; lips almost cover dental plates. Initial phase brown to reddish brown, shading to light orange-red on chest (in life, dorsal part of head may be pale); D with diffuse dark brown spot at base of 1st membrane; C with a narrow whitish rear margin; a small triangular blackish spot at upper P base. Terminal male with scales of body about half green and half salmon pink, the green forming 4 or 5 longitudinal series of spots on side of C peduncle and 3 stripes on abdomen; dental plates white; C light orange with blue margins, a vertical series of blue spots in middle of fin with a diagonal blue band joining uppermost blue spot to rear margin and another linking lowermost spot to margin.

A small species; largest Indian Ocean specimen examined 27.4 cm. Red Sea and Indo-Pacific, south to Sodwana.

221.15 *Scarus rubroviolaceus*
Bleeker, 1847
PLATES 106, 107 & 110
Ember parrotfish — Kool-papegaaivis

Scarus rubroviolaceus Bleeker, 1847: 162 (Java); Randall & Bruce, 1983: 28*. *Callyodon africanus* Smith, 1955: 19, Pl. 3, Fig. 26 (Shimoni, Kenya); 1956: 15*; 1959: 280*; 1965: 33*; Smith & Smith, 1963: 41*. *Callyodon rubroviolaceus:* Smith, 1956: 11*; 1959: 278*; 1962: 509; 1965: 33*; Smith & Smith, 1963: 41*. *Margaritodon africanus:* Smith, 1961: 569, **No. 822a.**

Median predorsal scales 5-7, subequal; cheek scale rows 3, lower row with 1-3 scales; a single row of scales on interopercle; P 14-16; GR 52-58; lips cover ⅓ to ⅔ of dental plates; each upper pharyngeal bone with a single row of ridged molariform teeth; C truncate in small initial-phase fish, emarginate in larger individuals (C concavity to 3.5 in head), and in terminal males lunate, lobes strongly produced (maximum concavity 1.5 in head). Body of initial phase yellowish grey dorsally and on sides, the scales with blackish edges and numerous short blackish segments set at different angles, becoming light red ventrally; head brownish red dorsally, shading to light red on snout and ventrally; dental plates light reddish to white. Terminal male with blue-green teeth; C orangish with a semicircular blue-green region centroposteriorly and broad blue upper and lower edges.

Attains 66 cm. Eastern Pacific to Durban, the most common parrotfish on reefs off Sodwana Bay. Most abundant in areas of rich coral growth. In the Pacific, terminal males are strongly bicoloured in life, the head and front third of body abruptly darker than rest of body.

221.16 *Scarus russelii*
Valenciennes, 1840
PLATES 106, 108, 111 & 113
Eclipse parrotfish — Eklips-papegaaivis

Scarus Russelii Valenciennes, *in* Cuv. & Val., 1840: 234 (Coromandel coast of India). *Scarus russelii* Randall & Bruce, 1983: 29*. *Xanothon pentazona:* Smith, 1956: 7*. *Xanothon venosus:* Smith, 1959: 278*.

Median predorsal scales 4; 2 rows of cheek scales; P 13-15; GR 48-52; lips almost cover dental plates. Colour: initial phase reddish to purplish

brown with a dull orange-red bar on each scale; 5 dark bars often present on body; lips dull red-orange, the lower lip and front of upper lip edged with dull blue-green; a dull blue-green band crossing front of snout, joining band from lower lip at corner of mouth and continuing faintly to eye; dental plates white; C dark reddish, the upper and lower edges bluish grey, with a dull green quadrangular enclosure in middle of fin. Terminal male blue-green, the scales rimmed with salmon pink (except posteriorly, where the salmon takes the form of a bar on each scale); postorbital head and body anterior to a line from base of 9th D spine to A suffused with purplish (nearly eliminating the green and salmon colour on some individuals); interorbital space and dorsal part of snout blue-green; upper lip bright blue-green, enclosing an area of salmon; lower lip edged in blue-green, this joining blue-green of upper lip and continuing as a band to below eye; a quadrangular blue-green enclosure on opercle; a region of deep yellow on lower cheek; C orange with blue upper and lower borders and a green quadrangular enclosure in centre of fin, the upper and lower edges of which extend as bands to rear margin of fin; dental plates white.

Attains at least 50 cm. Tropical and subtropical Indian Ocean from India westwards, but not the Persian Gulf nor Red Sea (where the related *S. fuscopurpureus* (Klunzinger, 1871) is found). One specimen collected from Sodwana Bay. A common shallow-water species, often seen grazing on algal films on sand.

221.17 *Scarus scaber*
Valenciennes, 1840
PLATES 106, 111 & 113

Fivesaddle parrotfish — Vyfsaal-papegaaivis

Scarus scaber Valenciennes, *in* Cuv. & Val., 1840: 239 (Mauritius); Randall & Bruce, 1983: 31*. *Callyodon oviceps* (*non* Val.): Smith, **SFSA No. 821*;** *Callyodon scaber*: Smith, 1956: 10*; 1959: 279*; 1961: 569, **No. 821*;** Smith & Smith, 1963: 41*. *Callyodon lazulinus:* Smith, 1956: 13*. *Callyodon cyanognathus:* Smith, 1959: 279*.

Median predorsal scales 4-7; 4th or 5th usually largest; cheek scale rows 3, lower row with 1-4 scales; P 13-14; GR 45-55; lips almost cover dental plates; no canines at rear of dental plates; C of subadults (10 cm SL or less) truncate, emarginate in adult initial-phase fish and lunate in terminal males (maximum concavity 2.0 in head). Colour: see Key above and illustration; initial phase with head dorsally dark grey suffused with yellow, the ventral part whitish; V and median fins pale salmon pink; C of terminal males blue with an orange band in each lobe.

Attains 37 cm. Islands of western Indian Ocean and coast of east Africa south to Natal. A common shallow-water species of protected coral reef areas.

221.18 *Scarus sordidus*
Forsskål, 1775
PLATES 111 & 113

Bullethead parrotfish — Koeëlkop-papegaaivis

Scarus sordidus Forsskål, 1775: 30 (Red Sea); Randall & Bruce, 1983: 31*. *Callyodon sordidus*: Smith, **SFSA No. 822*.** *Callyodon erythrodon*: Smith, 1955: 19*. *Xanothon erythrodon*:Smith, 1959: 278; Smith & Smith, 1963: 41*. *Xanothon bipallidus* Smith, 1956: 5*; 1959: 278*; Smith & Smith, 1963: 41*. *Xanothon margaritus*: Smith & Smith, 1963: 41*.

Median predorsal scales 4 (rarely 3), progressively larger anteriorly; cheek scale rows 2; P 14-16; GR 42-51; dental plates broadly exposed, C truncate to slightly rounded. Initial phase dark brown, becoming red around mouth; often with 2 longitudinal rows of 5 or 6 whitish spots on side of body; a broad whitish bar containing a large round blackish spot sometimes present on C peduncle and base of fin, this and the white spots in initial phase can be rapidly "turned on and off" by individual fish; dental plates pale salmon. Terminal males green, the edges of scales salmon pink except C peduncle which is nearly solid light green; chest and abdomen pale salmon with indistinct green stripes; a broad pink to lavender band on snout which narrows as it passes through lower part of eye; green bands radiating from eye; dental plates green; C green, the upper and lower edges blue with a submarginal salmon pink band; lesser longitudinal salmon pink streaks often present in central part of fin. In the Red Sea the cheek is broadly orange, shading to yellow on opercle (in contrast to green on Indian Ocean terminal male fish). Juveniles striped with dark brown (as are a number of other species of *Scarus*).

Attains about 40 cm. Indo-Pacific, south to Natal, in a variety of coral reef and rocky bottom habitats; often the most common species of parrotfish.

221.19 *Scarus tricolor*
Bleeker, 1847
PLATES 106, 111 & 113

Tricolour parrotfish — Driekleur-papegaaivis

Scarus tricolor Bleeker, 1847: 164 (Java); Randall & Bruce, 1983: 33*. *Callyodon mus* Smith, 1956: 13; 1959: 279*. *Callyodon pectoralis* (*non* Val.): Smith, 1956: 15*. *Callyodon viridibusius:* Smith, 1956; 13*. *Callyodon urbanus:* Smith, 1959: 279*. *Callyodon lepidus* Smith, 1959: 279*.

Median predorsal scales 5-7, subequal; cheek scale rows 3, the lowest row with 3-6 scales; P 14 (rarely 15); GR 47-56; lips cover $\frac{2}{3}$ or more of dental plates; C of initial phase truncate to moderately emarginate, of terminal males deeply emarginate to lunate, maximum C concavity about 1.5 in head. Colour: see Key above; initial phase with head, chest and upper half of body dark purplish to blackish; D blackish suffused with red; A orange yellow. Terminal males green with a crescentic pale salmon pink bar basally on each scale or with scales edged in this colour; head dull lavender suffused with green above horizontal green band through lower edge of eye, below green band orangish; dental plates dark blue-green; C blue-green, each lobe with a submarginal lavender-pink band, which are connected across basal scaled part of fin by a broad irregular bar of the same colour.

Reaches 40 cm (at least in the Pacific). Occurs from the central Pacific to east Africa, where it ranges south to Natal (observed by the author off Sodwana Bay). Prefers outer slope of exposed coral reefs.

Family No. 222: MUGILIDAE
by M.M. Smith & J.L.B. Smith

Mullets — **Harders**

Two widely separated dorsal fins, the first of 4 spines. Body moderately elongate; head depressed, interorbital broad and scaly; fairly large scales on body and head; no LL, but some species with 1 or more mucous canals on dorsal body scales; snout obtuse and short; preorbital serrate. In our subfamily, the Mugilinae, the small terminal mouth is either toothless or has small teeth loosely attached to

jaws; in the other subfamily, Agonostominae (which does not occur in our seas) the teeth are fixed in the jaws. Numerous long slender gill-rakers form a perfect filter: those on the 3 inner arches are at right angles, extremely close-set and meshed together by basal setiform processes to form a rigid plane surface. The gill-raker numbers of our species are not given as they increase in numbers with growth and apparently have no systematic significance.

Circumglobal fishes of commercial importance, found in all but the coldest seas near the coast, and in estuaries. Two of our species migrate up rivers, and our endemic freshwater mullet returns to the sea only to spawn. All species spawn offshore, mainly in winter and spring; the young enter the nursery area, mostly estuaries, at about 10-15 mm. Work has been done by Wallace and van der Elst (1975) on the use of our estuaries as nursery areas. Some species commonly leap out of the water, especially towards a light at night. In the Cape, large numbers are taken by seine nets, on the west coast by floating gill nets and on the Agulhas coast in summer by stonewalled traps called "fevres". Larger specimens, occasionally caught by anglers using bread, dough, stiff "mielie" porridge or even pilchard bait, give excellent sport. Some success with certain "flies" resembling soft-bodied insects has been claimed. The white firm flesh is widely used as food, and frequently for bait. Mullet feed mostly on detritus and algae, but if the opportunity arises will eat soft-bodied insects, fish eggs or the larvae of marine creatures. The stomach, spindle-shaped and muscular, is similar to a bird's gizzard and enables nutriment to be extracted from the large quantity of mud the fish swallows.

Thirteen genera containing about 70 species accepted at present (with 32 more of doubtful status); 5 genera and 15 species recorded from our area. The names of some species have altered since the 1949 edition of *The Sea Fishes of Southern Africa*, but only one, a new species, has been added to our fauna. Pappe's and Castelnau's names have been omitted from the references. Van der Elst and Wallace (1976) have published a useful paper on the identification of fry, and their key has been adapted at the end of this family for workers needing it. Thomson (1954) revised the Australian species. LS = number of scales in the 1st continuous row above the pectoral fin base from directly above rear margin of head to the caudal fin base. TR = transverse series of scales counted obliquely backwards from before origin of 1st dorsal fin to midline of belly.

KEY TO GENERA

1a Upper lip wide, with prominent papillae ..... *Crenimugil*
1b No papillae on upper lip 2

2a Adipose eyelids well developed (in adults and large juveniles) 3
2b Adipose eyelids feeble or absent 4

3a A III,8 ..... *Mugil*
3b A III,9 ..... *Valamugil*

4a P axillary scale pointed and long; body scales with pliable membranous edges ..... *Valamugil*
4b P axillary scale small or absent; no membranous edge to body scales 5

5a Maxilla end exposed when mouth shut; ..... *Liza*
5b Maxilla end almost completely concealed when mouth shut; ..... *Myxus*

Genus ***Crenimugil*** Schultz, 1946

Lips with distinct papillae; P axillary scale present; pliable membranous edges to scales with digitations ornamenting the rear margin. Teeth absent on lips, present on tongue; 9 pyloric caeca. Two species, 1 in our area.

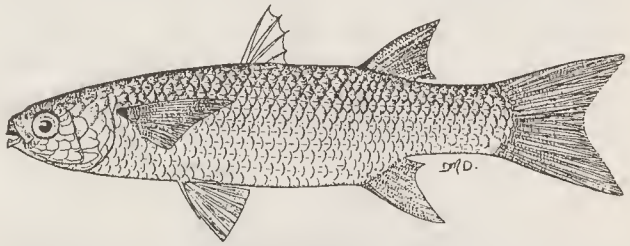
222.1 *Crenimugil crenilabis*
(Forsskål, 1775)

Fringelip mullet — Fraiinglip-harder

Mugil crenilabis crenilabis Forsskål, 1775: 14, 73 (Red Sea). *Crenimugil crenilabis:* Smith, **SFSA No. 880*;** van der Elst & Wallace, 1976: 373.

D IV+I,8; A III,9; P 16-17; LS 37-41; TR 13-14; scales cycloid with a straight, elongate mucous canal; no adipose eyelids; D, A & P slightly scaled in front; P reaches below 1st D and folded forward reaches beyond eye; scaly process at 1st D base about 8 in predorsal distance.

Generally silvery, greenish olive above, fins grey except pale yellow P with purplish axillary spot. Attains 40 cm. Indo-West Pacific from Marshall and Tuamoto Ids., Japan, Red Sea and south to Transkei.



222.1 *Crenimugil crenilabis:* 25 cm (Natal).

Genus ***Liza*** Jordan & Swain, 1884

Teeth finer than in other genera, generally straight; maxilla and premaxilla curved downwards. Pyloric caeca 7-8. *Ellochelon* Whitley, 1930; *Heteromugil* Schultz, 1943; *Pteromugil* Smith, 1948 and *Strializa* Smith, 1948 are considered synonyms of *Liza*. Eight species known from our area.

KEY TO SPECIES

1a A III,8; LS 26-28 3
1b A III,9 2

2a LS 25-28 ..... *L. melinoptera*
2b LS 29-52 4

3a C almost truncate; P 16 ..... *L. vaigiensis*
3b C forked; P 12-13 ..... *L. luciae*

4a V longer than head minus snout; LS 29-32 ..... *L. alata*
4b V shorter than head minus snout; LS 33-52 5

5a Outer teeth tricuspid; LS 43-52 ..... *L. tricuspidens*
5b Outer teeth not tricuspid or absent 6

6a Scales on nape with numerous wavy grooves; LS 36-39 . *L. dumerilii*
6b Scales on nape with at most one groove; LS 33-35 or 44-50 7

7a LS 33-35 ..... *L. macrolepis*
7b LS 44-50 ..... *L. richardsonii*

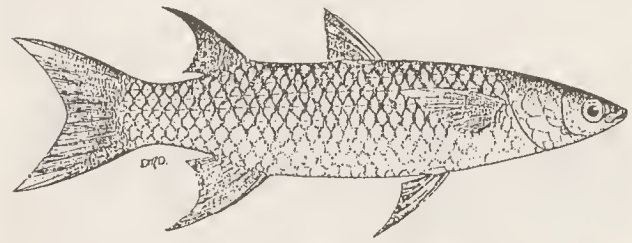
222.2 *Liza alata*
(Steindachner, 1892)

Diamond mullet — Diamant-harder

Mugil alata Steindachner, 1892: 133 (Madagascar). *Mugil diadema* Gilchrist & Thompson, 1911: 42 (Natal). *Pteromugil diadema:* Smith, **SFSA No. 881*.** *Liza alata:* Smith, 1975: 64.

D IV+I,8; A III,9; P 16; LS 29-32; TR 11; adipose eyelids feeble; tongue notched in front; lips thin, lower edentate, upper with 2 rows recurved teeth; teeth on pterygoid and tongue, none on palatines and vomer; preorbital slightly emarginate, denticulate and truncate behind. Scaly process at 1st D base 6.0-6.7 in predorsal distance; no P axillary scale; 2nd D & A falcate; V about as long as P in adults, shorter in juveniles. P folded forward reaches front of eye or beyond.

Scale margins dark, especially dorsally, giving the dull grey body the characteristic reticulate ("diamond") appearance; V bright yellow or orange. Attains 75 cm. Indo-West Pacific, reaches Algoa Bay. A splendid fish, being a great leaper and fine fighter.

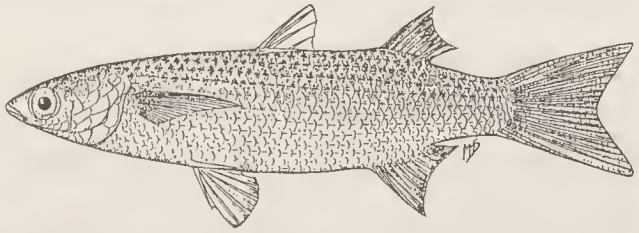


222.2 *Liza alata:* 45 cm (East London).

222.3 *Liza dumerilii*
(Steindachner, 1869)
PLATE 112

Groovy mullet — Keep-harder

Mugil dumerilii Steindachner, 1869: 959 (Senegambia). *Mugil canaliculatus* Smith, 1935: 630, Pl. 16, Fig. B (Knysna). *Strializa canaliculatus:* Smith, **SFSA No. 884*.** *Liza dumerilii:* Smith, 1975: 64.



222.3 *Liza dumerilii:* 26 cm (Knysna).

D IV+I,8; A III,9; P 16; LS 36-39; TR 13-14; scaly process at 1st D base 4.5-5.0 in predorsal distance; in juveniles no P axillary scale, in adults small and obscure; teeth feeble; palatines, vomer, pterygoid and tongue dentate; no adipose eyelids; P folded forward reaches beyond eye.

Attains nearly 40 cm. Senegal to southern Angola; in our area Breede River to Bazaruto Id.; common on our south coast, especially in estuaries which juveniles use as nursery areas. Does not leap easily, but fights well when hooked.

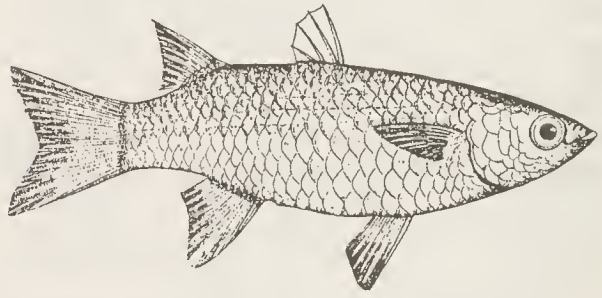
222.4 *Liza luciae*
(Penrith & Penrith, 1967)

St. Lucia mullet — St. Lucia-harder

Ellochelon luciae Penrith & Penrith, 1967: 69, Fig. 1 (St. Lucia Estuary; Wallace & van der Est, 1975: 14. *Liza luciae:* Smith, 1975: 64.

D IV+I,7; A III,8; P 12-13; LS 26-28; TR 9; adipose eyelid small; P axillary scale small but larger than in *L. vaigiensis*.

Colour very similar to *L. vaigiensis* except that P is overall a light dusky grey. Attains 20 cm. Northern Transkei to southern Mozambique, may occur further north.



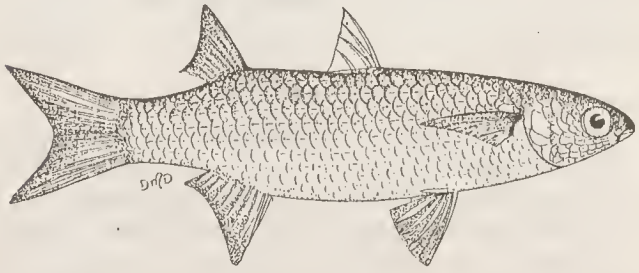
222.4 *Liza luciae:* 14 cm SL holotype (St. Lucia; after Penrith & Penrith, 1967).

222.5 *Liza macrolepis*
(Smith, 1846)

Large-scale mullet — Grootskub-harder

Mugil macrolepis Smith, 1846: Pl. 28 (South Africa "inhabits freshwater lakes and rivers"). *Mugil smithi* Günther, 1861: 477 (rivers and freshwater lakes of the Cape). *Liza macrolepis:* Smith, **SFSA No. 886*.**

D IV+I,8; A III,9; P 16; LS 33-35; TR 12; teeth feeble; palatines edentate, teeth on vomer, pterygoids and tongue; no adipose eyelids; scaly process at 1st D base 5-6 in predorsal distance; P folded forward reaches about to front of eye; P axillary scale hardly formed; scales finely ctenoid.



222.5 *Liza macrolepis:* 24 cm (Natal).

Attains 35 cm. Indo-West Pacific, most abundant mullet in Mozambique and Natal, reaches Port Alfred, enters freshwater. Makes a faint "cheeping" noise out of water.

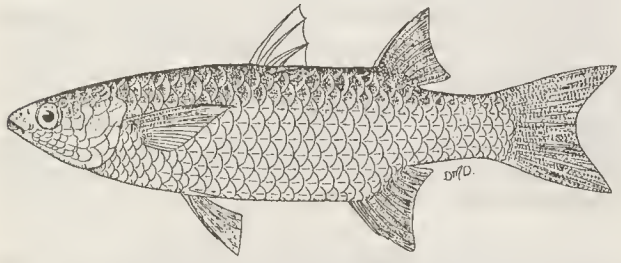
222.6 *Liza melinoptera*
(Valenciennes, 1836)

Giantscale mullet — Reuseskub-harder

Mugil melinoptera Valenciennes, *in* Cuv. & Val.: 146, Pl. 314 (Vanicola). *Liza oligolepis* (*non* Bleeker): Smith, **SFSA No. 885***. *Valamugil parmatus:* Smith, 1975: 64.

D IV+I,8; A III,9; P 15; LS 26-28; TR 10; D spines strong; scaly process at 1st D base 4.5 in predorsal distance; no P axillary scale, but behind upper part of P base is a small scaly process. Second D completely scaly with heavy basal scaly sheath; rear adipose eyelid covers about ⅓ iris, and is better developed than front eyelid. Preorbital unnotched, bent slightly downward, edge strongly serrate. Teeth in upper jaw, none in lower; all palate bones edentate, tongue toothed.

Attains 30 cm. Indo-West Pacific, rare in our area, occasional specimens reach Natal.



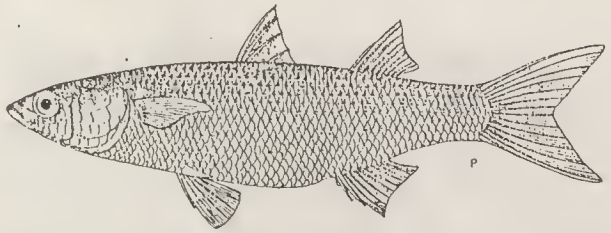
222.6 *Liza melinoptera:* 22 cm (Natal).

222.7 *Liza richardsonii*
(Smith, 1846)
PLATE 112

Southern mullet — Suidelike harder

Mugil richardsonii Smith, 1846: Pl. 29, Fig. 1 (South Africa - Cape). *Liza ramada* (*non* Risso): Smith, **SFSA No. 887***. *Mugil richardsoni:* Smith, 1965: 22*; Smith & Smith, 1966: 101*; Wallace & van der Elst, 1975: 14; van der Elst & Wallace, 1976: 373*; van der Elst, 1981: 217*.

D IV+I,8-9; A III,9; P 16-18; LS 44-50; TR 15-16; teeth feeble; palatines, vomer, pterygoids and tongue dentate; no adipose eyelids; scaly process at 1st D base 4-5 in predorsal distance; P folded forward reaches about to eye; P axillary scale small or absent in adults; 2nd D scaly only on front half.



222.7 *Liza richardsonii:* 24 cm (Knysna).

Attains 40 cm. Abundant on southwest Cape coast to Agulhas where many millions are landed annually. Experienced watchers on elevated coastal points cover the movement of shoals, which are caught by seine nets and pulled ashore. On the west coast, floating gill nets are employed. Known only from Kunene River to St. Lucia, but less abundant in warmer waters. Juveniles have been found in the Berg River (west coast) to Kwelega near East London (Wallace & van der Elst, 1975).

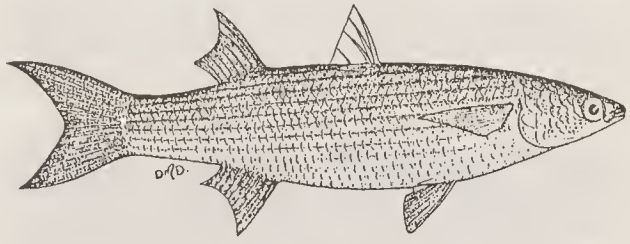
222.8 *Liza tricuspidens*
(Smith, 1935)
PLATE 112

Striped mullet — Gestreepte harder

Mugil tricuspidens Smith, 1935: 618, Fig. 10, Pl. 17, Fig. A (Knysna); Smith & Smith, 1966: 101*. *Heteromugil tricuspidens:* Smith, **SFSA No. 882***; Edwards, 1971: 25. *Liza tricuspidens:* Wallace & van der Elst, 1975: 14; van der Elst & Wallace, 1976: 373*; Blaber, 1977: 261; van der Elst, 1981: 218*.

D IV+I,8; A III,9; P 18; LS 43-52; TR 14-15; scaly process at 1st D base about 5.5 in predorsal distance; in juveniles no P axillary scale, in adults blunt and very short; tricuspid teeth in jaws larger than most other species; palatines edentate; vomer, pterygoids and tongue with villiform teeth; adipose eyelids feeble; P folded forward reaches beyond eye.

Attains 75 cm. Recorded by Franca & Ferreira (1966) from Angola. Known only from Mossel Bay to Kosi Estuary. Jumps further than *M. cephalus* with body more or less straight and parallel with water. Large fishes are able to rise 2.4 m and cover 12 m in one leap, which may be repeated several times. They almost always leap over a seine net. When occasionally hooked on prawn or pilchard they fight magnificently. Flesh much esteemed.



222.8 *Liza tricuspidens:* 45 cm (Knysna).

222.9 *Liza vaigiensis*
(Quoy & Gaimard, 1825)

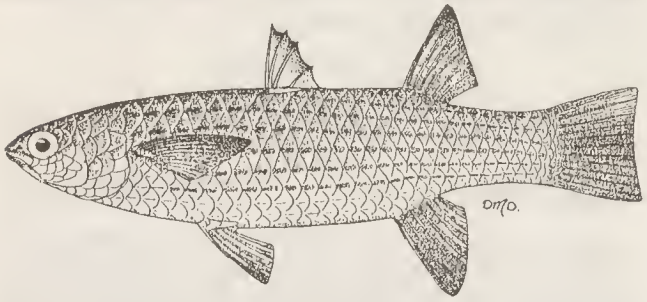
Squaretail mullet — Stompstert-harder

Mugil vaigiensis Quoy & Gaimard, 1825: 337, Pl. 59, Fig. 2 (Waigiou, Indonesia). *Ellochelon vaigiensis:* Smith, **SFSA No. 883***.

D IV+I,8; A III,8; P 16; LS 26-28; TR 10-12; head broad and flat; adipose eyelids vestigial; scaly process at 1st D base 6-8 in predorsal distance; no P axillary scale visible. Adults without teeth; juveniles have scattered fine ciliate teeth on upper lip, very few on lower; tongue dentate; scales large, ctenoid, each with a short mucous canal; preorbital notched,

denticulate, rear margin broadly rounded. P bent forward reaches front of eye; 2nd D & A scaly.

Light olive above, silvery on sides, dirty yellowish below; dusky streaks along upper scale rows; most fins dusky, P black in young, lower margin yellow in adults; iris with yellow reflections – a dusky fish with a truncate tail. Attains 60 cm or more. Indo-West Pacific, south to Durban.



222.9 *Liza vaigiensis:* 28 cm (S. Mozambique).

Genus ***Mugil*** Linnaeus, 1758

Maxilla and premaxilla not hooked downwards, hence maxilla not exposed when mouth closed. Adipose eyelids reaching to, or nearly to pupil. Teeth in jaws become flattened antero-posteriorly with age; none on vomer, palatines, or tongue; pterygoids dentate. Scales cycloid or feebly ctenoid; P axillary scale long and pointed; 2 pyloric caeca. Several species, 1 in our area.

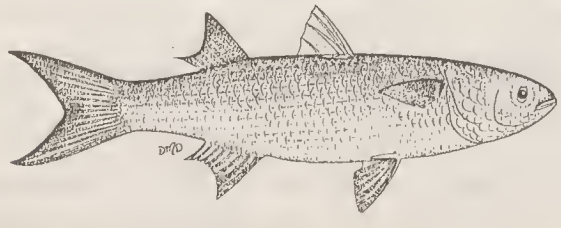
222.10 *Mugil cephalus*
Linnaeus, 1758
PLATE 112

Flathead mullet — Platkop-harder

Mugil cephalus Linnaeus, 1758: 316 (European seas); Smith, **SFSA No. 877*;** Smith & Smith, 1966: 100*; van der Elst & Wallace, 1976: 372*; van der Elst, 1981: 219*. *Myxus barnardi* Gilchrist & Thompson, 1914: 83 (Durban Bay).

D IV+I,6-8; A III,8; P 16-17; LS 39-42; TR 14-15; scaly process at 1st D base 5.0-6.5 in predorsal distance; P axillary scale 3.3-4.8 in head, scales cycloid in young, becoming feebly ctenoid with growth, rear edge membranous, scalloped with central emargination; a single slightly oblique mucous canal on some scales; the minute secondary scales on fin axillary scales and occiput scales of especially large specimens are cycloid. Preorbital moderately narrow, anterior and posterior edges serrate.

Attains 60 cm. In all warm and temperate seas, estuaries and rivers, has great leaping powers and may be seen jumping repeatedly in estuaries, especially towards evening; jumps with head up and body curved, but not as far as *L. tricuspidens*. Its great tolerance of freshwater has led to its being used extensively in aquaculture. Of considerable commercial importance both wild and cultivated.



222.10 *Mugil cephalus:* 30 cm (Knysna).

Genus ***Myxus*** Günther, 1861

Adipose eyelids rudimentary, just visible in adults. Preorbital with lower margin gently curved downwards, serrate but not notched. Maxilla mostly hidden when mouth closed. Upper lip fairly thick. Several species; 1 in our area.

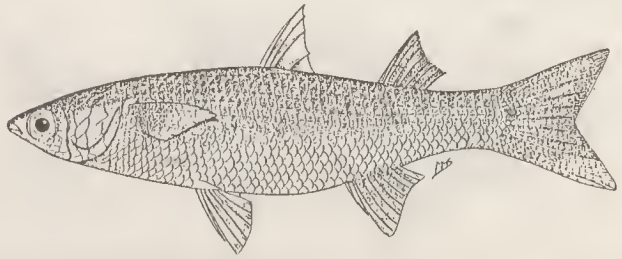
222.11 *Myxus capensis*
(Valenciennes, 1836)

Freshwater mullet — Varswater-harder

Mugil capensis Valenciennes, *in* Cuv. & Val., 1836: 108 (Cape Seas). *Mugil euronotus* Smith, 1845: Pl. 19, Fig. 2 (Cape). *Trachystoma euronotus:* Smith, **SFSA No. 890*;** Smith & Smith, 1966: 102*; van der Elst & Wallace, 1976: 372*.

D IV+1,8; A III,9; P 17; LS 43-45; TR 14-15; P folded forward scarcely reaches eye; no P axillary scale; scaly process at 1st D base 5.0-6.5 in predorsal distance; scales before D cycloid, those behind ctenoid. Vomer, palatines, pterygoids and tongue with small villiform teeth; single series of relatively large, close-set, flattened, recurved, dilated spatulate teeth with notch each side of apex (developing at 35 mm fish length) in top jaw; small cilia sometimes in lower jaw. Earlier workers misidentified this species as *Mugil saliens* Risso.

Adults seldom found outside rivers along the Cape south coast, but in the sea the colour is light dusky above, silvery below; in fresh, especially muddy, water they are not highly esteemed as food, and the colour is almost black above, silver below, as shown in colour plate. Attains nearly 50 cm. Known only from Knysna to Natal; spends most of its life in freshwater, ascending the rivers as far as it can go and returning to the sea to spawn. Unfortunately a 1 m weir is sufficient to stop its upward migration and so its habitat is thereby often restricted. Because of its preference for freshwater, experiments are being conducted with a view to aquaculture. Some anglers specialise in fishing for this species using a long thin rod, fine fixed line and a small hook buoyed by a small cork, with dough, flying ants or termites as bait. Large catches are occasionally made, mostly towards evening.



222.11 *Myxus capensis:* 24 cm (Eastern Cape).

Genus *Valamugil* Smith, 1948

Lips thin; pterygoids and tongue dentate; scales cycloid with membranous edge. An Indo-Pacific genus with 4 species in our area.

KEY TO SPECIES

1a Adipose eyelids well developed 2
1b Adipose eyelids feeble or absent 3

2a P folded forward barely reaches eye ..... *V. robustus*
2b P folded forward reaches beyond eye ..... *V. cunnesius*

3a 2nd D & A falcate, longer than V; vomer and palatines edentate; LS 33-36 ..... *V. buchanani*
3b 2nd D & A not falcate, shorter than V; vomer and palatines with teeth; LS 38-42 ..... *V. seheli*

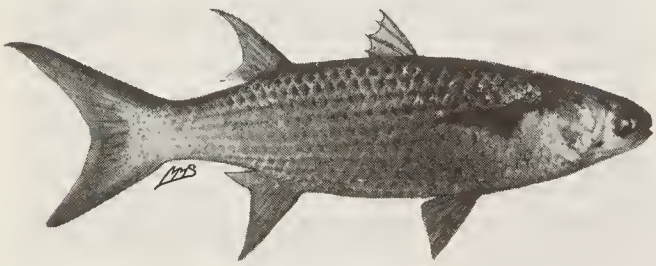
222.12 *Valamugil buchanani*
(Bleeker, 1853)
PLATE 112

Bluetail mullet — Bloustert-harder

Mugil buchanani Bleeker, 1853: 99 (Hooghly River, India). *Valamugil buchanani:* Smith, **SFSA No. 888*.**

D IV+I,8; A III,9; P 17-18; LS 33-36; TR 11-13; scaly process at 1st D base 4.0-4.5 in predorsal distance. P folded forward reaches beyond eye; P axillary scale, 2.8-5.2 in head. No adipose eyelids. Lower margin preorbital slightly bent, not or slightly notched, end truncate, lower and rear edge serrate, scaly. Very young with minute villiform teeth in single row in jaws; none visible in older specimens; palatines and vomer edentate, pterygoids and tongue with teeth.

Characterised by the brilliant blue tail. Once an explosion that caused many hundreds to leap out of the water at Ponte Torres (Inhaca Id.) produced a huge shimmering sheet of blue. Attains 100 cm. Widespread and abundant in warm waters of Indo-West Pacific south to Knysna.



222.12 *Valamugil buchanani:* 56 cm (Algoa Bay).

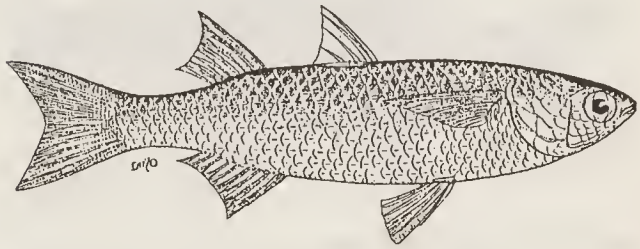
222.13 *Valamugil cunnesius*
(Valenciennes, 1836)

Longarm mullet — Langarm-harder

Mugil cunnesius Valenciennes, *in* Cuv. & Val., 1836: 114 (Moluccas, Malabar, Bombay). *Mugil strongylocephalus:* Smith, **SFSA No. 879*;** Wallace & van der Elst, 1975: 12. *Valamugil cunnesius:* Smith, 1975: 64; Blaber & Whitfield, 1977: 279; van der Elst, 1981: 220*.

D IV+I,8; A III,9; P 15-16; LS 33-36; TR 11-12; scaly process at 1st D base 4.0-4.5 in predorsal distance; a few small secondary elongate cycloid scales on nape scales; P axillary scale 3.0-3.5 in head; maxilla exposed when mouth shut. Minute villiform teeth on both lips, upper more sparse; none on palatines but vomer, pterygoids and tongue dentate.

Attains 41 cm. Indo-West Pacific, occasionally reaches Transkei; juveniles from 5 cm up occur in estuaries along the Natal coast.



222.13 *Valamugil cunnesius:* 20 cm (S. Mozambique).

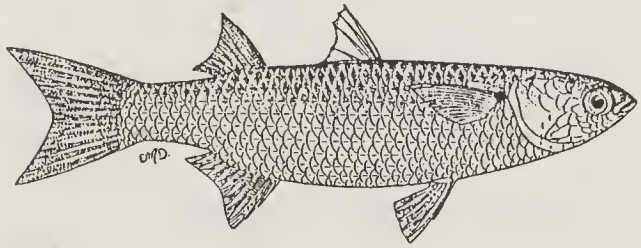
222.14 *Valamugil robustus*
(Günther, 1861)

Robust mullet — Wilde harder

Mugil robustus Günther, 1861: 432 (Madagascar); Smith, **SFSA No. 878*.** *Valamugil robustus:* Blaber & Whitfield, 1977: 279.

D IV+I,8; A III,9; P 15; LS 37-39; TR 12-13; scaly process at 1st D base 4.0-4.5 in predorsal distance; P axillary scale 3.5 in head; adipose eyelids fragile and appear to shrink on preservation; preorbital margin unnotched, sharply bent over angle of mouth, end slightly convex, scarcely serrate. No teeth in jaws, on tongue or palate bones. Soft D & A completely scaly.

Bright silvery, dusky above, sometimes golden opercular spot; traces of faint stripes along scale rows; P axillary spot distinct. Attains 30 cm. Transkei to Inhambane and Madagascar, common in southern Mozambique; in estuaries.



222.14 *Valamugil robustus:* 24 cm (Natal).

222.15 *Valamugil seheli*
(Forsskål, 1775)

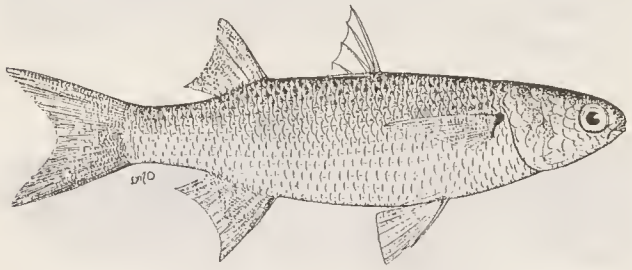
Bluespot mullet — Bloukol-harder

Mugil crenilabis seheli Forsskål, 1775: 14, 73 (Lohaja, Red Sea). *Valamugil seheli:* Smith, **SFSA No. 889*.**

D IV+I,8; A III,9; P 18; LS 38-42; TR 12-14; scaly process at 1st D base 4.2-5.0 in predorsal distance; P axillary scale 3.2 in head; no teeth in lips or

on palatines, but vomer and tongue dentate; preorbital margin scaly, bent, the notch and serrations become obscured with growth.

Silvery, darker above; axil of P black. Attains 50 cm. Indo-West Pacific south to Transkei, common in southern Mozambique estuaries.



222.15 *Valamugil seheli:* 20 cm (Natal).

Teeth of (left to right): *Liza tricuspidens, L. macrolepis, L. richardsonii, Mugil cephalus.*

KEY TO JUVENILE MULLETS
(based on van der Elst & Wallace, 1976)

LS 26-28
a Teeth in upper jaw more numerous than any that may be on lower jaw ..... *Liza melinoptera*
b C truncate; no teeth in upper jaw ..... *Liza vaigiensis*
c C emarginate to forked; no teeth in upper jaw ..... *Liza luciae*

LS 29-32
Teeth in upper jaw more numerous than any that may be in lower jaw; diamond scale pattern visible in specimens over 35 mm SL ..... *Liza alata*

LS 33-35
Teeth flattened with square tops, often in 2 close-set rows in 50 mm specimens, 25-30 in upper jaw; P does not reach below origin of 1st D ..... *Liza macrolepis*

LS 33-36; teeth absent in upper jaw.
a Snout blunt; maxilla hidden when mouth closed; no adipose eyelids at any stage ..... *Valamugil buchanani*
b Snout pointed; maxilla partly exposed when mouth closed; adipose eyelid present in specimens over 50 mm SL ..... *Valamugil cunnesius*

LS 36-39
Teeth small, flattened, expanded at apex, 13-21 in upper jaw; numerous wavy mucous canals develop on back and predorsal scales at 55-65 mm SL ..... *Liza dumerilii*

LS 37-39
No teeth in upper jaw; not more than 1 mucous canal per scale ever develops; adipose eyelid develops with growth ..... *Valamugil robustus*

LS 37-41
Papillae on lips instead of teeth become visible at 20 mm SL ..... *Crenimugil crenilabis*

LS 38-42
No papillae on lips, no teeth in jaws ..... *Valamugil seheli*

LS 39-42
About equal number of curved, pointed teeth present in both jaws; adipose eyelid develops and A II,9 changes to A III,8 at about 55 mm SL ..... *Mugil cephalus*

LS 43-45
Upper teeth only present; at 35 mm SL, pinched amber-coloured apex of teeth becomes distinct ..... *Myxus capensis*

LS 43-52
Teeth present in both jaws, tricuspid nature becomes obvious at 25-30 mm SL ..... *Liza tricuspidens*

LS 44-50
Teeth in both jaws simple, bluntly pointed and not strangulated ..... *Liza richardsonii*

Family No. 223: POLYNEMIDAE

by M.M. Smith

Threadfins **Draadvinne**

The fishes of this family resemble the mullets (Mugilidae) in body shape and in having 2 dorsal fins and adipose "eyelids", but the distinguishing characters are the inferior mouth and the pectoral fin divided into 2 parts: the upper normal but the lower of 3-8 free, elongate, simple rays from which the fishes get their name "threadfins". These "filaments" are used as feelers, and become relatively shorter as the fish grows. Jaws with a band of villiform teeth. Caudal fin deeply forked.

Threadfins are used extensively as food in the tropics where they are usually taken by nets. Some enter freshwater and while most species are moderately small, the large species (up to 2 m TL) are commercially important. Seven genera with about 35 species are known from warmer waters: 2 genera from the Atlantic, 4 Indo-West Pacific genera and 1 widespread genus that reaches our area. *Galeiodes decadactylus* (Bloch, 1795) from the Mediterranean and west Africa has been recorded by Penrith (1980) at 17°37'S; it can be recognised by the 8 free pectoral rays.

Genus ***Polydactylus*** Lacepède, 1803

Upper lip absent, lower lip present; preopercle serrate; scales finely ctenoid; C lunate. This, the largest genus in the family, occurs in all warm seas and contains about 20 species, 10-15 from the Indo-West Pacific but only 3 recorded from our area.

KEY TO SPECIES

1a 6 (rarely 7) free P rays; LL 44-50 ..... *P. sextarius*
1b 5 free P rays; LL 58-75 2

2a All upper P rays simple; LL 58-64 ..... *P. plebeius*
2b Most upper P rays branched; LL 70-75 ..... *P. indicus*

223.1 *Polydactylus indicus*
(Shaw, 1804)

Indian threadfin — Indiese draadvin

Polynemus indicus Shaw, 1804: 155 (India). *Polydactylus indicus:* Smith, **SFSA No. 899.**

D VIII+I,13-14; A II-III,11-12; P (14-15)+5, reaches almost to origin of A; lower GR 16; LL 70-75; vomer toothed.

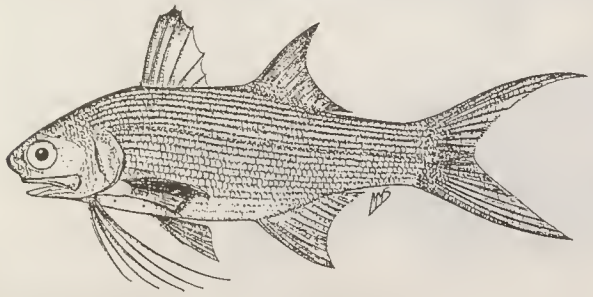
Golden olive, darker above, with faint dusky lines along body; fins yellowish. The rarest but largest species recorded from our area, attains over 1 m. Indo-West Pacific, south to Durban.

223.1 *Polydactylus indicus:* (after Hora, 1929).

223.2 *Polydactylus plebeius*
(Broussonet, 1782)

Striped threadfin — Gestreepte draadvin

Polynemus plebeius Broussenet, 1782: Pl. 8 (Pacific Ocean near Tahiti). *Polydactylus plebeius:* Smith, **SFSA No. 898*.**



223.2 *Polydactylus plebius:* 21 cm (East London).

D VIII+I,13; A II,11-12; P (15-18)+5, reaches to, or near, end of V; GR (9-11)+15; LL 58-64; vomer dentate.

Golden, dusky olive above, with a dark line along each scale row; fins dusky. Attains 45 cm. Indo-West Pacific from Red Sea to Knysna.

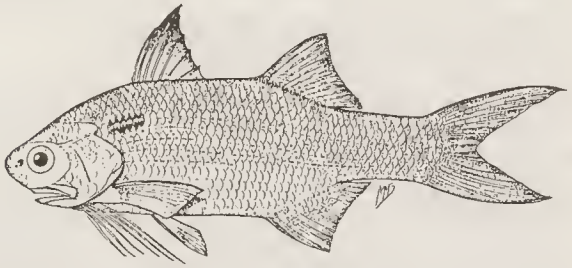
223.3 *Polydactylus sextarius*
(Bloch & Schneider, 1801)

Sixfinger threadfin — Sesvinger-draadvin

Polynemus sextarius Bloch & Schneider, 1801: 18, Pl. 4 (Tranquebar, India). *Polydactylus sextarius:* Smith, **SFSA No. 900*.**

D VIII+I,12-13; A II-III,12-13; P (13-15)+6, upper rays mostly branched, fin reaches near end of V; GR (12-14)+(17-18); LL 44-50; vomer edentate.

Silvery, golden olive above; black blotch at origin of LL always present. Attains 30 cm. Indo-West Pacific, reaches Algoa Bay.



223.3 *Polydactylus sextarius:* 22 cm (S. Mozambique).

Family No. 224: SPHYRAENIDAE

by D.P. de Sylva & F. Williams

Barracudas — **Barrakudas**

Body elongate, subcylindrical, covered with small, cycloid scales. Head long, pointed, scaly above and on sides. Mouth horizontal, large. Jaws elongate, the lower considerably projecting; large, sharp, flattened or conical teeth of unequal size on jaws and palatines; usually one or two strong, sharp canines near tip of lower jaw. Lateral line well developed, straight. Pectoral fins short, placed on or below axis of body; pelvic fins I,5, abdominal. Two dorsal fins, widely separated. Caudal fin forked. Branchiostegal rays 7, the membranes free from isthmus and each other. Gill-rakers as short spinules, or as 1 or 2 at angle of arch, or absent. Vertebrae 12+12 = 24.

Carnivorous pike-like fishes occurring in all tropical and temperate seas. Adults coastal, pelagic to demersal, or oceanic epipelagic; species range from 30 to 205 cm and are excellent eating in African seas. One genus (Sphyraena Röse, 1793) and 20 species, 10 in our area. West African species have been revised by de Sylva (1981); Indian Ocean

species have been most recently revised by Williams (1959) and by de Sylva (1975). LL scale counts are of all pored scales, including those on the caudal fin base.

KEY TO SPECIES

1a GR absent 2
1b GR present 7

2a LL 75-85; sides of body with irregular black blotches below LL ..... *S. barracuda*
2b LL greater than 100; sides of body without irregular black blotches 3

3a No crossbars or contrasted markings on body ..... *S. fosteri*
3b Crossbars or contrasted markings on body 4

4a Preopercle obliquely rounded; teeth usually slanted backwards; last rays of D_2 and A longer than anterior rays ..... *S. putnamiae*
4b Preopercle smoothly rounded; teeth erect; last rays of D_2 and A not longer than anterior rays 5

5a Crossbars on body chevron-shaped ..... *S. afra*
5b Crossbars on body not chevron-shaped 6

6a LL 120-130, usually 127-130; body blue-black above, with vertical or slightly angled wavy crossbars usually reaching well below LL; D and A dark, except last 2 rays of A pale, contrasting strongly with rest of fin ..... *S. qenie*
6b LL 130-140, usually 135-140; body dusky yellow-green above, with short serpentine crossbars reaching only slightly below LL; D dusky green; A pale ..... *S. jello*
7a A single GR at angle of 1st gill arch; LL 120-155 8
7b Two (rarely 3) GR on 1st gill arch; LL 80-96 9

8a Origin of D_1 above or in front of origin of V; LL 122-128, usually 124-127; body depth 6.5-8.5 times in SL ..... *S. acutipinnis*
8b Origin of D_1 distinctly behind origin of V; LL 127-155, usually 127-140; body depth 9.5-10 in SL ..... *S. novaehollandiae*
9a Tip of P reaches past D_1 origin; D_1 height equal to or greater than postorbital head length and greater than distance between D_1 and D_2 ..... *S. chrysotaenia*
9b Tip of P does not reach beyond D_1 origin; D_1 height less than postorbital head length and less than distance between D_1 and D_2 ..... *S. flavicauda*

224.1 *Sphyraena acutipinnis*
Day, 1876

Sharp-fin barracuda — Skerpvin-barrakuda

Sphyraena acutipinnis Day, 1876: 342, Pl. 79, Fig. 1 (Sind, Pakistan); de Sylva, 1975: 83; Talwar, 1968*. *Sphyraena helleri* Jenkins, 1901: 387, Fig. 1 (Hawaii). *Sphyraena africana* Gilchrist & Thompson, 1909: 256 (Natal); Williams. 1959: 103*. *Sphyraena natalensis* von Bonde, 1923: 10, Pl. 3, Fig. 2 (Natal). *Indosphyraena africana:* Smith, 1956: 39*.

D V+1,i,7; A II,i,7; P ii,12; LL 122-128; 1 GR at angle of 1st gill-arch. Depth 6.5-8.5, head 3.1-3.2, snout to D_1 2.2-2.3, distance between dorsals 3.4-3.8 in SL. Preopercle obliquely rounded, with a small membranous flap at the lower rear corner in large specimens; opercle with 1 membranous point above P base. Interorbital area flat. Teeth in lower jaw conical, erect and widely spaced (spaces between teeth greater than tooth widths).

Body silvery grey, greenish dorsally; fins dusky. Attains 80 cm. Indo-Pacific from Hawaii and French Polynesia to Japan, Philippines and northern Australia to South Africa as far south as Mossel Bay (34°S, 22°E).

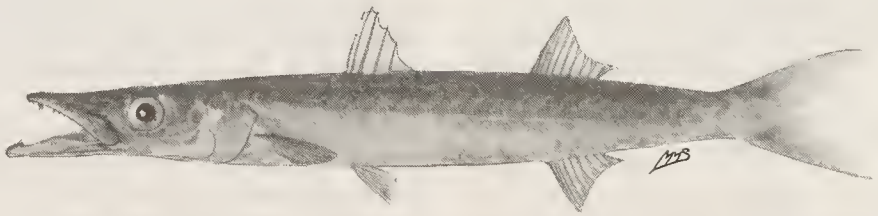
224.2 *Sphyraena afra*
Peters, 1844

Guinean barracuda — Guinese-barrakuda

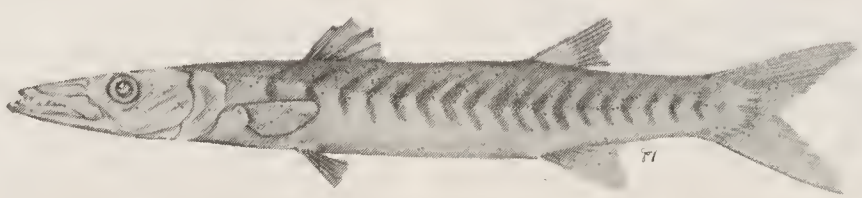
Sphyraena afra Peters, 1844: 32 (Luanda, Angola); de Sylva, 1981: Sphy 5*. *Sphyraena piscatorum* Cadenat, 1964: 673, Figs. 1, 4, 8c & 10 (west Africa). *Sphyraena jello* (*non* Cuvier): Pauca, 1930: 36.

D V+1,i,8; A II,i,8; no GR; P ii,11-13; LL 122-140;. Depth 5-7, head 3.4-4.0 in SL. Teeth compressed, erect, contiguous. Poorly developed fleshy knob at tip of lower jaw. Last rays of D_2 and A about equal to anterior rays.

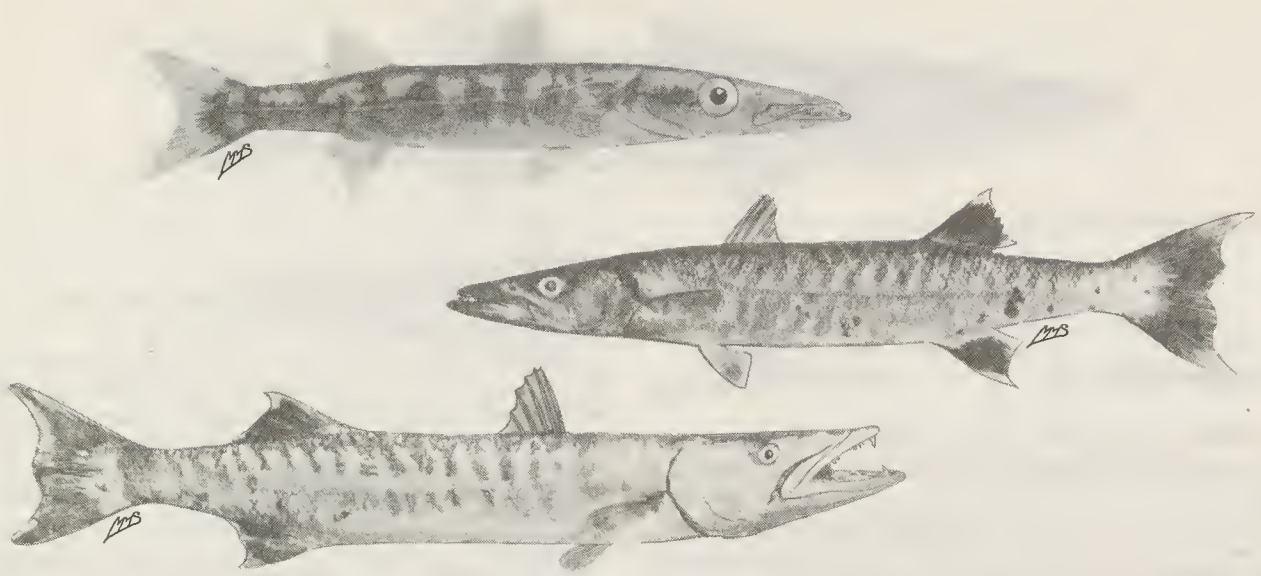
Sides of body with about 20 dark chevrons angled forward, less distinct in large specimens; no white tips on fins. Attains 205 cm (50 kg). Known only from Senegal to Namibia, with 1 record from Walvis Bay.



224.1 *Sphyraena acutipinnis:* 24.5 cm (E. of Port Alfred).



224.2 *Sphyraena afra:* 39.5 cm SL (lower Congo River, Zaire).



224.3 *Sphyraena barracuda*: top: 7 cm (Kenya); middle: 66 cm; bottom: 152.5 cm (N. Mozambique).

224.3 *Sphyraena barracuda*
(Walbaum, 1792)

Great barracuda — Groot barrakuda

Esox barracuda Walbaum, 1792: 94 (West Indies). *Sphyraena commersonnii* Cuvier, 1829: 260 (Indian Ocean). *Sphyraena dussumieri* Valenciennes, *in* Cuv. & Val., 1831: 381 (western Indian Ocean). *Sphyraena barracuda:* Smith, 1956: 41*; De Sylva, 1963*.

D V+I,i,8; A I,ii,8; P ii,11-13. Depth 6.4-8.3, head 2.5- 3.6 in SL. LL 77-85. No GR. Teeth compressed, erect, contiguous. Poorly developed fleshy knob at tip of lower jaw. Interorbital space flattened. Last rays of D_2 and A about equal to anterior rays. C bilobed or quadrilobed in adults.

In adults, sides above LL with a series of about 20 faint crossbars angled backwards; irregular black blotches usually visible on lower sides of body posteriorly; median fins dusky, tips of rays pale; C with pale edge. P and V pale. Attains 165 cm, 38 kg. Known from Natal and all tropical seas except eastern Pacific. Although this species has been implicated in ciguatera fish poisoning in the western tropical Atlantic and western South Pacific oceans, there is no record of ciguatera from Africa; the closest ciguatoxic region is Mauritius.

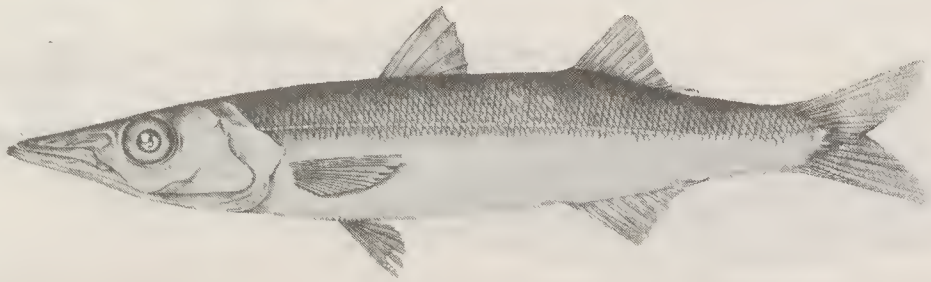
224.4 *Sphyraena chrysotaenia*
Klunzinger, 1884

Yellowstripe barracuda — Geelstreep-barrakuda

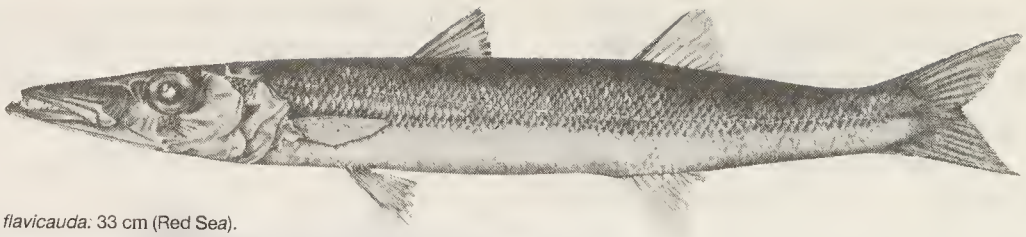
?*Sphyraena obtusata* Cuvier, 1829: 258 (India, Réunion, Australia); Smith, **SFSA No. 897** (in part); de Sylva, 1975: 83*. *Sphyraena chrysotaenia* Klunzinger, 1884: 128, Pl. 9, Fig. 3 (Red Sea); Williams, 1959: 97*. *Sphyraenella chrysotaenia:* Smith, 1956: 39*.

D V+I,i,8; A II,i,8; P ii,11-13; LL 85-96; 1 GR at angle of 1st gill arch, and a 2nd raker on lower limb. Depth 6-7.5, head 2.8-3.0, snout to D_1 2.1-2.4, distance between dorsals 3.9-4.2 in SL. Eye 4.9-5.4; snout 2.3-2.5; postorbital 2.7-3.1; depth of C peduncle 3.9-5. Angle of preopercle with a membranous flap; opercle with a single membranous point. Maxilla does not reach past front of eye. Tip of lower jaw blunt. Teeth conical, erect, widely spaced (spaces between teeth greater than tooth widths).

Dusky band from snout through centre of eye and above base of P to C peduncle; the band may be yellowish on head but fades rapidly to become dusky; C yellow, trailing edge and upper edge usually black. Attains 30 cm. Throughout central and western Indo-Pacific; Natal and south to East London, 33°S. The exact distribution of the small, schooling barracudas of the Indo-Pacific *chrysotaenia-flavicauda-pinguis* complex is not known because of difficulties in identification of the types and other museum specimens.



224.4 *Sphyraena chrysotaenia*: 22 cm (Madagascar).



224.5 *Sphyraena flavicauda:* 33 cm (Red Sea).

224.5 *Sphyraena flavicauda*
Rüppell, 1838
PLATE 112

Yellowtail barracuda — Geelstert-barrakuda

?*Sphyraena obtusata* Cuvier, 1829: 258 (India, Réunion, Australia). *Sphyraena flavicauda* Rüppell, 1838: 100, Pl. 25, Fig. 3 (Red Sea); Smith, 1956: 38*.

D V+1,i,8; A 11,i,8; P ii,11; LL 80-90; 1 GR at angle of 1st gill arch and a 2nd on lower limb. Depth 6.8-8.3, head 2.7-3.0, snout to D_1 2.1-2.3, distance between dorsals 3.6-4.2 in SL. Eye 4.8-5.6, snout 2.2-2.4, postorbital 2.8-3.1, depth of C peduncle 4.7-6.1 in head. Angle of preopercle with a membranous flap; opercle with a single membranous point just above P base. Maxilla ends about a pupil width in front of eye. Tip of lower jaw blunt. Teeth conical, erect, widely spaced (spaces between teeth greater than tooth widths). Origin of D_1 behind V origins and from behind to above tip of P.

Brown stripe from tip of snout through centre of eye and P base to C peduncle where it lies on LL; faint dusky stripe from top of eye along LL to upper C peduncle; C dusky yellow. Attains 37 cm. Throughout western and central Indo-Pacific, south to Durban.

224.6 *Sphyraena forsteri*
Cuvier, 1829

Blackspot barracuda — Swartkol-barrakuda

Sphyraena forsteri Cuvier, 1829: 261 (Tahiti); Klausewitz & Bauchot, 1967* (specimen from New Guinea designated as neotype). *Sphyraena toxeuma* Fowler, 1904: 502, Pl. 9 (Padang, Sumatra); Williams, 1959: 111*. *Callosphyraena toxeuma:* Smith, 1956: 42*.

D V+I,i,8; A II,i,8; P ii,12-13; LL 112-123. No GR, but minute bony setae dispersed on 10-20 small tubercles on lower limb of 1st arch. Depth 6.9-7.7, head 2.9-3.2 in SL. Preopercle rounded, lower angle not produced; opercle with 2 flattened spines. Maxilla does not quite reach front edge of eye. Teeth laterally compressed, contiguous; lower jaw with small to moderate teeth at sides, increasing in size posteriorly, where they are directed backwards. Origin of D_1 behind origin of V.

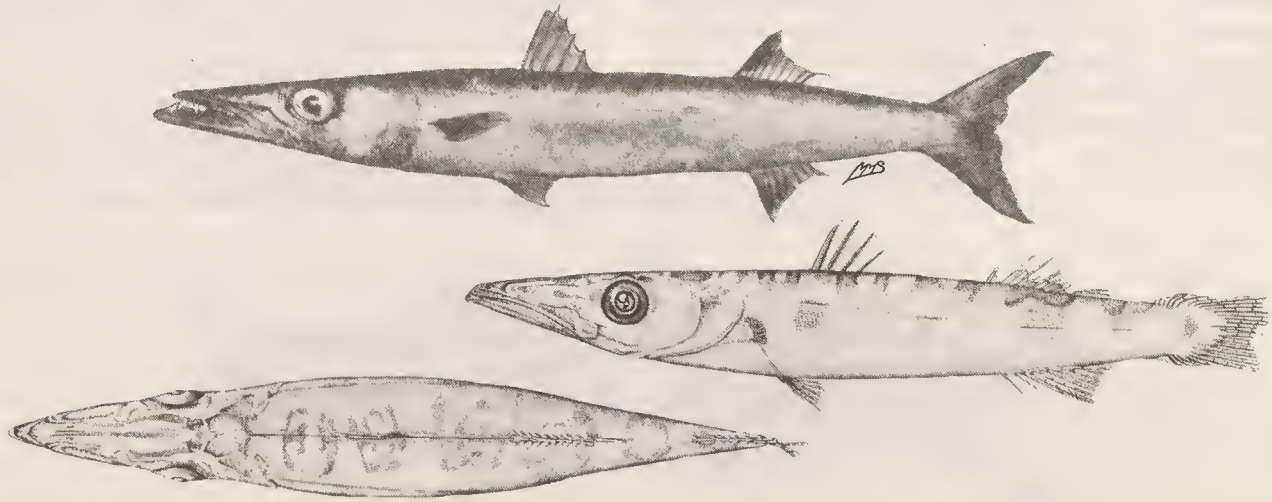
No crossbars on body; black axillary blotch at base of P; C dusky. Attains 65 cm. An Indo-Pacific species extending south to Bazaruto, Mozambique (21°S, 36°E); not reported from South Africa.

224.7 *Sphyraena jello*
Cuvier, 1829

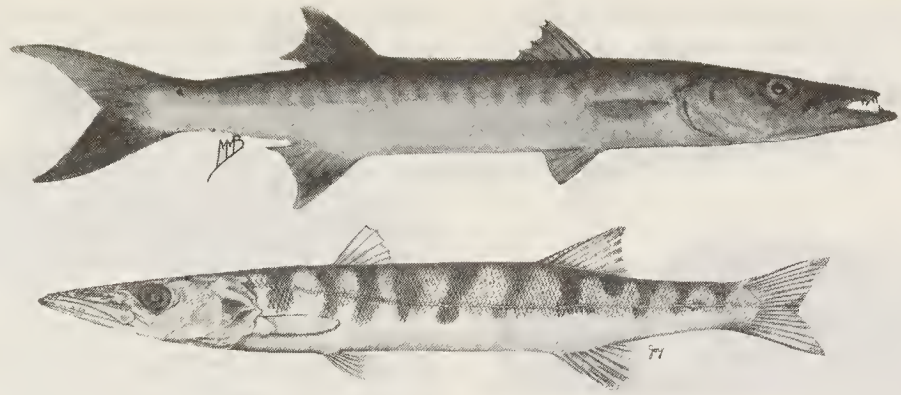
Pickhandle barracuda — Piksteel-barrakuda

Sphyraena jello Cuvier, *in* Cuv. & Val., 1829: 258 (Pondicherry, India); Smith, **SFSA No. 895;** Smith, 1956: 44*; Williams, 1959: 119*. *Sphyraena japonica:* Smith, **SFSA No. 896*** (in part). *Sphyraena permisca* Smith, 1956: 45, Pl. 2, Fig. 8 (Bazaruto, Mozambique).

D V+I,i,8; A 11,i,7; P ii,12-13; LL 130-140, usually 135-140; no GR on 1st arch. Depth 7.9-8.9, head 3.2-3.6, snout to D_1 2.5-2.6, distance between dorsals 3.2-3.5 in SL. Preopercle rounded, no produced flap; opercle with 2 spines. Maxilla reaches front edge of eye. No blunt fleshy tip on lower jaw. Interorbital space flat. Teeth moderate to large, erect, somewhat compressed. D_1 origin behind origin of V. In large specimens C is trilobed or quadrilobed.



224.6 *Sphyraena forsteri:* top: 74 cm (Seychelles); bottom: dorsal and lateral views of juvenile.



224.7 *Sphyraena jello:* top: 71 cm (N. Mozambique); bottom: 28 cm (Sri Lanka).

Body with 20 vertical dusky crossbars which extend only a short distance below LL, and form a festooned or serpentine pattern. Attains 125 cm. Indo-Pacific; due to previous confusion of this species with *S. putnamiae* and *S. qenie,* the exact range is uncertain, although it appears to be restricted to the northwestern Indian Ocean. Common in Natal, penetrating as far south as Knysna (33°35′S).

224.8 *Sphyraena novaehollandiae*

Günther, 1860

Arrow barracuda — Pyl-barrakuda

Sphyraena novaehollandiae Günther, 1860: 335 (Australia); de Sylva, 1975: 81*. *Australuzza novaehollandiae:* Smith, 1956: 40*.

D V+I,i,8; A II,i,7; P ii,11-12; LL 127-155. A single GR at angle of 1st gill arch. Depth 9.5-10, head 3.7, snout to D_1 2.2; distance between dorsals 3.5 in SL. Lower rear edge of preopercle with a membranous flap. Maxilla not reaching eye. Teeth conical, erect, widely spaced (spaces between teeth greater than tooth widths). Interorbital space flat.

Attains 50 cm or more. Known with certainty from Australia, Papua-New Guinea and Caroline Ids., but its exact distribution is not certain because of its similarity to *S. helleri.* Smith (1956) indicates possible capture of this species in northern Mozambique.

224.9 *Sphyraena putnamiae*

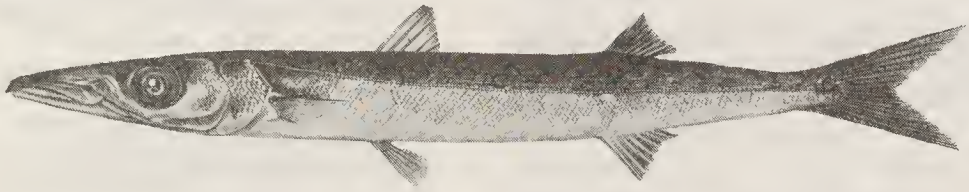
Jordan & Seale, 1905

Sawtooth barracuda — Saagtand-barrakuda

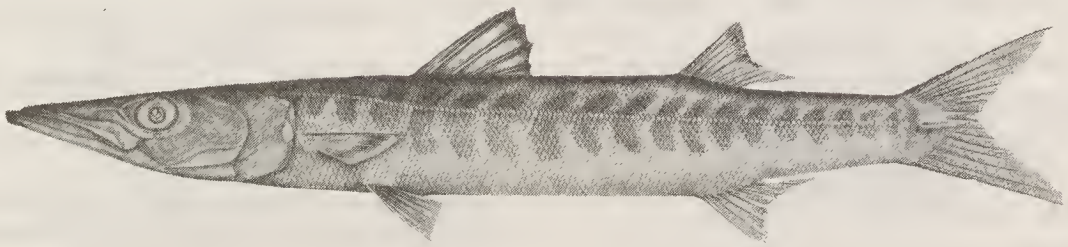
Sphyraena putnamiae Jordan & Seale, 1905: 4, Pl. 13 (Hong Kong). *Sphyraena bleekeri* Williams, 1959: 122, Pl. 2, Fig. D (Tanzania); de Sylva, 1975: 85*.

D V+I,i,8; A II,i,7; P ii,12-14; LL 123-136, usually 125-131; no GR. Depth 7.3-8.5, head 3.2-3.4, snout to D_1 2.4-2.6, distance between dorsals 3.3-3.5 in SL. Preopercle obliquely rounded, no membranous flap at lower rear edge; opercle rounded, with 2 weak, flattened spines. Maxilla reaches almost to front edge of eye. Lower jaw with a fleshy point. Interorbital flat. Teeth in lower jaw compressed, contiguous and slanting backwards. D_1 origin behind origin of V and just in front of tip of P. Posterior rays of D_2 and A longer than anterior rays.

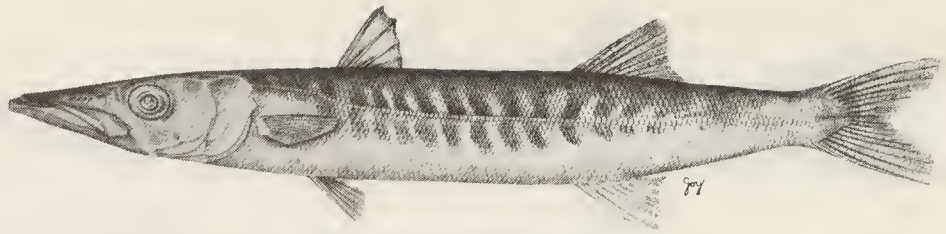
About 15 acutely angled chevrons on sides of body, their apices directed forward. Attains 87 cm. Tropical Indo-Pacific from French Polynesia and Philippines to Red Sea and Natal, South Africa. Because of its previous confusion with *S. jello,* its exact distribution is unknown.



224.8 *Sphyraena novaehollandae:* 41.5 cm.



224.9 *Sphyraena putnamiae:* 45.5 cm SL.



224.10 *Sphyraena qenie*: 29 cm (Indonesia).

224.10 *Sphyraena qenie*
Klunzinger, 1870

Blackfin barracuda — Swartvin-barrakuda

Sphyraena qenie Klunzinger, 1870: 823 (Red Sea). *Sphyraena tessera* Smith, 1956: 43, Pl. 2, Fig. 6 (Assumption Id.).

D V+I,i,8; A II,i,7; P ii,13; LL 120-130, usually 127-130; no GR. Depth 6.0-7.9, head 3.4-3.7, snout to D_1 2.5-2.7, distance between dorsals 3.0-3.3 in SL. Preopercle rounded, rear edge not produced; opercle with 2 flattened spines. Maxilla reaches front edge of eye. Tip of lower jaw projecting, blunt but without fleshy knob. Teeth in lower jaw moderate to strong, compressed, erect and contiguous. D_1 origin behind P; C usually deeply forked, but may be trilobed in large individuals.

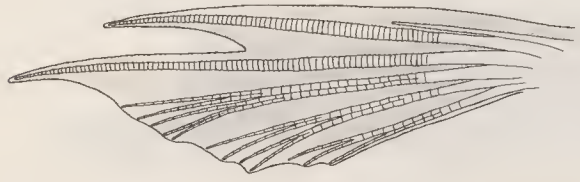
Body with 18-22 dark crossbars extending well below LL; crossbars slightly wider than interspaces. Usually a small black dot on LL at rear margin of each crossbar. D and C dark; A dark except for last 1 or 2 rays, which are white. Attains 115 cm. An Indo-Pacific species known from Red Sea and Arabian Gulf, throughout central Indian Ocean, French Polynesia, to Mexico and Panama. Recorded on east African coast to 15°S, but now reported from Natal (S. Blaber, pers. comm.).

Family No. 225: OPISTOGNATHIDAE

by W.F. Smith-Vaniz

Jawfishes — **Grootbekvisse**

Small, moderately elongate fishes with narrow tapering bodies and rounded caudal fin. Head and mouth noticeably large, with eyes relatively large and high on head. Moderate canine-like teeth usually in a single row along sides of jaws; maxilla usually extends well beyond eye; dorsal fin continuous, with 11 weak spines and 13-16 rays; anal fin III,13-15. Pelvic fins I,5 with the outer 2 rays unbranched and inner 3 branched. Lateral line high on body, close to dorsal-fin base and ending below middle of fin; lateral-line tubes or canals mostly embedded in skin.



Pelvic fin to show unbranched outer two segmented rays.

Jawfishes occur in all oceans except the eastern Atlantic and only at the eastern margin of central Pacific. They are found from shore to 300 m, but usually occur shallower than 30 m on continental margins. All species occupy burrows, which they construct by scooping sand or small stones with the mouth or by picking up larger rocks in their jaws; such burrows may be elaborately lined and reinforced with pebbles and shell fragments. As far as is known, all species brood the eggs orally. Three genera, with about 70 total species many of which lack scientific names. One genus with 3 species in our area.

Genus ***Opistognathus*** Cuvier, 1816

About 60 species, many undescribed; 3 in southern Africa. Most authors have incorrectly spelled the generic name "*Opisthognathus*". The smaller species of this genus are ideally suited as aquarium fishes because of their interesting behaviour, but most are strongly territorial.

KEY TO SPECIES

1a Black spot in D ending between 4th and 5th spine; GR (9-11)+(17-18) ..... *O. margaretae*
1b Black spot in D ending between 7th and 8th spine; GR (13-17)+(23-29) 2

2a Maxilla widest at mid-length, then curved upward and tapering posteriorly; D mottled and spotted but without 2 large blotches that extend onto body; cheek without dusky stripe bordering maxilla ..... *O. nigromarginatus*
2b Maxilla widest at end; D with 2 large irregular blotches that extend onto body; cheek with dusky stripe bordering maxilla ..... *O. muscatensis*

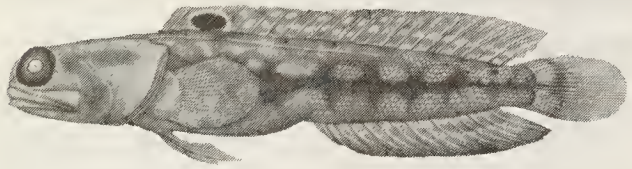
225.1 *Opistognathus margaretae*
Smith-Vaniz, 1983

Halfscaled jawfish — Halfskub-grootbekvis

Opistognathus margaretae Smith-Vaniz, 1983: 2, Figs. 1-4 (Sodwana Bay).

D XI,13-14; A III,13-14; GR (9-11)+(17-18); scales in longitudinal series 38-52. Maxilla 1.9-2.1 in head, not extending to opercle margin and with end truncate. Anterior nostril with long cirrus.

Life colour unknown; D with black spot between spines 3-5, fin otherwise mostly dusky with a few pale spots. Attains 92 mm. Known from Natal to Shimoni, Kenya.



225.1 *Opistognathus margaretae:* 8.5 cm holotype (Kenya).

225.2 *Opistognathus muscatensis*
Boulenger, 1887
PLATE 112

Robust jawfish — Sterk grootbekvis

Opisthognathus muscatensis Boulenger, 1887: 662, Pl. 54, Fig. 1 (Muscat, Oman); Barnard, 1927: 443*; Smith, **SFSA No. 385*.** *Opistognathus muscatensis:* Smith-Vaniz, 1983: 7*.

D XI,15; A III,15; GR (13-17)+(23-29); scales in longitudinal series 103-142. Maxilla 1.4-1.6 in head, not extending to opercle margin and with broad rounded end. Anterior nostril a short tube without cirrus.

D with black spot between spines 3-8, and 2 large irregular blotches that extend onto body; spots and blotches in D and on body bordered with pale blue. Attains 41 cm. Known from Durban to Arabian Gulf, also Seychelles (Mahé Id.), in 30 - 50 m.

225.2 *Opistognathus muscatensis:* 28 cm (Natal).

225.3 *Opistognathus nigromarginatus*
Rüppell, 1830

Bridled jawfish — Gesnorde grootbekvis

Opistognathus nigromarginatus Rüppell, 1830: 114, Pl. 28, Fig. 4 (Red Sea); Smith-Vaniz, 1983: 6*. *Opisthognathus nigromarginatus:* Smith, **SFSA No. 386*.** *Opisthognathus macrostomus* Smith, 1935: 186, Pl. 20, Fig. B (Natal); **SFSA No. 387.**

D XI,14-15; A III,14-15; GR (13-17)+(23-29); scales in longitudinal series 68-88. Maxilla 1.0-1.2 in head, extending well beyond opercle margin and with end narrowly rounded. Anterior nostril with very short cirrus.

D with black ocellated spot between spines 4-8, otherwise dusky with white spots; head and body brown, with white spots; inner lining of maxilla white, bordered with a black band. Attains 186 mm. Shallow coastal waters from Natal to South China Sea, including Red Sea and Aldabra.

225.3 *Opistognathus nigromarginatus:* 14.5 cm (Zanzibar).

Family No. 226: CEPOLIDAE

by W.F. Smith-Vaniz

Bandfishes — **Bandvisse**

Small, moderately to noticeably elongate fishes with compressed, tapering body and lanceolate caudal fin. Mouth large, oblique with slender, slightly curved teeth; upper jaw broad at end, ending below rear margin of eye. Dorsal fin continuous, with 0-4 flexible spines and 21-89 rays; anal-fin spine present or absent, soft-rays 13-102. Pelvic fins I,5 with outer ray unbranched or weakly branched and other rays fully branched. Lateral line high on body, close to dorsal-fin base.

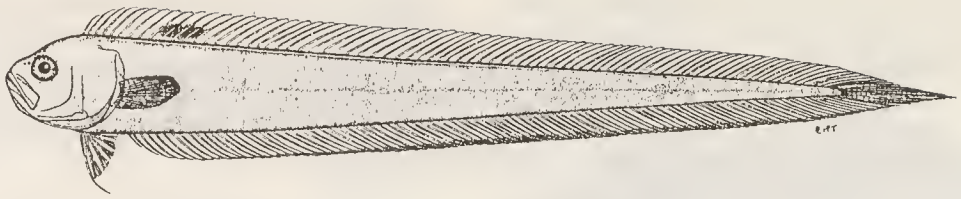
General colour red to pink; all known species have a distinctive dark stripe (usually hidden) on the membrane connecting the premaxillary and maxillary bones of the upper jaw. Adults occupy burrows on level bottom substrates in 50 - 475 m; restricted to continental margins of eastern Atlantic, Indian and western Pacific oceans. About 20 species in 4 genera. The Owstoniidae, considered by many authors as a distinct family, is here synonymised with the Cepolidae following Okada & Suzuki (1956) and Springer et al., (1977).

KEY TO GENERA

1a Last ray of D and A broadly united to C by a membrane; total D elements 82-89 ..... *Acanthocepola*
1b Last ray of D and A not connected to C by a membrane; total D elements 24 or 25 ..... *Owstonia*

Genus *Acanthocepola* Bleeker, 1874

At least 4 species; 1 in southern Africa.



226.1 *Acanthocepola limbata:* 39 cm (Arabian Sea).

226.1 *Acanthocepola limbata*
(Valenciennes, 1835)

Bandfish — Bandvis

Cepola limbata Valenciennes, *in* Cuv. & Val., 1835: 402 (Japan, after Krusenstern, Pl. 60, Fig. 2). *Acanthocepola cuneatus* Smith, 1935: 193, Pl. 21, Fig. A (Natal); Smith, **SFSA No. 465*.** *Acanthocepola limbata:* Smith, **SFSA No. 466.**

D 82-89; A 91-102; vertebrae 12+(60-66); GR (14-16)+(32-36). Preopercle with 6-7 blunt spines, longest at angle. Head 6.7-8.6 in SL.

Black spot (bright red in large adults) in D between spines 8-14; head and body orange-red, with 18-20 yellow bands on sides; median fins orange-red; P and V yellow with orange rays. Attains 50 cm. Occasionally taken by trawl in 50 - 100 m in coastal waters from Natal to Japan. A radiograph of the type of *A. cuneatus* reveals at least 10 vertebrae missing and a regenerated C, a condition not appreciated in the original description. These burrow dwellers must be particularly vulnerable to predation because fish with some missing caudal vertebrae are common.

Genus ***Owstonia*** Tanaka, 1908

Sphenanthias Weber, 1913, recognised by some authors as a valid genus, has traditionally been distinguished from *Owstonia* solely on the basis of a different LL arrangement. *Sphenanthias* is here treated as a junior synonym because *O. tosaensis* Kamohara, 1934 has an intermediate LL configuration. Eleven species; 2 in southern Africa.

KEY TO SPECIES

1a LL united on nape to form a loop in front of D; GR (12-13)+25 = 37-38 ..... *O. weberi*

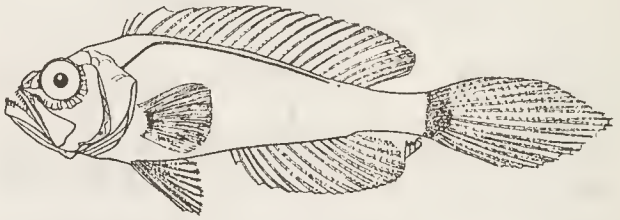
1b LL lines separate, strongly arched from origin to below front of D; GR (15-18)+(28-32) = 45-50 ..... *O. simoterus*

226.2 *Owstonia simoterus*
(Smith, 1968)

Sphenanthias simoterus Smith, 1968: 11, Fig. 1 (off Bazaruto, southern Mozambique).

D III,21; A I,14; scales in longitudinal series about 70; cheek scale rows 12. Head 3.3 in SL.

Body and fins red or crimson; membrane between premaxilla and maxilla black. Known from a single 39 cm specimen trawled in 475 - 500 m.



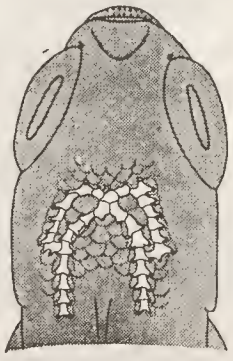
226.2 *Owstonia simoterus:* 44.5 cm holotype (S. Mozambique).

226.3 *Owstonia weberi*
(Gilchrist, 1922)
PLATES 112 & 113

Parasphenanthias weberi Gilchrist, 1922: 69, Pl. 10, Fig. 2 (Natal); Smith, **SFSA No. 464*.** *Parasphenanthias microlepis* Fowler, 1934: 462, Fig. 35 (Natal). *Owstonia weberi:* Smith, 1968: 10*.

D III,21-22; A I,13-14; scales in longitudinal series 38-41; cheek scale rows 3-4. Head 3.1-3.9 in SL.

Head and body reddish-pink dorsally, white below; fins reddish-pink, except V mostly white; membrane between premaxilla and maxilla black. Attains 52 cm. Trawled in 190 - 350 m from Natal to Kenya.



226.3 *Owstonia weberi:* dorsal view of head showing LL arrangement.

Family No. 227: CONGROGADIDAE

by R. Winterbottom

Snakelets **Slangetjies**

Body elongate and eel-like; 1 or 2 dorsal spines (absent in 1 Pacific species); dorsal and anal fins long (32-77 and 26-65 rays respectively); no anal spines; pectoral fin rays 9-14; pelvic fin varies from I,4 to absent; branched caudal rays 10. Teeth conical; gill-rakers poorly developed; gill membranes united, fused or free from isthmus; 6 branchiostegal rays; a single spine on opercle. Scales cycloid, small, covering body. Head scaled (cheek and opercle) or naked. Lateral line variable (from short and incomplete to as many as 4 separate lateral-lines on each side).

Snakelets range from intertidal to 140 m; some attain 50 cm in length. Widely distributed in coastal waters of the Indo-West Pacific area. Ten genera, 17 species; 5 species in our area. *Halimuraenoides isostigma* Maugé & Bardach, 1985 from Madagascar may be found in our area and is thus included in the key.

KEY TO GENERA

1a V present 2
1b V absent 4

2a LL single, short, ending below anterior part of D ..... *Natalichthys*
2b LL not a single, short section 3

3a LL consisting of a short anterior section and a longer posterior section along midlateral part of body; V I,3; P 12 ..... *Halimuraenoides*
3b Three LL on body posterior to anus; V I,2; P 10 ..... *Halidesmus*

4a Gill membranes fused to isthmus ..... *Haliophis* (*H. guttatus* Forsskål, known from the Red Sea, SW Madagaşcar and from Mozambique Id.).
4b Gill membranes united but free of isthmus ..... *Halimuraena*

Genus ***Halidesmus*** Günther, 1871

Three species, 1 in South Africa.

227.1 *Halidesmus scapularis*
Günther, 1871
PLATE 112

Snakelet Slangetjie

Halidesmus scapularis Günther, 1871: 668, Pl. 67, Fig. A (Port Elizabeth, South Africa); Smith, 1952: 97*; **SFSA No. 1028*;** Smith & Smith, 1966: 113*. *Porogrammus capensis* Gilchrist & Thompson, 1916: 57* (False Bay, South Africa).

D I,58-63; A 48-52; P 8-10; LL variable, but always 3 lines (dorsal, lateral, ventral) posterior to A origin; GR 3+6. Depth 6.6-7.6; head 10.3-13.2.

Colour variable, usually light to dark brown, sometimes with dusky crossbars; an ocellated dark spot on shoulder above opercle. Attains 20 cm. False Bay to Coffee Bay, Transkei; common in intertidal pools and marginal subtidal areas.

Genus ***Halimuraena*** Smith, 1952

Three species, 1 in our area (the other 2 extralimital, but may be found here).

KEY TO SPECIES

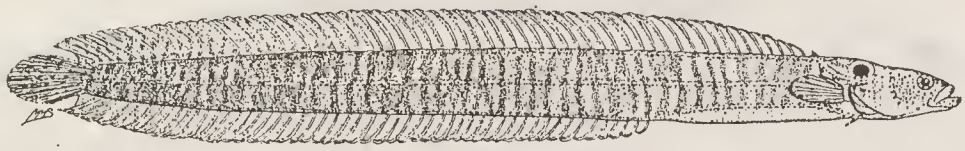
1a Cheek, opercle and nape scaled; 8 suborbital canal pores ..... *H. lepopareia* Winterbottom, 1980 (Comoro Ids. and northern Madagascar)
1b Cheek, opercle and nape naked; 7 suborbital canal pores 2

2a Dark ocellated spot on shoulder above opercle; LL of a single, short, anterior section and a longer posterior section along midlateral part of body ..... *H. hexagonata* Smith, 1952 (Extralimital, to about 15°S on Mozambique coast; Madagascar)
2b No dark spot on shoulder above opercle; LL single, ending below anterior part of D ..... *H. shakai*

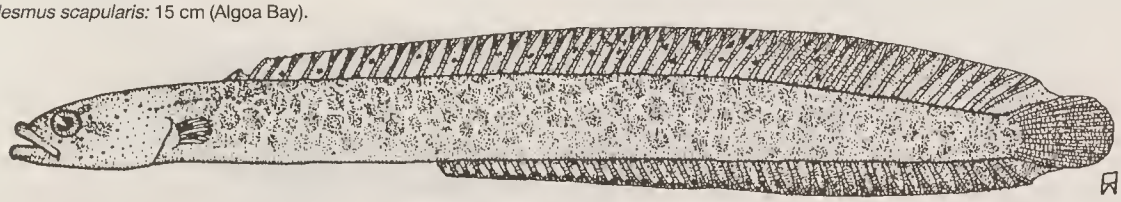
227.2 *Halimuraena shakai*
Winterbottom,.1978

Zulu snakelet Zoeloe-slangetjie

Halimuraena shakai Winterbottom, 1978: 49, Figs. 1 & 2 (off Sodwana Bay, Natal).



227.1 *Halidesmus scapularis:* 15 cm (Algoa Bay).



227.2 *Halimuraena shakai:* 5 cm SL holotype (Natal).

D I,47-49; A 36-38; P 9; LL 7-22; GR (2-3)+(7-8). Depth 7.6-9.6; head 14.9-17.7.

Colour ranging from uniform light brown to a body covered with dark, unevenly rounded, eye-sized blotches. Attains 6 cm. Relatively common at 12 - 15 m. Known only from limestone/coral reefs off Sodwana Bay, Natal and 1 specimen from Mauritius.

Genus ***Natalichthys*** Winterbottom, 1980

V I,2; gill membranes united, but free from isthmus. Three species, all endemic to Natal.

KEY TO SPECIES

1a Cheek scaled; 1 dorsal procurrent C ray ..... *N. leptus*
1b Cheek not scaled; 2 dorsal procurrent C rays 2

2a D I,52-53; 2 ventral procurrent C rays ..... *N. ori*
2b D I,42; 1 ventral procurrent C ray ..... *N. sam*

227.3 *Natalichthys leptus*
Winterbottom, 1980

Pencil snakelet — Potlood-slangetjie

Halidesmus scapularis (*non* Günther): Barnard, 1927: 870 (part, Natal). *Natalichthys leptus* Winterbottom, 1980: 8, Fig. 3 (Umhlangankulu River, Natal).

D I,48; A 39; P 9; LL 20-24; GR (2-3)+(6-7). Depth 8.6-9.2; head 16.9-17.5.

Colour when preserved light brown, a dark blotch on shoulder above opercle. Attains 7 cm. Known from 2 specimens from Natal, probably from 90 m off the Umhlangankulu River.

227.4 *Natalichthys ori*
Winterbottom, 1980

Natal snakelet — Natalse slangetjie

Halidesmus scapularis (*non* Günther): Barnard, 1927: 870 (part, Natal). *Natalichthys ori* Winterbottom, 1980: 3 Fig. 1 (Umhlangankulu River, Natal).

D I,52-53; A 42-43; P 9; LL 22-23; GR (2-3)+(8-9). Depth 7.5-8.0; head 15.0-15.6.

Colour when preserved light brown, a dark blotch on shoulder above opercle. Attains 7 cm. Known from 2 specimens from Natal, probably from 90 m off the Umhlangankulu River.

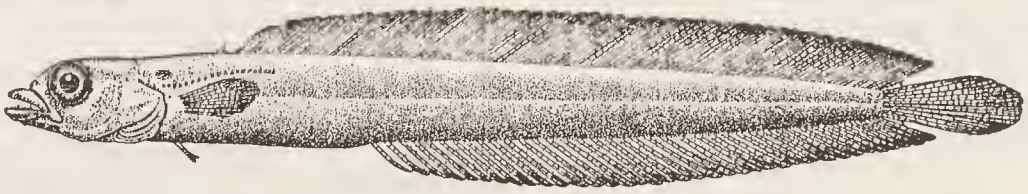
227.5 *Natalichthys sam*
Winterbottom, 1980

Nail snakelet — Spyker-slangetjie

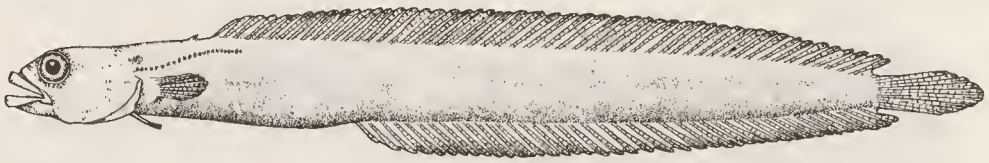
Natalichthys sam Winterbottom, 1980: 6, Fig. 2 (off Port Shepstone, Natal).

D I,42; A 32; P 10; LL 22-27; GR 2+6. Depth 10.5-11.2; head 18.3-18.9.

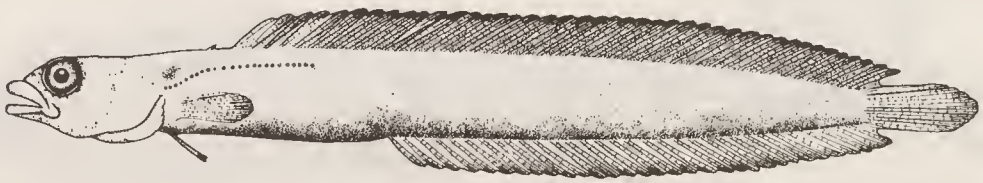
Colour when preserved light brown, a dark brown blotch on shoulder above opercle. Attains 5 cm. Known from 2 specimens from 44 m off Port Shepstone, Natal.



227.3 *Natalichthys leptus:* 6.5 cm holotype (Natal).



227.4 *Natalichthys ori:* 6 cm SL holotype (Natal).



227.5 *Natalichthys sam:* 4 cm SL holotype (Natal).

Family No. 228: CHIASMODONTIDAE

by R.K. Johnson & M.J. Keene

Swallowers **Slukkers**

Body moderately compressed, elongate. Dorsal fin IX-XIII+18-29. Dorsal fin spines flexible. Anal fin I,17-29. Pectoral fin rays 9-15. Pelvic fins I,5. Branchiostegal rays 6 or 7 (2 on epihyal). Vertebrae 33-48. Body naked (*Kali, Chiasmodon* (half-grown, adults)), scabrous, with numerous small projecting spinules (*Chiasmodon,* postlarvae, juveniles), or with 2 or more rows of larger (and fewer), stout, projecting prickles (*Dysalotus*). Mouth large with long teeth. Premaxilla and maxilla slender and elongate, firmly connected distally. Jaw teeth in 1 or 2 rows (*Chiasmodon, Kali*) or in bands 3-5 teeth wide tapering to 1 or 2 rows posteriorly (*Dysalotus*). Teeth present on palatines, present or absent on vomer. Lath-like gill-rakers lacking, replaced (*Dysalotus, Kali,* but not *Chiasmodon*) with short gill teeth, fixed (1-3 teeth per plate) on nodular bony plates. Post-temporal bone distinctly forked, with ventral limb connected (via a ligament) to opisthotic. All chiasmodontids with a rather uniform blackish or brownish pigmentation over entire body and fins, without any distinct concentration into bars, stripes or other markings. Photophores lacking.

Chiasmodontids are oceanic and mesopelagic or bathypelagic piscivorous fishes. They reach a relatively large size for midwater fishes (record for family: 262 mm SL in *Kali indica*). Their ability to swallow large prey, sometimes as large as themselves, has earned them the name "swallowers". The anterior anal fin pterygiophores are not embedded in the musculature, enhancing the ability of the stomach to expand and accommodate large prey. Nothing is known of the behaviour or reproduction of chiasmodontids. The family is circumglobal in tropical and subtropical oceanic areas, but of no commercial importance. Three genera with a total of 11 currently recognised species, 9 species in our area or likely to occur here. The most recent revisions are those by Norman (1929), Johnson (1969), and Johnson & Cohen (1974).

KEY TO GENERA
(Adults)

1a Jaw teeth arranged in bands up to 3-4 teeth wide; large prickles along sides of body ..... *Dysalotus*
1b Jaw teeth in 1 or 2 rows, large prickles lacking 2

2a None of 3 anteriormost jaw teeth are as long as some more posterior teeth in inner row; tooth plates (small nodules of bone with 1-3 tiny teeth per plate) present on 1st 3 gill arches; vertebrae 33-41 ..... *Kali*
2b One or more of 3 anteriormost jaw teeth distinctly longer than any posterior tooth; no gill tooth plates; vertebrae 43-48 ..... *Chiasmodon*

Genus *Chiasmodon* Johnson, 1863

Four currently recognised species, 2 off southern Africa. The genus needs revision; information presented here is based on the literature or on examination of limited material, most of it from the Atlantic.

KEY TO SPECIES

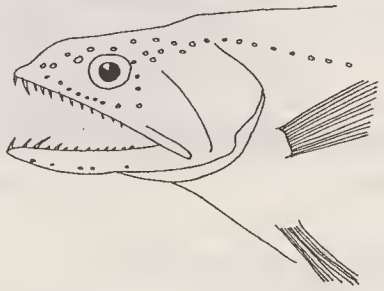
1a Teeth strong; head 27-31% SL; snout 22-25% head length; interorbital width 18-20% head length ..... *C. niger*
1b Teeth moderate in size; head 23-27% SL; snout 27-30% head length; interorbital width 21-23% head length ..... *C. bolangeri*

228.1 *Chiasmodon bolangeri*
Osorio, 1909

Chiasmodon bolangeri Osorio, 1909: 22, Pl. 2, Fig. 1 (off Setubal, Portugal). *Chiasmodon microcephalus* Norman, 1929: 539, Fig. 86 (South Atlantic, 39°50′S, 36°23′W and 33°25′S, 06°31′E).

D XI-XIII+26-29; A I,26-29; P 12-15; vertebrae 43-46. Teeth smaller and weaker, but otherwise arranged exactly as in *C. niger*. Spine at lower angle of preoperculum weakly developed.

Most captures below 750 m. Not yet recorded from our area but has been taken at 33°25′S, 06°37′E. Tropical/subtropical in Atlantic Ocean.



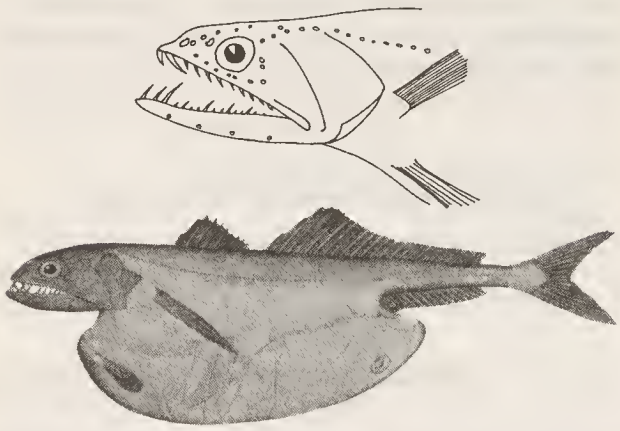
228.1 *Chiasmodon bolangeri:* head of 11.5 cm holotype of *C. microcephalus* (drawn after Norman, 1929).

228.2 *Chiasmodon niger*
Johnson, 1863

Chiasmodon niger Johnson, 1863: 408 (off Madeira); Goode & Bean, 1896: 292*; Barnard, 1927: 434; Smith, **SFSA No. 377***. *Chiasmodus niger:* Günther, 1864: 45 (invalid emendation of *Chiasmodon*); Gilchrist & von Bonde, 1924: 12.

D XI-XIII+26-29; A I,26-29; P 12-15; vertebrae 43-46. Teeth more strongly developed than in *C. bolangeri,* acutely pointed, in 2 series in each jaw. Expanded part of premaxilla with 3 canine teeth, the 1st fixed and strongly curved, the 2nd of moderate size, depressible, directed posteriorly, and lying flat against roof of mouth when not erected; the 3rd very large, depressible, crossing that of the opposite side when laid back; 3 anterior teeth on each dentary also enlarged, the 1st fixed, the 3rd very long (see Norman, 1929). A small but stout spine at lower angle of preopercle.

Most captures have been at depths exceeding 750 m. Tropical/subtropical in the 3 major oceans.



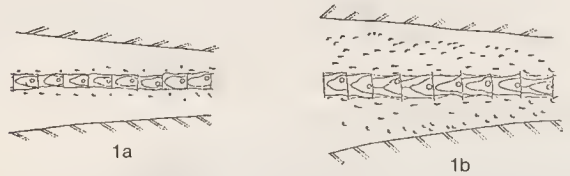
228.2 *Chiasmodon niger*: head (drawn after Norman, 1929); specimen found dead on surface containing a fish larger than itself (after Goode & Bean, 1896).

Genus ***Dysalotus*** MacGilchrist, 1905

Two species, both presumed to occur off southern Africa.

KEY TO SPECIES

1a Single row of emergent prickles above and below LL; vomerine teeth present ..... *D. oligoscolus*



1a 1b

1b More than 1 row of prickles above and below LL; vomerine teeth lacking ..... *D. alcocki*

228.3 *Dysalotus alcocki*
MacGilchrist, 1905

Dysalotus alcocki MacGilchrist, 1905: 268 (Bay of Bengal), Alcock & MacGilchrist, 1905: Pl. 37, Fig. 1; Johnson & Cohen, 1974: 31*.

D X-XI+26-28; A I,26-28; P 11-13; vertebrae 39-40.

Majority of adults have been taken in depths exceeding 1 000 m; apparently no adults have been taken in hauls restricted to the upper 700 m. Tropical/subtropical in the 3 major oceans; known from relatively few, widely-scattered localities from Sargasso Sea to equatorial Pacific at 137°16'W. Has yet to be taken within our area due to inadequate sampling.

228.4 *Dysalotus oligoscolus*
Johnson & Cohen, 1974

Dysalotus oligoscolus Johnson & Cohen, 1974: 32, Fig. 11. *Dysalotus alcocki* (*non* MacGilchrist): Norman, 1929: 541* (in part, specimen from South Atlantic).

D X-XII+24-26; A I,24-27; P 11-12; vertebrae 38-40.

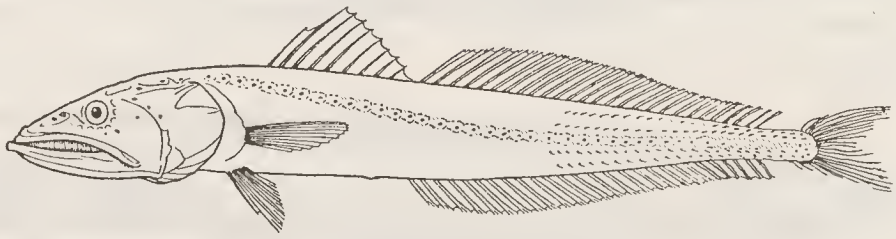
All adults have been taken in depths exceeding 1 500 m. Tropical/subtropical in the 3 major oceans; known from relatively few, widely-scattered localities from South Atlantic to off Baja California. Not yet taken in our area, but very wide distribution suggests that it probably does occur here.

Genus ***Kali*** Lloyd, 1909

Five species, all presumed to occur off southern Africa.

KEY TO SPECIES

1a Segmented D rays 18-21 2
1b Segmented D rays 22-26 3



228.3 *Dysalotus alcocki*: 22.5 cm type (after Norman, 1929).

228.4 *Dysalotus oligoscolus*: 13 cm holotype (after Johnson & Cohen, 1974).

2a 3 or 4 teeth in inner row in upper jaw; 7-10 teeth in inner row in lower jaw; 9-10 spines in 1st D ..... *K. macrura*
2b 9-13 teeth in inner row in upper jaw; 7-19 teeth in inner row in lower jaw; 11-12 spines in 1st D ..... *K. parri*

3a 6-12 teeth in outer row of each jaw ..... *K. indica*
3b 14-38 teeth in outer row of each jaw 4

4a P rays 10 or 11 ..... *K. macrodon*
4b P rays 12 or 13 ..... *K. normani*

228.5 *Kali indica*
Lloyd, 1909

Kali indica Lloyd, 1909: 154, Pl. 44, Fig. 5 (Bay of Bengal); Johnson, 1969: 387*; Johnson & Cohen, 1974: 39.

D XI-XIII+22-24; A I,21-25; P 12-13; vertebrae 37-41. Upper jaw with 6-12 teeth in outer row, 3-4 teeth in inner row. Lower jaw with 6-10 teeth in outer row, 3 or 4 teeth in inner row.

Most adults have been taken in depths exceeding 1 500 m. The single gargaropteron-stage (see Johnson & Cohen, 1974) 20 mm SL, was taken (RHB 1290) in the Yucatan Channel, in 0 - 124 m, the shallowest depth record for this species. Tropical/subtropical in the 3 major oceans; known from relatively few, widely-scattered localities from Gulf of Mexico to eastern Pacific off Baja California. Not yet taken, but assuredly occurs within our area.

228.6 *Kali macrodon*
(Norman, 1929)

Dysalotus macrodon Norman, 1929: 542, Fig. 10 (Atlantic off Cape Town). *Kali macrodon:* Johnson, 1969: 388; Johnson & Cohen, 1974: 41. *Gargaropteron pterodactylops* Smith, 1965: 569, Fig. 1, Pl. 13, Figs. B & C (specimen found on beach at Seapark, Natal).

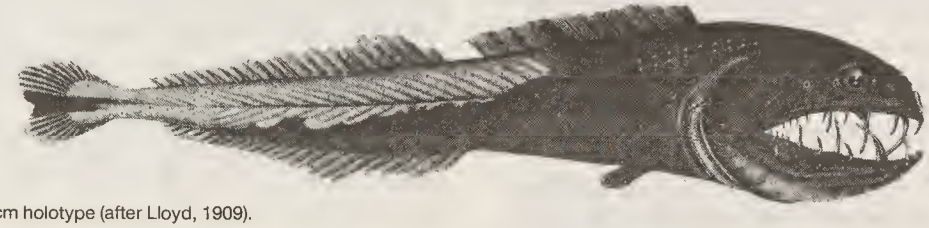
D XI-XIII+22-25; A I,22-25; P 10-11; vertebrae 35-40. Upper jaw with 20-34 teeth in outer row, 6-9 teeth in inner row. Lower jaw with 18-31 teeth in outer row, 7-10 teeth in inner row.

Most adults have been taken in depths exceeding 1 500 m. Tropical/subtropical in the 3 major oceans; known from relatively few scattered localities from Gulf of Mexico to Ecuador. Within our area, known only from the holotype taken off Cape Town and the single-known gargaropteron-stage, the 45 mm SL holotype of *Gargaropteron pterodactylops* Smith, from Natal.

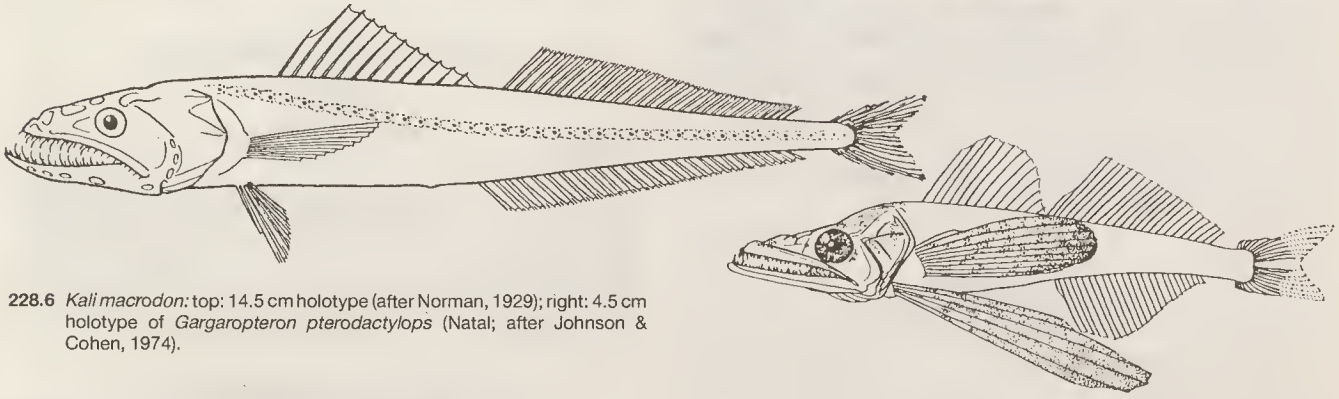
228.7 *Kali macrura*
(Parr, 1933)

Hemicyclodon macrurus Parr, 1933: 35, Fig. 15 (Bahamas). *Kali macrurus:* Johnson, 1969: 389; Johnson & Cohen, 1974: 38.

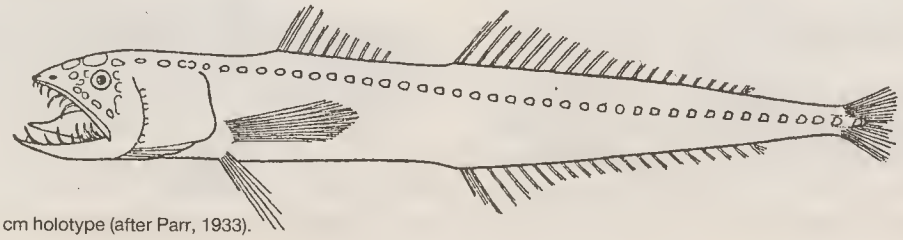
D IX-X+18-21; A I,17-20; P 11-13; vertebrae 33-35. Upper jaw with 16-21 teeth in outer row, 4 or fewer teeth in inner row. Lower jaw with 17-22 teeth in outer row, 7-10 teeth in inner row.



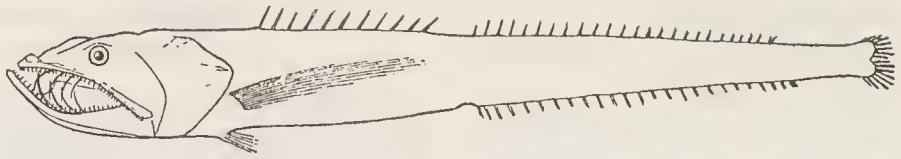
228.5 *Kali indica:* 17 cm holotype (after Lloyd, 1909).



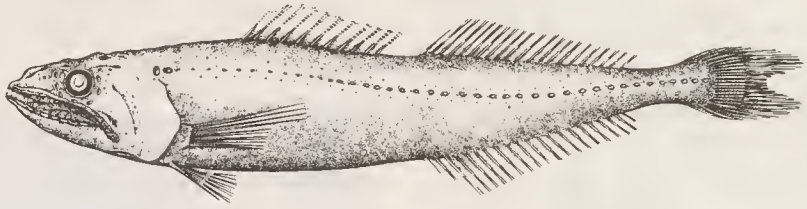
228.6 *Kali macrodon:* top: 14.5 cm holotype (after Norman, 1929); right: 4.5 cm holotype of *Gargaropteron pterodactylops* (Natal; after Johnson & Cohen, 1974).



228.7 *Kali macrura:* 12 cm holotype (after Parr, 1933).



228.8 *Kali normani:* 10.5 cm SL holotype (after Parr, 1931).



228.9 *Kali parri:* 23 cm SL holotype (after Johnson & Cohen, 1974).

All adults have been taken in depths exceeding 1 000 m. Gargaropteron-stage specimens unknown. Tropical/subtropical in the 3 major oceans; known from relatively few scattered localities from Sargasso Sea to eastern Pacific off Baja California. Has yet to be taken within our area, but has been taken in the eastern South Atlantic and assuredly occurs within our area.

228.8 *Kali normani*
(Parr, 1931)

Dolichodon normani Parr, 1931: 46, Fig. 18 (eastern Pacific off Central America). *Kali normani:* Johnson, 1969: 389; Johnson & Cohen 1974: 42.

D XII-XIII+24-26; A I,23-26; P 12-13; vertebrae 36-40. Upper jaw with 16-38 teeth in outer row, 4-6 teeth in inner row. Lower jaw with 14-27 teeth in outer row, 4 or 5 teeth in inner row.

Most adults have been taken in depths exceeding 1 000 m, but several have been taken in 500 - 1 000 m. Gargaropteron-stage specimens known from 2 stations, one (questionably referred to *K. normani*) from Caribbean, the other from Indian Ocean. Worldwide, mainly limited to the tropics. May not occur in South Atlantic sector of our area, but, based on the distribution of numerous tropical species in the Indian Ocean (Johnson, 1982), is presumed to occur off the east coast of southern Africa.

228.9 *Kali parri*
Johnson & Cohen, 1974

Kali parri Johnson & Cohen, 1974: 37, Fig. 13 (south central Atlantic).

D XI-XII+19-21; A I,20-22; P 11-12; vertebrae 37-38. Teeth not sufficiently enlarged to prevent mouth from closing. Upper jaw with 23-33 teeth in outer row, 9-13 teeth in inner row.

The 5 known adults are from depths exceeding 1 500 m. A single gargaropteron-stage specimen, 45.6 mm SL, taken in 0 - 304 m. Known from only 4 stations in tropical/subtropical South Atlantic, ca. 02.5°-27°S, 26°W-03°E; presumably occurs within our area.

Family No. 229: CHAMPSODONTIDAE

by P.C. Heemstra

Gapers **Gapers**

Small fishes with elongate slightly compressed body covered with very small rough scales (resembling shark denticles). Two dorsal fins; anal fin similar to soft dorsal; pectorals small; ventrals I,5, inserted in advance of pectorals; caudal fin forked, branched rays 13. Mouth large, maxilla exposed. Jaws with bands of cardiform teeth and an inner band of much larger depressible, needle-like teeth; 2 patches of teeth on vomer, none on palatines. A long dagger-like spine at angle of preopercle. Two indistinct lateral lines with transverse branches.

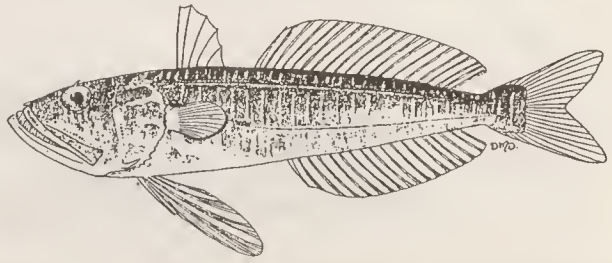
One genus, *Champsodon* Günther, 1867, with about 6 species known from depths of 100 - 400 m in the Red Sea and Indo-Pacific region; 1 species in our area.

229.1 *Champsodon capensis*
Regan, 1908
PLATE 112

Gaper Gaper

Champsodon capensis Regan, 1908: 244, Pl. 27, Fig. 2 (Cape Province, south coast; 30 - 35 fms); de Beaufort, 1951: 3*; Smith, **SFSA No. 376***; Smith, 1964: 295.

D V+19-20; A 17-18; P 14; GR 1+(10-11). Depth 5.1-5.3, head 3.3-3.8 in SL. Eye greater than interorbital width, 4.1-5.0 in head. Maxilla reaches past eye; premaxillae with deep notch either side of symphysis.



229.1 *Champsodon capensis:* 7 cm (Port Alfred).

Body brownish dorsally; lateral and ventral parts silvery. Attains 14 cm. A widely distributed species reported from India, Indonesia and the Philippines; from the Cape to Durban in fairly deep water (to 460 m). Occur in great shoals, evidently rising to the surface at night; after storms, sometimes numbers are found still alive on the beach in the early morning.

Family No. 230: URANOSCOPIDAE

by P.C. Heemstra

Stargazers **Opkykers**

Body thick, compressed posteriorly, naked or with small scales. Head massive, flattened dorsally with bones exposed. Mouth large, vertical; lower jaw heavy, projecting. Upper jaw somewhat protrusible. Small teeth on jaws, vomer and palatines. Gill membranes separate, not connected to isthmus; 6 branchiostegal rays. Pelvic fins on isthmus, well in front of pectorals, with 1 short spine and 5 rays. Spinous dorsal fin small or absent (reduced to isolated nubbins in *Pleuroscopus*) or continuous with soft-rayed part of fin. Gill-rakers rudimentary.

Stargazers are benthic predators that often lie buried up to their eyes in mud or sand waiting for their unsuspecting prey to venture close enough to be caught with a swift lunge. Some species have a long tentacle on inside of lower jaw which can be made to wriggle like a worm to attract small creatures which are then engulfed. Eight genera and about 25 species are currently recognised; 2 genera represented in our area.

KEY TO GENERA

1a Eyes dorsal; spinous D present; scales cycloid, in oblique series, none on belly ..... *Uranoscopus*

1b Eyes lateral; spinous D reduced to a series of isolated nubbins before the soft D; body completely covered with spiny, non-imbricate scales ..... *Pleuroscopus*

Genus *Pleuroscopus* Barnard, 1927

Scales spiny, thickened (rather like the denticles of some sharks). Interorbital very broad, its width 2.4-2.6 times orbit diameter. Supraorbital shelf with a bony knob-like tubercle. Opercle not free above (gill openings not extending above P base), with a bony horizontal ridge. No spines on preopercle or subopercle. LL obscure, running well below D base. Monotypic.

230.1 *Pleuroscopus pseudodorsalis* Barnard, 1927

Spotted stargazer Gespikkelde opkyker

Pleuroscopus pseudodorsalis Barnard, 1927: 437, Pl. 18, Fig. 6 (off Table Bay in about 200 fms); Smith, **SFSA No. 379*.**

D 9 or 10 (not counting a row of 9 or 10 short conical tubercles in front of fin); A 10 (mostly covered by skin and denticles); P 21-22; 18-20 low spiny plates on 1st gill arch. One row of subequal cardiform teeth in lower jaw, 2 rows in upper jaw, and 1 row on palatines and vomer.

Dorsolateral part of head and body slatey blue, covered with round black spots extending onto D and P. Attains 33 cm. Off Table Bay and Algoa Bay; also reported from Australia. More wanted.

230.1 *Pleuroscopus pseudodorsalis*: 33 cm, dorsal and lateral views (Algoa Bay).

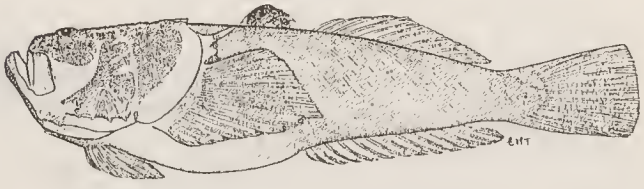
Genus *Uranoscopus* Linnaeus, 1758

Large spine on shoulder girdle above base of P. First D with 3-5 flexible spines. Lips fringed. Lower edge of preopercle with 3-8 spines. The large spine on the shoulder is venomous (Halstead, 1979). About 12 species, 1 in our area.

230.2 *Uranoscopus archionema* Regan, 1921

Stargazer Opkyker

Uranoscopus archionema Regan, 1921: 416 (off Umvoti River, Natal; 120 - 130 fms); Smith, **SFSA No. 378*.** *Uranoscopus haplostoma* Regan, 1921: 417 (Mossel Bay).



230.2 *Uranoscopus archionema*: 24.5 cm (off Natal).

D 1V-V+13; A 13-14; P 17-18; 52-56 oblique scale series from shoulder spine to C base; 10 branched C rays. Depth 3.7-4.1, head 2.8-2.9 in SL. Eye 4-5 in head, subequal to interorbital width. Anterior nostril tubular; 4-6 spines along lower edge of preopercle; 2 or 3 blunt preorbital spines.

Body grey or brown usually with numerous round pale spots dorsally; 1st D black with pale border; P greyish with pale margin; C uniform. Attains 33 cm. Taken by trawl in 60 - 300 m from Mossel Bay to Kenya; common in Mozambique Channel.

Family No. 231: TRICHONOTIDAE

by P.C. Heemstra

Sand divers **Sandduikers**

Body very elongate, somewhat compressed, covered with rather large cycloid scales. Lateral line continuous. Dorsal fin begins over pectoral fin base and continues almost to caudal fin; anal fin almost as long as dorsal; ventrals (I,5) well developed; 11 or 12 branched caudal rays. Mouth large, terminal; lower jaw projecting; upper jaw slightly protrusile; small sharp teeth on jaws, vomer and palatines. Gill membranes separate, not joined to isthmus; branchiostegal rays 7.

One genus, *Trichonotus* Bloch & Schneider, 1801, with 3 or 4 species, distinguished mainly by colour patterns; 1 species in our area.

231.1 *Trichonotus marleyi*

(Smith, 1936)
PLATE 113

Sand diver Sandduiker

Taeniolabrus marleyi Smith, 1936: 4, Pl. 1 (Durban); Smith, **SFSA No. 374***. *Trichonotus marleyi:* Clark & von Schmidt, 1966.

D 45-47; 1st 2 or 3 rays not articulated and more or less prolonged; A 37-39; P 14; LL 55-57; GR 6+(19-21). Body depth 12-13 in SL; head length (from tip of snout) 5.0 in SL.

Colour: "Above amber, studded with turquoise blue and red dots. The lower surface faint rosy. Anal and ventrals with numerous dark red dots. Eye with about 20 golden lines, umbrous red above" (H.W. Bell-Marley). Attains 19 cm. Known only from Durban to Delagoa Bay.

Family No. 232: CREEDIIDAE

by J.S. Nelson

Sand burrowers **Sandgrawers**

Body elongate. Dorsal fin continuous. All fins except pelvics without spines; dorsal, anal and pectoral rays unbranched (except in 1 Australian species). Tip of snout (upper lip) fleshy, projecting beyond lower jaw. Eyes dorsolateral, chameleon-like. Row of cirri along lower lip. Gill membranes separate, free from isthmus; branchiostegal rays 7. Gill-rakers low knobs, about 6-9 on lower limb, covered with spinules. Lateral-line scales behind pectoral fin with posterior extension, often trilobed. Vertebrae 37-59. Colour in life usually translucent to transparent; preserved specimens with dark saddle bars.

An Indo-West Pacific family of small cryptic fishes occurring on sand and gravel bottoms, from shore out to about 165 m. Rarely seen in life, these sand burrowing fishes can be collected in considerable numbers using ichthyocides. Seven genera with 14 species, 3 in our area. Reviewed by Nelson (1978, 1979).

KEY TO GENERA

1a V present; LL descending gradually at end of P 2
1b V absent; LL descending abruptly at end of P and running near base of A ..... *Apodocreedia*

2a D and A each with 35 or more rays; V 1,4; body naked anteriorly except for LL scales ..... *Chalixodytes*
2b D and A with 34 or fewer rays; V I,5; body fully scaled ..... *Limnichthys*

Genus *Apodocreedia* de Beaufort, 1948

One species, endemic to southern Africa.

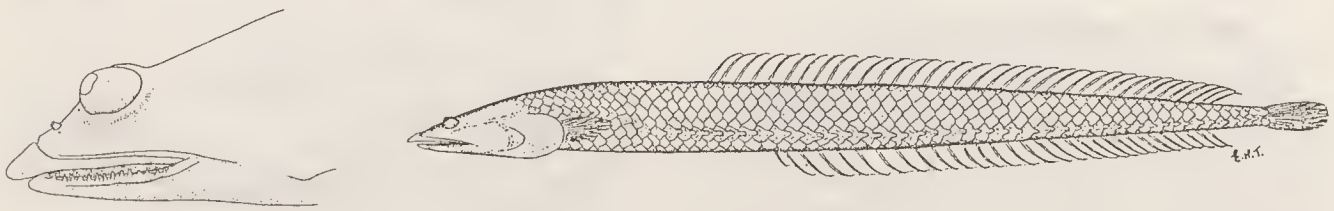
232.1 *Apodocreedia vanderhorsti*

de Beaufort, 1948

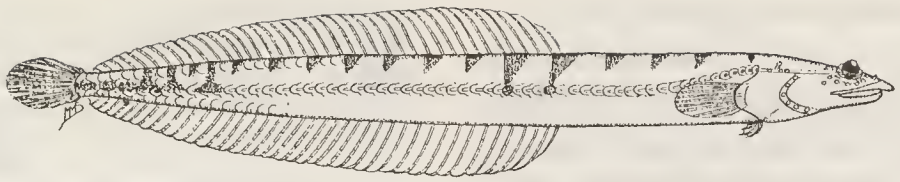
Longfin burrower Langvin-grawer

Apodocreedia vanderhorsti de Beaufort, 1948: 476, Fig. 1 (Inhaca Id., Delagoa Bay, Mozambique); Smith, **SFSA No. 375***; Nelson, 1978: 362.

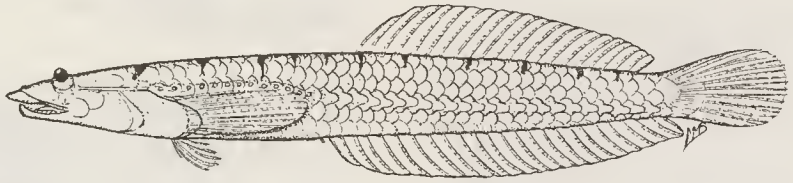
D 36-40; A 33-36; P splint + 12 or 13; LL 56-58. Depth 13-15; head 5.6-6.0.



232.1 *Apodocreedia vanderhorsti:* 6.5 cm SL (Natal).



232.2 *Chalixodytes chameleontoculis:* 4 cm holotype (Seychelles).



232.3 *Limnichthys nitidus:* 2.5 cm holotype (N. Mozambique).

Body silvery white. Attains 8 cm. Intertidal to at least 16 m, between Delagoa Bay and Durban.

Genus ***Chalixodytes*** Schultz, 1943

Two species. Our species is perhaps conspecific with *C. tauensis* Schultz, 1943 (which usually has fewer D and A rays) known from the eastern Indian and western Pacific oceans.

232.2 *Chalixodytes chameleontoculis* Smith, 1956

Sand dart — Sandpyltjie

Chalixodytes chameleontoculis Smith, 1956: 890, Fig. 1 (Denis Id., Seychelles); Nelson, 1978: 363.

D 37-40; A 37-40; P splint + 11-13; LL 57-59. Depth 11-15; head 4.8-5.3.

Body pale, with 13-19 dark bars across dorsal surface. Attains 46 mm. Rare off southern Africa; known from various localities in Indian Ocean.

Genus ***Limnichthys*** Waite, 1904

Five species; 1 in our area.

232.3 *Limnichthys nitidus* Smith, 1958

Sand submarine — Sandduikboot

Limnichthys nitidus Smith, 1958: 247, Fig. 1 (Pinda, Mozambique); Smith, 1961: 566, **No. 374b;** Nelson, 1978: 360.

D 22-25; A 26-28; P splint + 12 or 13; LL 39-41; depth 7.0-8.7; head 3.4-3.9.

Body pale, with 8-12 narrow, short bars across dorsal surface. Attains 35 mm. Western Indian Ocean and Red Sea, south to Chaka's Rock, Natal.

Family No. 233: PERCOPHIDAE

by P.C. Heemstra & J.S. Nelson

Duckbills — **Eendbekke**

Body elongate, subcylindrical, compressed posteriorly; head depressed anteriorly. Two separate dorsal fins (first absent in *Hemerocoetes* of New Zealand); anal fin similar to soft dorsal; pelvics with 1 weak spine and 5 branched rays, inserted well in advance of pectorals, their bases widely separated; caudal fin truncate or rounded, with 7-13 branched rays. Fine teeth on jaws; vomer and palatines with or without teeth. Branchiostegal rays 6 or 7, the membranes separate, attached anteriorly to isthmus. Swimbladder absent.

Rather small fishes of deepish water (100 - 600 m); represented in all oceans (between 40°N and 50°S latitudes). This family needs revision. There are about 12 genera and 30-35 species currently recognised in this family; most of these taxa are not well differentiated. *Bembrops* was formerly placed in a separate family, Bembropsidae.

KEY TO GENERA

1a Skinny flap at rear end of maxilla; lower jaw projecting in front of upper jaw ..... *Bembrops*
1b No skinny flap at rear end of maxilla; lower jaw shorter than upper jaw 2

2a D VI+21-22; snout length 1.2-1.3 in orbit length ..... *Pteropsaron*
2b D IV-V+19-20; snout length 1.9-2.0 in orbit length ..... *Osopsaron*

Genus ***Bembrops*** Steindachner, 1876

Maxilla exposed, scaly, with triangular flap of skin at the end. Vomerine teeth in 2 separate patches. C branched rays 11. Last D and A rays split to their base, but counted as a single ray. How many of the 20 nominal species assigned to this genus are valid remains to be determined; 1 species known from our area.

233.1 *Bembrops platyrhynchus*
(Alcock, 1893)

Bathypercis platyrhynchus Alcock, 1893: 177, Pl.9, Fig. 1 (Bay of Bengal). ?*Bembrops adenensis* Norman, 1939: 69, Fig. 1b (Gulf of Aden). ?*Bembrops nematopterus* Norman, 1939: 70, Fig. 1c (off Zanzibar). *Bembrops caudimacula* (*non* Steindachner, 1876): Smith, **SFSA No. 383a*.**

D VI+14-15; A 15-16; P 23-25; GR 5+(14-16); LL 41-48 plus 2 or 3 scales on C. Depth 6.5-8.5; head 2.6-2.8. Eye 3.7-4.2 in head; interorbital 7.0-9.4 in eye.

Scales margined in black; vague dusky spots along body, 1 on C at base of upper rays; 1st D dusky to black. Attains 25 cm. Taken by trawl in 200 - 300 m off Natal. If the synonymy above is correct, this species also occurs in the northern Indian Ocean.

233.1 *Bembrops platyrhynchus:* 20 cm (off Natal).

Genus ***Osopsaron*** Jordan & Starks, 1904

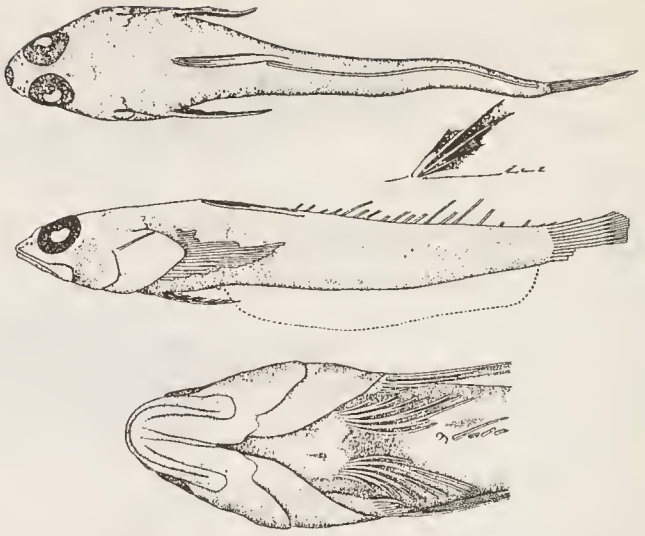
Anterior tip of maxilla with spine directed forward; C branched rays 8. Three species, 1 in our area.

233.2 *Osopsaron natalensis*
Nelson, 1982

Osopsaron natalensis Nelson, 1982: 4, Figs. 3 & 4 (off Kosi Bay in 100 m).

D IV-V+19-20; A 23-25; P 18-19; GR short and broad, about 9 on lower limb of 1st arch; LL about 31-33. Bases of D spines contiguous; front nostrils in raised tube; rear nostrils a simple pore; V reaches past A origin.

Head and body pale (in alcohol); 1st D black. Attains at least 34 mm. Known only from 3 battered specimens taken in a dredge off Kosi Bay.



233.2 *Osopsaron natalensis:* 3 cm SL holotype; ventral view of head and belly (off Natal); lateral view of spinous D erected.

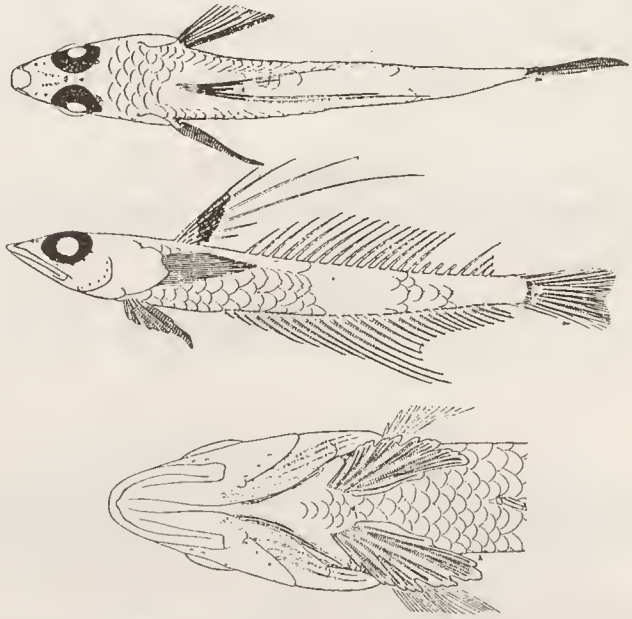
Genus ***Pteropsaron*** Jordan & Snyder, 1902

Anterior tip of maxilla with spine directed forward; C branched rays 8. Two species, 1 in our area.

233.3 *Pteropsaron heemstrai*
Nelson, 1982

Pteropsaron heemstrai Nelson, 1982: 2, Figs. 1 & 2 (off Park Rynie, Natal).

D VI+21-22; A 25; P 19; GR short and broad, 10 or 11 on lower limb; LL 32 or 33. Bases of D spines contiguous; front nostrils in raised tube; rear nostrils a simple pore; V not reaching A origin.



233.3 *Pteropsaron heemstrai:* 4.5 cm SL holotype; ventral view of head and belly (off Natal).

Body pale (in alcohol), with 6 faint broad dark bars, 1st on nape, last on C peduncle. Males (?) with black band on 1st D as shown in figure; females have shorter D spines and the fin is almost entirely black. Attains 50 mm. Known only from 2 specimens collected in a dredge off southern Natal.

Family No. 234: MUGILOIDIDAE

by P.C. Heemstra

Sandsmelts **Sandspierings**

Body elongate, subcylindrical, posteriorly compressed. Dorsal fin with 4 or 5 pungent spines and 20 to 24 soft-rays, the last spine more or less attached by membrane to first soft-ray; anal fin with 1 weak spine and 16 to 19 branched soft-rays; pelvic fins with 1 short, hidden spine and 5 branched soft-rays; caudal fin rounded, truncate to emarginate, upper and lower rays prolonged in some adults, branched rays 15; pectoral fins with 15 to 21 rays. Maxilla mostly covered by preorbital; lips somewhat thickened; jaws with a band of villiform teeth, an outer row of larger, cardiform teeth and a few curved canines at front of jaws; teeth present on vomer, present or absent on palatines. Gill membranes united, attached to isthmus far forward, with a broad to narrow fold across isthmus; branchiostegal rays 6. One stout spine on opercle; preopercle edge smooth, broadly rounded. Scales small to moderate, ctenoid, those on cheeks usually cycloid; lateral line complete, slightly curved above pectoral fin. Gills 4, a slit behind fourth arch. Swimbladder absent.

Small to moderate-sized benthic fishes of sandy, shallow-water habitats. Three or four genera with about 60 species. The family diagnosis given above is based on *Parapercis*, the only genus represented in our area.

Genus *Parapercis* Bleeker, 1863

Distinguishing the species of *Parapercis* is complicated by sexual dichromatism in some species and by the hermaphroditism of these species. The smaller (female) fish often have a colour pattern that is different from the pattern of the larger (male) specimens of the same species. About 50 species, including several undescribed ones. Six species occur in our area, and another 2 species are likely to be found here. Scales from 1st D ray to LL are counted in a series downwards and backwards from the base of the ray to the LL.

KEY TO SPECIES

1a Scales small, LL 79-86; 8-10 scales from 1st D ray to LL ..... *P. robinsoni*
1b LL 55-64; 4-8 scales from 1st D ray to LL 2

2a D V,23; A I,19; P 21 ..... *P. multifasciata*
2b D V,21-22; A I,16-18; P 16-18 3

3a Front of lower jaw with 8 canines in outer row (4 on each side of symphysis) 4
3b Front of lower jaw with 6 canines in outer row 5

4a Membrane from last D spine joins 1st D ray at its base; no black blotch covering most of C ..... *P. pulchella*
4b Membrane from last D spine joins 1st D ray opposite tip of spine; black blotch covers most of C ..... *P. hexophthalma*

5a C emarginate, the upper and lower rays elongated in specimens >7 cm SL; membrane from last D spine joins 1st D ray at (or near) its base ..... *P. schauinslandi*
5b C truncate or rounded, without elongated rays (except dorsal branched rays slightly elongated in some specimens); membrane from last D spine joins 1st D ray opposite or slightly below tip of spine 6

6a Scales from 1st D ray to LL 6-7; 29-31 scales in a zigzag series around C peduncle; lower-limb GR 12 ..... *P. xanthozona*
6b Scales from 1st D ray to LL 4 or 5; 24-26 scales around C peduncle; lower-limb GR 8-11 7

7a Large black blotch covering most of spinous D; belly with 3 black spots on each side or 2 or 3 narrow black crossbars; 5 scales from 1st D ray to LL ..... *P. punctulata*
7b No black blotch on spinous D; belly without black markings; 4 scales from 1st D ray to LL ..... *P. somaliensis*

234.1 *Parapercis hexophthalma*

(Ehrenberg, 1829)

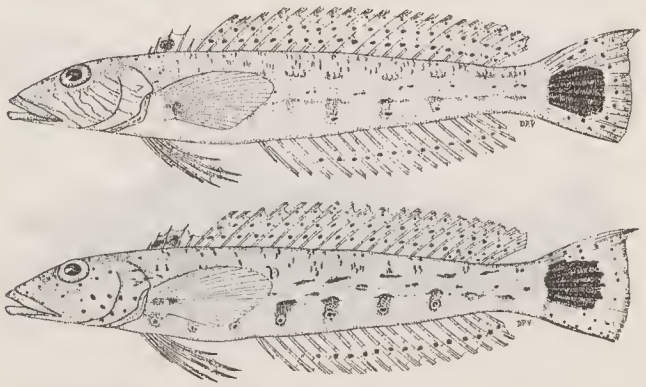
PLATE 113

Blacktail sandsmelt **Swartstert-sandspiering**

Percis hexophthalma Ehrenberg, *in* Cuv. & Val., 1829: 271 (Massawa, Red Sea). *Percis polyophthalma* Ehrenberg, *in* Cuv. & Val., 1829: 272 (Massawa, Red Sea). *Parapercis hexophthalma:* Smith, **SFSA No. 380*;** Cantwell, 1964: 269*. *Parapercis polyophthalma*: Cantwell, 1964: 270*. *Parapercis cylindrica* (*non* Bloch): Smith & Smith, 1963: 13*.

D V,21; A I,16; P 16-17; LL 59-61; 6-8 scales from 1st D ray to LL; 29-33 scales around C peduncle; GR (4-6)+(8-10); 8 canines in outer row at front of lower jaw, the pair nearest symphysis are the smallest and mostly hidden by spongy tissue and the lower lip; no palatine teeth; rear end of subopercle smooth or with a few minute serrae; snout narrow, the lower jaw length greater than its width; cheek scales cycloid.

Black blotch on C is distinctive. Attains 25 cm. Günther (1860) was apparently the first author to synonymise *hexophthalma* and *polyophthalma*. Playfair and Günther



234.1 *Parapecis hexophthalma:* top: 20 cm male; bottom; 16 cm female (Natal).

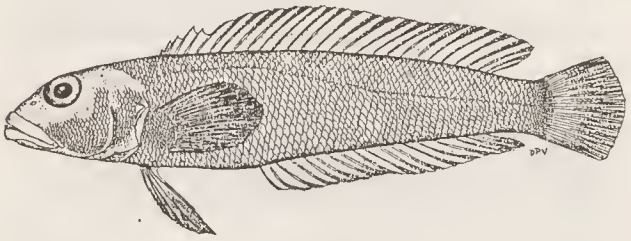
(1867) supposed that the differences in colour pattern of these two species might be due to sexual dichromatism. Smith (**SFSA**) correctly illustrated the female (*polyophthalma*) and male (*hexophthalma*) forms. Females change sex (and colour pattern) at 17-20 cm SL; attains 26 cm (TL). Indo-West Pacific from Durban northwards; also in Red Sea.

234.2 *Parapercis multifasciata*
Döderlein, 1884
Gold-bridled sandsmelt Gouetoom-sandspiering

Parapercis multifasciatus Döderlein, *in* Steindachner & Döderlein, 1884: 190, Pl. 6, Figs. 2 & 2a (Tokyo Bay); Cantwell, 1964: 251*; Masuda et al., 1975: 258*.

D V,23; A I,19; P 21; LL 62; 5 scales from 1st D ray to LL; 27 scales around C peduncle; GR 4+11; 4(6?) canines in outer row at front of lower jaw; 2 rows of short conical teeth on palatines; rear end of subopercle with a smooth, rounded, bony process; membrane from last D spine joins 1st ray opposite spine tip; cheek scales rather large, ctenoid, imbricate.

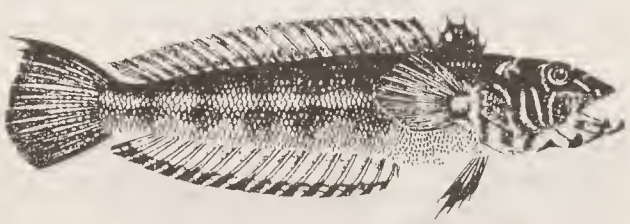
One 18 cm SL specimen (RUSI 10966) from 150 m off Natal; colour in life unknown; in alcohol, uniformly straw coloured without dark marks of any kind. This specimen is tentatively identified as *P. multifasciata*, previously known only from Japan. Without knowledge of the fresh coloration of this fish, the identification is somewhat uncertain.



234.2 *Parapercis multifasciata:* 18 cm SL (off Natal).

234.3 *Parapercis pulchella*
(Temminck & Schlegel,1843)
Harlequin sandsmelt Harlekyn-sandspiering

Percis pulchella Temminck & Schlegel, 1843: 24, Pl. 10, Fig. 2 (Nagasaki). *Parapercis pulchella*: Cantwell, 1964: 264* (in part); Masuda et al., 1975: 258*.



234.3 *Parapercis pulchella:* 15 cm (after Temminck & Schlegel, 1846).

D V,21; A I,17; P 16-17; LL 58-64; 4-6 scales from 1st D ray to LL; 30-34 scales around C peduncle; 8 canines in outer row at front of lower jaw; no palatine teeth.

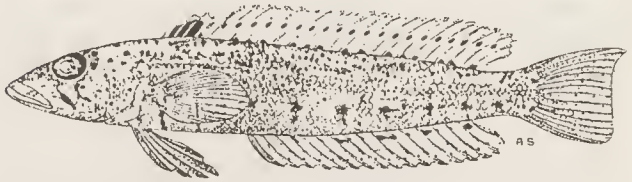
Head and body mostly brownish orange; several pale (bluish in life) stripes on head; black marks on lower lip and underside of head. Attains 20 cm. Japan to Zanzibar; probably occurs in our area. The above diagnosis is compiled from the literature, as there are no specimens available from our area. The record of *P. pulchella* from Durban (Smith, **SFSA No. 382**) is based on *P. schauinslandi*.

234.4 *Parapercis punctulata*
(Cuvier, 1829)
PLATE 113
Spotted sandsmelt Gespikkelde sandspiering

Percis punctulata Cuvier, *in* Cuv. & Val., 1829: 266 (Mauritius). *Parapercis bivittata* Schultz, 1968: 11, Pl. 3 (Seychelles); Smith, 1980: 176; Heemstra, 1984: 2. *Parapercis trispilota* Schultz, 1968: 13, Pl. 4 (Seychelles). *Parapercis punctulata*: Randall, 1984: 41*.

D V,21; A I,17; P 17-18; LL 55-57; 26 scales around C peduncle; GR (5-6)+(8-10); 6 canines in outer row at front of lower jaw; no palatine teeth; a cluster of serrae at rear end of subopercle; membrane from last D spine joins 1st ray slightly below spine tip; cheek scales cycloid.

Female with 3 distinct black spots on each side of belly, first just above V base. Male with 2 blackish brown lines across belly, 1st from lower ends of P bases with a short break at ventral midline, 2nd fainter but complete; indications of a 3rd dark line across the belly at the anus are visible on some large specimens. Attains 13 cm. Judging from the number of specimens in our collection, this species is one of the two most common *Parapercis* in coral reef areas of the western Indian Ocean. Previously known from the Seychelles and Amirantes; specimens in the J.L.B. Smith Institute of Ichthyology from Mozambique, Mauritius and northern Natal.



234.4 *Parapercis punctulata:* 11.5 cm SL holotype of *P. bivittata* (after Schultz, 1968).

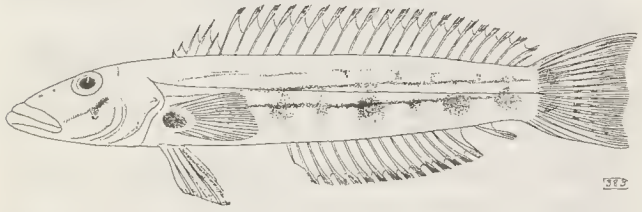
234.5 *Parapercis robinsoni*
Fowler, 1929
PLATE 113
Smallscale sandsmelt Kleinskub-sandspiering

Parapercis robinsoni Fowler, 1929: 261, Fig. 5 (Natal); Smith, **SFSA No. 383***. *Parapercis nebulosa* (*non* Quoy & Gaimard): Smith, **SFSA No.**

381*; Smith & Smith, 1963: 13*; Cantwell, 1964: 261* (in part); Heemstra, 1984: 5*.

D V,22; A I,18; P 16-18; LL 79-86; 8-10 scales from 1st D ray to LL; 40-42 scales around C peduncle; GR (3-6)+(10-11); 4-7 canines in outer row at front of lower jaw; no teeth on palatines; 2-6 stout canines in a transverse series along anterior edge of vomer; subopercle with several small serrae; membrane from last D spine joins to base of 1st ray; cheek scales small, ctenoid, mostly embedded.

Body bluish white with 9 dark brown bars ventrally; belly white; P base dark brown with 2 curved silver lines, black blotch at base of upper C rays and a less distinct blotch at base of lower C rays. Attains 30 cm. Indian Ocean south to Algoa Bay.



234.5 *Parapercis robinsoni:* 28 cm holotype (Natal; after Fowler, 1929).

234.6 *Parapercis schauinslandi*
(Steindachner, 1900)
PLATE 113

Rosy sandsmelt — Rosige sandspiering

Percis schauinslandi Steindachner, 1900: 175 (Hawaii). *Parapercis pulchella* (*non* Temminck & Schlegel): Smith, **SFSA No. 382*.** *Parapercis schauinslandi*: Cantwell, 1964: 257*; Schultz, 1968: 15; Heemstra, 1984: 2. *Parapercis* sp.: Smith, 1975: 32.

D V,21-22; A I,17-18; P 16-17; LL 56-58; 4½ scales from 1st D ray to LL; 25-28 scales around C peduncle; GR (3-5)+(7-9); 6 canines in outer row at front of lower jaw; no teeth on palatines; rear edge of subopercle serrate; 4th D spine distinctly longer than others; cheek scales cycloid, embedded.

Attains 14 cm. Known from Hawaii, Seychelles, Comores and Durban.

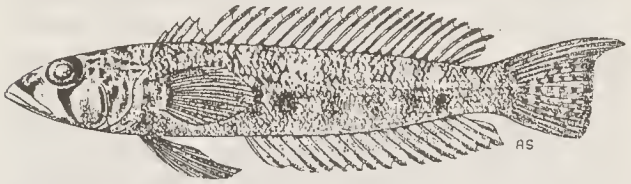
234.7 *Parapercis somaliensis*
Schultz, 1968

Weeping sandsmelt — Huil-sandspiering

Parapercis somaliensis Schultz, 1968: 10, Pl. 2 (Gulf of Aden, off Somali coast); Masuda et al., 1975: 259*.

D V,21; A I,17; P 17; LS 51-55; 24-26 scales around C peduncle; 6 canines in outer row at front of lower jaw; no palatine teeth; membrane from last D spine joins 1st ray opposite spine tip.

Body brownish orange dorsally with 8 faint darker saddle blotches, the dorsal body colour continued ventrally into the white lower part as 8 blotches; ventral part of head pale, with an orange (dusky in alcohol) "tear" mark resembling a comma below eye. Attains 20(?) cm. Somalia and Japan; probably occurs in our area. The diagnosis given above is compiled from the literature, as there are no specimens available from our area.



234.7 *Parapercis somaliensis:* 10.5 cm SL holotype (after Schultz, 1968).

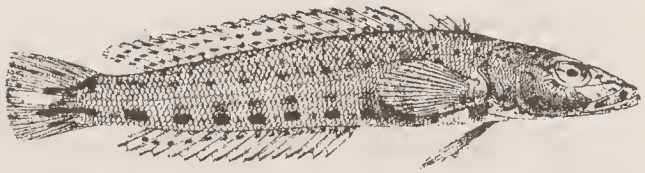
234.8 *Parapercis xanthozona*
(Bleeker, 1849)
PLATE 113

Blotchlip sandsmelt — Vleklip-sandspiering

?*Percis xanthozona* Bleeker, 1849: 55 (Indonesia); Playfair & Günther, 1867: 69*. ?*Parapercis xanthozona*: Cantwell, 1964: 273*.

D V,21; A I,17; P 16-17; LL 58; LS 56-60; 6-7 scales from 1st D ray to LL; 29-31 scales around C peduncle, GR (6-7)+12; 6 canines in outer row at front of lower jaw; palatine teeth present or absent; rear end of subopercle with 2 small, contiguous spines; cheek scales small, cycloid, embedded.

Colour in alcohol: see illustration; note 3 black blotches on each side of upper lip. Two specimens from Natal in our collection (RUSI 9430, 150 mm SL and RUSI 15019, 143 mm SL) appear to be the species illustrated as "*Percis xanthozona*" by Playfair and Günther (1867: Pl. 8, Fig. 3). Although the colour pattern of RUSI 9430 is greatly faded, it is obviously the same as RUSI 15019; and these two specimens surely represent the same species. The presence or absence of palatine teeth has been used as a key character to separate species of *Parapercis*; however, one of these two specimens of *P. xanthozona* lacks palatine teeth and the other specimen (RUSI 9430) has a small but distinct patch of teeth on each palatine. The colour pattern described and illustrated by Cantwell (1964: 273, Fig. 9E) for *P. xanthozona* is rather different from that of our specimens, but this may be due to sexual dichromatism. Indo-West Pacific.



234.8 *Parapercis xanthozona:* 15 cm (after Playfair, in Playfair & Gunther, 1867).

Family No. 235: BLENNIIDAE

by V.G. Springer

Blennies **Blennies**

(Note: Some extralimital species will not conform with all the characters given here.) Small fishes, most species less than 15 cm (*Xiphasia,* an atypical eel-like blenny, attains 55 cm); scaleless; dorsal-fin spines 7-17, flexible, fewer than segmented rays (except in *Pereulixia,* with rays one less to one more than spines); segmented dorsal-fin rays 11-119; anal-fin spines 2, reduced, often hidden; pelvic fins inserted before pectorals, with hidden spine and 1-4 segmented rays; all fin rays unbranched, or some caudal rays bifurcate in some species; premaxillaries not protractile; upper lip without dorsal free margin across snout; many species with cirri and/or fleshy crest on head.

Benthic fishes in a wide variety of shallow habitats ranging from fresh and brackish water to coral reefs; distributed worldwide in temperate and tropical waters. About 300 species; 42 species in our area. Smith's records of *Salarias meleagris* (**SFSA No. 974**) and *Salarias fuscus* (**SFSA No. 969**), based on Norman (1943), are not identifiable.

Alticus and *Lipophrys* have not been recorded from our area, but are included in the key because they might be found here. *Alticus* comprises about 5 species, and *A. kirkii* (Günther, 1868), which is widely distributed in the Indian Ocean, may occur in southern Mozambique. *Lipophrys* consists of 8 species; *L. velifer* (Norman, 1935) has been reported from southern Angola.

KEY TO GENERA

1a All C rays unbranched; no cirrus on eye (except in *Alticus* and some species of *Petroscirtes*); gill opening not extending below level of P base (except in *Alticus* and *Ecsenius*) 2
1b Some C rays forked, except in some juveniles less than 25 mm SL; cirrus on eye present (except in *Antennablennius*); gill opening extending well below P base (just to ventral level of fin base in *Chaleroderma*) 9

2a Upper jaw teeth freely movable, about 100 or more; no enlarged canine tooth posteriorly in jaws 3
2b Upper jaw teeth fixed, fewer than 50; enlarged curved canine posteriorly on each side of lower jaw (and in upper jaw in some species) 4

3a Supraorbital cirrus present; fleshy flap or crest on top of head; no LL; more than 100 teeth in lower jaw ..... [*Alticus*]
3b No supraorbital cirrus; no fleshy flap or crest on top of head; LL present anteriorly on body; lower jaw teeth 65 or fewer ..... *Ecsenius*

4a Total D elements 110-133; segmented C rays 10 ..... *Xiphasia*
4b Total D elements 25-48; segmented C rays 11-14 5

5a Segmented C rays 12-14; segmented V rays 2; no cirri on lower jaw 6
5b Segmented C rays 11; segmented V rays 3; cirri on ventral side of lower jaw present or absent 7

6a Both nostrils with cirri; D spines 11-12 (rarely 12); no fleshy crest on top of head ..... *Laiphognathus*
6b No cirri on nostrils; D spines 11-14 (rarely 11); fleshy crest on top of head present or absent ..... *Omobranchus*

7a P rays 11-12, rarely 13; LL absent; no enlarged canine posteriorly in upper jaw ..... *Plagiotremus*
7b P rays 13-16; LL extending at least to below last D spine; enlarged canine usually present posteriorly in upper jaw 8

8a Total D elements 25-32; gill opening above P base; cirrus present above and anterior to gill opening ..... *Petroscirtes*
8b Total D elements 37-44; gill opening extends below upper end of P base; no cirrus above and anterior to gill opening ..... *Aspidontus*

9a Upper jaw teeth freely movable, more than 100 10
9b Upper jaw teeth relatively fixed, less than 75 (usually less than 50) 15

10a Nape cirri, if present, a simple slender filament on each side 11
10b Nape cirri variable: in a comb, as a broad-based flap with filaments on margin, or both, but never a simple filament 12

11a Segmented D rays 17-23; vomer toothless; fleshy, median crest on top of head present or absent ..... *Istiblennius*
11b Segmented D rays 14-16; teeth present on vomer; no fleshy crest on top of head ..... *Entomacrodus*

12a Segmented D rays 18-20; last A ray bound by membrane to C peduncle; segmented V rays 2 ..... *Salarias*
12b Segmented D rays 11-16; last A ray not bound by membrane to C peduncle; segmented V rays 3 or 4 (innermost ray reduced, closely applied to adjacent ray, may be difficult to find) 13

13a Segmented D rays 14-16; lower jaw teeth 80-150, about ½ as numerous as upper jaw teeth ..... *Cirripectes*
13b Segmented D rays 11-13; lower jaw teeth fewer than 65, about ⅓ as numerous as upper jaw teeth 14

14a Ventral margin of upper lip entire; supraorbital cirrus long and simple; no barbels on chin ..... *Pereulixia*
14b Margin of upper lip crenulate; supraorbital cirri multifid; pair of barbels present on each side of chin just behind lip ..... *Exallias*

15a Supraorbital cirri branched; anterior LL with numerous distinct, dorsoventrally-paired branches terminating in pores or multiple pores 20
15b Supraorbital cirrus, if present, simple; anterior LL not as above 16

16a P rays 12; canine tooth posteriorly on each side of upper jaw; males with fleshy blade-like crest on top of head ..... [*Lipophrys velifer*]
16b P rays 14; no canines in upper jaw, males without crest 17

17a D spines 13 (rarely 12); nape and orbital cirri present; vomer toothless ..... *Mimoblennius*
17b D spines 12 (rarely 13); nape and orbital cirri present or absent; vomer with or without teeth 18

18a Nape cirri absent; cirri present on both nostrils and on eye (may be difficult to find); vomer toothless ..... *Alloblennius*
18b Nape cirri present (may be difficult to find); cirri present on rim of anterior nostril only; orbital cirrus present or absent (obvious if present); vomer with or without teeth 19

19a Conspicuous long cirrus present on eye; vomer with teeth ..... *Hirculops*
19b No cirrus on eye; vomer toothless ..... *Antennablennius*

20a Gill opening extends ventrally only to about lower end of P base ..... *Chalaroderma*
20b Gill opening unrestricted (gill membrane forms free fold across ventral surface of head) 21

21a Several cirri on top of head (does not include supraorbital cirri) in specimens over 22 mm SL; no canines posteriorly in upper jaw ..... *Scartella*
21b No cirri on top of head (except supraorbital cirri); canine tooth usually present at rear end of upper jaw ..... *Parablennius*

Genus ***Alloblennius*** Smith-Vaniz & Springer, 1971

Three species, 1 in our area.

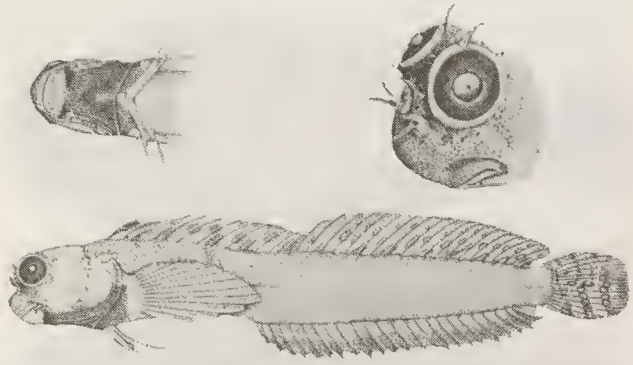
235.1 *Alloblennius parvus*
Springer & Spreitzer, 1978

Dwarf blenny — Dwerg-blennie

Alloblennius parvus Springer & Spreitzer, 1978: 4, Fig. 1 (Grand Comoro Id.).

D XII,18-20; A II,20-21; P 14; V I,3 (only 2 rays visible without dissection); upper jaw teeth 30-37; lower jaw teeth 25-28; no canines posteriorly in either jaw; tiny simple cirrus on eye; simple cirrus on anterior nostril.

Body pale; small dark spot between 1st 2 D spines; males with dark area under head and on P base. Attains about 26 mm SL. Known only from Grand Comoro Id. and 1 specimen from Sodwana Bay.



235.1 *Alloblennius parvus:* 2.5 cm SL male paratype (Comores; after Springer & Spreitzer, 1978).

Genus ***Antennablennius*** Fowler, 1931

Revised by Bath (1983); 7 species, 2 in our area.

KEY TO SPECIES

1a Nape cirri contiguous, long, much longer than short nasal cirri ..... *A. bifilum*
1b Nape cirri separate, short, much shorter than long nasal cirri ..... *A. australis*

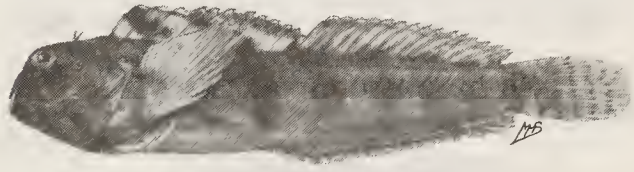
235.2 *Antennablennius australis*
Fraser-Brunner, 1951
PLATE 114

Moustached rockskipper — Gesnorde klipspringer

Antennablennius hypenetes (*non* Klunzinger): Smith, **SFSA No. 968*.** *Antennablennius australis* Fraser-Brunner, 1951: 218* (Delagoa Bay); Smith, 1953, **No. 968*;** 1959: 248*; Penrith & Penrith, 1972: 83*; Bath, 1983: 52*.

D XII-XIII,14-18; A II,17-18; P 14; V I,3. Differs from the Red Sea *A. hypenetes* Klunzinger, 1871 in neither sex having a crest.

About 7 dusky bands on body. Attains 7 cm SL. From Port Elizabeth to the Red Sea.



235.2 *Antennablennius australis:* 4 cm (Inhaca Id.).

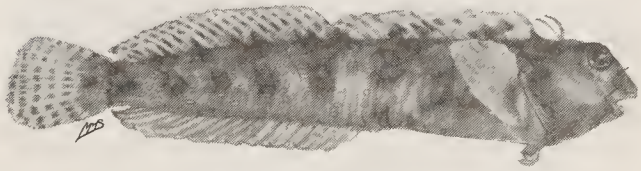
235.3 *Antennablennius bifilum*
(Günther, 1861)
PLATE 114

Horned rockskipper — Horing-klipspringer

Blennius bifilum Günther, 1861: 225 & 561 ("Cape of Good Hope"). *Antennablennius bifilum:* Smith, **SFSA No. 967*;** Penrith & Penrith, 1972: 82*. *Croaltus bifilum:* Smith, 1959: 247*; Bath, 1983: 54*,

D XI-XIII,17-20; A II,17-21; P 14; V I,3.

About 7 dark bands and numerous dark-margined pale spots (blue in life) on body, particularly in males, less so in females. Attains 7-8 cm SL. Port Alfred to Persian Gulf.



235.3 *Antennablennius bifilum:* 6.5 cm (Transkei).

Genus ***Aspidontus*** Cuvier, 1835

Two species, 1 with 2 subspecies; both species (but only 1 subspecies) present in our area.

KEY TO SPECIES

1a Black spot or bar on P base; lateral stripe, if present, widens posteriorly and extends to end C; C of adults truncate; D spines X-X11 (XI-XII in 90% of specimens); total D elements 37-39 (rarely 40) ..... *A. taeniatus tractus*

1b No black spot or bar on P base; lateral stripe, if present, uniformly wide, not extending to end of C; C of adults lanceolate; D spines IX-XI (IX-X in 95% of specimens); total D elements 38-44 (rarely less than 40) ..... *A. dussumieri*

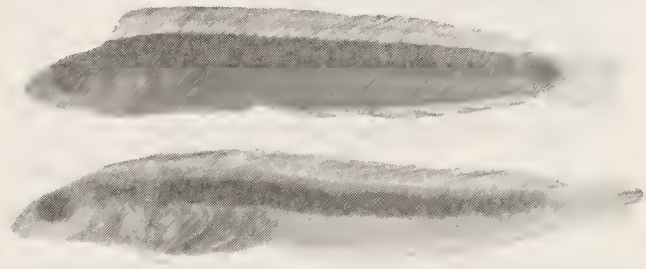
235.4 *Aspidontus dussumieri*
(Valenciennes, 1836)
PLATE 114

Floating blenny — Dryf-blennie

Blennechis dussumieri Valenciennes, *in* Cuv. & Val., 1836: 282 (Mauritius). *Aspidontus (E) gorrorensis:* Smith, 1959: 235. *Aspidontus (E) fluctuans:* Smith, 1959: 235*; 1961: 571, **No. 961b.** *Aspidontus (E) wamiziensis* Smith, 1959: 235* (Wamizi Id., Mozambique). *Aspidontus dussumieri:* Smith-Vaniz, 1976: 63*.

D IX-XI,28-34; A II,25-30; P 13-15. Anterior part of D never elevated.

Attains 10 cm SL. Red Sea and Indian Ocean to Tuamotus in Pacific; south to Knysna.



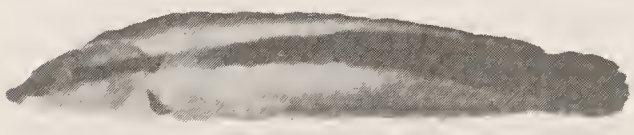
235.4 *Aspidontus dussumieri:* top: 4 cm female; bottom: 6 cm male (after Smith-Vaniz, 1976).

235.5 *Aspidontus taeniatus tractus*
Fowler, 1903
PLATE 114

Mimic blenny — Nabootser-blennie

Aspidontus tractus Fowler, 1903: 170* (Zanzibar). *Aspidontus filamentosus* (*non* Valenciennes): Smith, **SFSA No. 961*.** *Aspidontus taeniatus:* Smith, 1955: 25*. *Aspidontus (Aspidontus) tractus:* Smith, 1959: 235*; 1961: 571, **No. 961a*.** *Blennechis filamentosus:* Smith, 1959: 235*. *Aspidontus taeniatus tractus:* Smith-Vaniz, 1976: 62*.

D X-XII,26-28; A II,25-28; P 13-15. Specimens 4-6 cm SL may have high anterior D rays (15-30% SL).



235.5 *Aspidontus taeniatus tractus:* 6 cm SL female (after Smith-Vaniz, 1976).

Attains 10 cm SL. An exact mimic of the cleaner wrasse (*Labroides dimidiatus*), the mimic blenny feeds on the fins of unsuspecting fishes that mistake the blenny for a harmless cleaner wrasse. Red Sea and Indian Ocean south to Durban Bay where it is frequently found inside empty bottles; replaced by *A. t. taeniatus* Quoy & Gaimard, on west coast of Australia.

Genus ***Chalaroderma*** Norman, 1943

Two species, both in our area.

KEY TO SPECIES

1a LL continuous anteriorly on upper portion of body, consisting of separated tubes posteriorly on midside and extending to or on C peduncle; V I,4 (spine and innermost 1 or 2 rays difficult to see without dissection); interorbital width equal to or greater than ½ eye diameter ..... *C. capito*

1b LL continuous, restricted to upper portion of body, not extending posteriorly much beyond tip of P; V I,3 (spine and innermost ray difficult to see without dissection); interorbital width less than ½ eye diameter ..... *C. ocellata*

235.6 *Chalaroderma capito*
(Valenciennes, 1836)

Looseskin blenny — Losvel-blennie

Blennius capito Valenciennes, *in* Cuv. & Val., 1836: 260 (Cape); Bauchot, 1967: 10. *Chalaroderma capito:* Smith, **SFSA No. 954*;** 1964: 297; Penrith & Penrith, 1972: 76*; Bath, 1977: 180*.

D XII-XIV,17-21; A II,21-23; P 14; V I,4.

Small specimens with about 5 broad, irregular bands on body extending onto D. Large specimens irregularly banded and mottled. Skin of large specimens flabby. Attains 20 cm SL. Known only from Saldanha Bay to East London.

235.6 *Chalaroderma capito:* 18 cm (Cape).

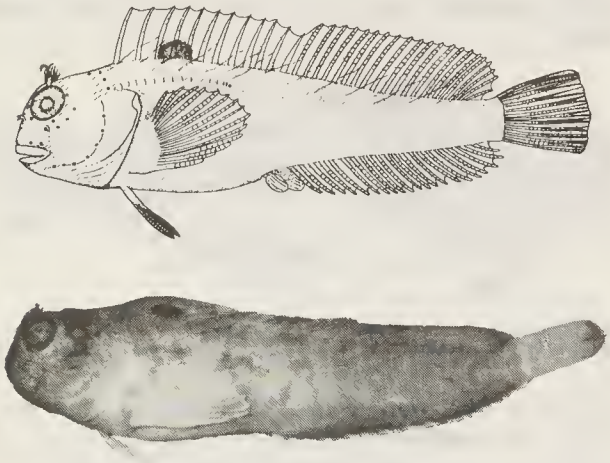
235.7 *Chalaroderma ocellata*
(Gilchrist & Thompson, 1908)

Two-eyed blenny — Tweeoog-blennie

Blennius ocellatus Gilchrist & Thompson, 1908: 103 (False Bay); Smith, **SFSA No. 953.** *Chalaroderma ocellata:* Penrith & Penrith, 1972: 77*; Bath, 1977: 180.

D XII-XIII,19-21; A II,21-22; P 14; V I,3.

Variably dusky with indications of up to 5 bands on body; conspicuous dark spot covering bases of D spines 3-5. Attains 7 cm SL. Known only from Saldanha Bay to Port Elizabeth.



235.7 *Chalaroderma ocellata*: top: 2 cm holotype (after Penrith & Penrith, 1972); bottom: 6.5 cm SL (photo by K. Bruwelheide).

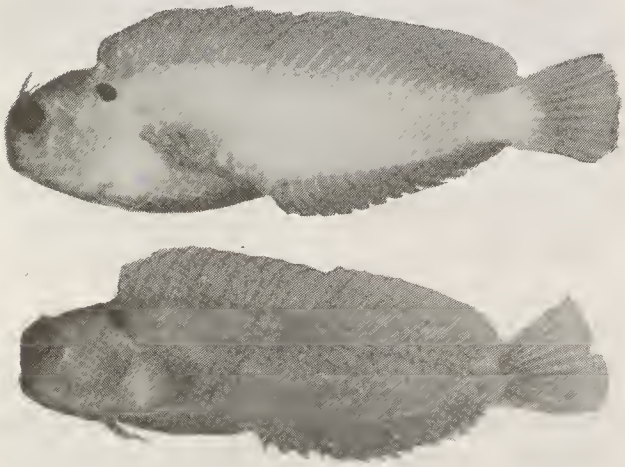
Genus ***Cirripectes*** Swainson, 1839

About 20 species; 2 in our area. This genus requires revision.

KEY TO SPECIES

1a A large black, weakly-fringed flap on each side of nape with a row of up to 10 widely spaced, simple cirri between flaps; D XII,15-18 ..... *C. auritus*

1b No flap on each side of nape; a comb of more than 20 filaments from 1 side of nape to the other; D XII,14-15 ..... *C. castaneus*



235.8 *Cirripectes auritus*: top: 5 cm SL; bottom: 4 cm SL, both males (photos by K. Bruwelheide).

235.8 *Cirripectes auritus*
Carlson, 1981

Blackflap blenny — Swartflap-blennie

Cirripectes auritus Carlson, 1981: 408* (Fanning Id., Line Ids.).

D XII,15-18; A II,16-18; P 14-15; V I,4; 3-4 simple cirri on nostril and eye; nape cirri as described in key.

Body and head (except black flap) uniformly pale or with scattered fine, dusky spots. Attains 5 cm SL. Known from Line Ids., Philippines, Grand Comoro, Kenya and Sodwana Bay.

235.9 *Cirripectes castaneus*
Valenciennes, 1836

Muzzled rockskipper — Muilband-klipspringer

Salarias castaneus Valenciennes, *in* Cuv. & Val., 1836: 326 (Mauritius). *Cirripectus gibbifrons* Smith, 1947: 815; **SFSA No. 966***. *Cirripectes variolosus* (*non* Valenciennes): Smith, 1959: 238*; 1961: 571, **No. 966.**

D XII,14-15; A II,14-15; P 15; V I,4; 4-6 simple cirri on nostril and eye; nape cirri as described in key.

Uniformly dark or with dark and pale bars on head and body. Attains 95 mm SL. Widely distributed in Indo-West Pacific; extends south to Sodwana Bay.

235.9 *Cirripectes castaneus*: 8 cm (Kenya).

Genus ***Ecsenius*** McCulloch, 1923

About 40 species; 2 in our area.

KEY TO SPECIES

1a D not notched; dark blotch in region of anus; lower jaw teeth 13-16; canines obvious ..... *E. midas*

1b D deeply notched; no dark blotch in region of anus, lower jaw teeth more than 40, canines not obvious ..... *E. nalolo*

235.10 *Ecsenius midas*
Starck, 1969
PLATE 115

Golden blenny — Goue blennie

Ecsenius (Anthiiblennius) midas Starck, 1969: 1* (D'Arros Id., Amirante Ids.); Springer, 1971: 13*.

D XIII-XIV,19-21; A II,20-23; P 12-13; V I,3; upper jaw teeth 26-34; lower jaw teeth 13-16; lower jaw canines about twice size of other teeth; C lyre-shaped; short, simple cirrus on nostril, none on eye or nape.

Head and sides pale or pale dusky (golden orange in life); conspicuous black spot around and anterior to anus; front half of D with narrow, dark margin. Attains 10 cm SL. Red Sea and east Africa to Marquesas Ids.; known only from Sodwana Bay in our area.

235.10 *Ecsenius midas*: 7.5 cm SL male (drawn by S. L. Chambers).

235.11 *Ecsenius nalolo*
Smith, 1959
PLATE 116

Nalolo — Nalolo

Ecsenius nalolo Smith, 1959: 245, Fig. 10 (Pinda, Mozambique); Springer, 1971: 33*; Winterbottom, 1978: 48.

D XI-XIII,12-15; A II,14-17; P 12-13; V I,3 (innermost ray difficult to see); upper jaw teeth more than 75; lower jaw teeth 42-63; small canine usually present posteriorly on each side of lower jaw, scarcely distinguishable from other teeth; small, simple cirrus on nostril, none on eye or nape.

Body with pale spots on dusky ground colour, dusky stripes anteriorly, short stripe on P base; no dark blotch in anal region. Attains 5 cm SL. Red Sea and Indian Ocean east to Maldive and Chagos Ids., south to Sodwana Bay.

Genus ***Entomacrodus*** Gill, 1859

Twenty-two species; 2 in our area.

KEY TO SPECIES

1a Small patch of cirri, with common base, on each side of nape; orbital tentacle with all, or almost all, branches arising on mesial margin; preopercular pores in pairs or multiples ..... *E. epalzeocheilus*

1b Single cirrus on each side of nape; orbital tentacle with branches on both mesial and lateral margins, preopercular pores single ..... *E. striatus*

235.12 *Entomacrodus epalzeocheilus*
(Bleeker, 1859)

Fringelip rockskipper — Fraiinglip-klipspringer

Salarias epalzeocheilus Bleeker, 1859: 343 (Karangbollang, Java). *Entomacrodus epalzeocheilus*: Smith, 1966: 90*; Springer, 1967: 61*.

D XIII,14-16; A II,15-17; P 14; V I,4; ventral margin of upper lip completely crenulate.

Body with about 5 dusky bands or pairs of bands, each member of a band pair may appear as 3 separate spots; upper lip with several dusky bands; irregular dark mark behind eye, separated from eye by pale area greater than eye diameter. Attains 11 cm SL. Widely distributed in Indo-Pacific; on east African coast, known only from 1 from Natal.

235.12 *Entomacrodus epalzeocheilus*: 11 cm (Natal).

235.13 *Entomacrodus striatus*
(Quoy & Gaimard, 1836)

Pearly rockskipper — Pêrel-klipspringer

Salarias striatus Quoy & Gaimard, *in* Cuv. & Val., 1836: 309 (Masson, Réunion). *Halmablennius marmoratus* (*non* Bennett): Smith, 1961: 508, **No. 973a***. *Entomacrodus striatus*: Smith, 1959: 241*; Springer, 1967: 73*; Winterbottom, 1976: 66.

D XII-XIV,14-16; A II,15-18; P 13-15; V I,4; ventral margin of upper lip completely crenulate.

Body with numerous small dark spots; upper lip uniformly dusky or with scattered spots; irregular dark mark posterior to eye, separated from eye by pale area equal to or less than eye diameter. Attains 9 cm SL. Western Indian Ocean to 30°S, eastward to central Pacific.

235.13 *Entomacrodus striatus*: 7.5 cm male (St. Pierre Id.).

Genus ***Exallias*** Jordan & Evermann, 1905

One species.

235.14 *Exallias brevis*
(Kner, 1868)
PLATE 114

Leopard rockskipper — Luiperd-klipspringer

Salarias brevis Kner, 1868: 29 (Savaii, Samoa). *Cirripectes leopardus*: Smith, 1955: 25*. *Exallias brevis*: Smith, 1959: 237*; 1961: 571, **No. 965a.**

D XII,12-13; A II,14; P 15; V I,4. No canines in lower jaw; no teeth on vomer. Nape cirri in a transverse comb narrowly interrupted at dorsal midline; anterior LL with numerous dorsal and ventral branches terminating in pores.

Body, head and fins covered with numerous dark spots, sometimes arranged in clusters on body. Attains 12 cm SL. Red Sea to central Pacific; south to Sodwana Bay.

Genus ***Hirculops*** Smith, 1959

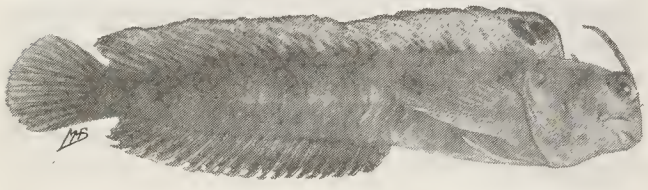
One species.

235.15 *Hirculops cornifer*
(Rüppell, 1830)
PLATE 114
Highbrow rockskipper — Geleerde klipspringer

Blennius cornifer Rüppell, 1830: 112 (Djedda, Red Sea). *Hirculops cornifer cornifer:* Smith, 1959: 247. *Hirculops cornifer menos* Smith, 1959: 247* (Mozambique Id.); 1961: 571, **No. 976a.**

D XII,18-21; A II,20-23; P 14; V I,3. Long ribbon-like cirrus on eye; short simple cirrus on nape; upper jaw teeth 32-34; lower jaw teeth 20-26; 1 or 2 small canine teeth posteriorly on each side of lower jaw; vomer with teeth.

Dusky or dark spot between membranes of 1st 2 D spines; P spotted; A spotted in females, uniformly dusky in males; body variously banded and spotted; 2 dusky spots on breast anterior to V. Attains 6 cm SL. Red Sea and Indian Ocean, south to Pondoland.



235.15 *Hirculops cornifer:* 7 cm male paratype of *H. c. menos* (Kenya).

Genus ***Istiblennius*** Whitley, 1943

Numerous species; 7 in our area; nasal tentacle branched. V I,3 except *I. flaviumbrinus* which has V I,3-4. This genus is greatly in need of revision; several of the specific names used here are probably incorrectly applied.

KEY TO SPECIES

1a Orbital tentacle branched 2
1b Orbital tentacle simple 3

2a Segmented D rays 17-19; ventral margin of upper lip crenulate; V I,3 or I,4 ..... *I. flaviumbrinus*
2b Segmented D rays 19-22; margin of upper lip smooth; V I,3 ..... *I. dussumieri*

3a Anterior LL with numerous vertical pairs of pores; no fleshy crest on top of head of either sex ..... *I. gibbifrons*
3b Anterior LL with no vertical pairs of pores; fleshy crest present or absent on top of head 4

4a No cirrus present on nape 5
4b Simple cirrus present on each side of nape 6

5a Ventral margin of upper lip smooth; small canine tooth present at rear of lower jaw (difficult to see: requires forcing mouth open); females with several fine, dark stripes, terminating as dashes, on body ..... *I. andamensis*
5b Ventral margin of upper lip crenulate; no canines in lower jaw; females densely covered with fine, dark specks ..... *I. impudens*

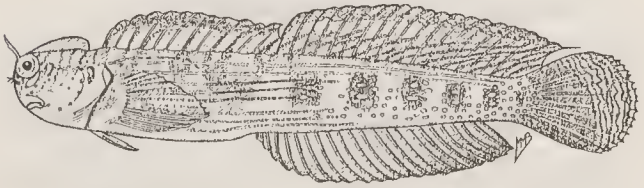
6a Ventral margin of upper lip smooth; no canine posteriorly in lower jaw; well-developed crest on top of head of males ..... *I. edentulus*
6b Ventral margin of upper lip crenulate; canine tooth at rear of lower jaw (difficult to see: requires forcing mouth open); no fleshy crest on head (a low ridge occasionally present in males) ..... *I. periophthalmus*

235.16 *Istiblennius andamensis*
(Day, 1870)
PLATE 114
Striped rockskipper — Gestreepte klipspringer

Salarias andamensis Day, 1870: 611 (Andaman Ids.). *Istiblennius andamanensis:* Smith, 1959: 242*.

D XIII-XIV,20-21; A II,20-21; P 14. Fleshy crest on top of head of males and some females.

Males with about 5 or 6 dusky bands on body, each band with vertical pair of oblong spots included; several faintly dusky pinstripes on body anteriorly; dark spot behind eye, another on opercle. Females with 5 or 6 faintly dusky bands on body overlain by several dark lines which break up into dashes posteriorly; numerous dark spots on median fins. Attains 8 cm SL. Possibly restricted to western and central Indian Ocean; south to Bazaruto.



235.16 *Istiblennius andamensis:* 8.5 cm male (N. Mozambique).

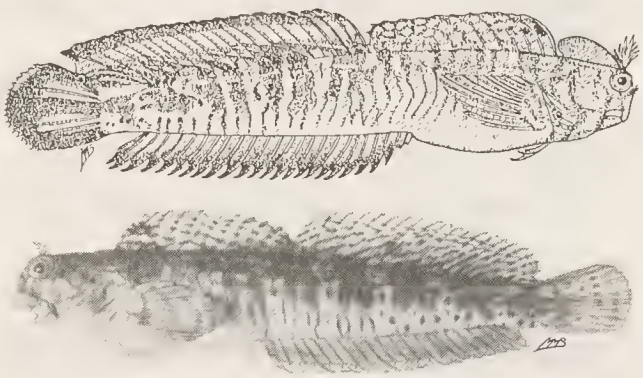
235.17 *Istiblennius dussumieri*
(Valenciennes, 1836)

Streaky rockskipper Streepkol-klipspringer

Salarias dussumieri Valenciennes, *in* Cuv. & Val., 1836: 310 (Malabar). *Halmablennius dussumieri:* Smith, **SFSA No. 975*;** 1959: 244*. *Halmablennius oortii:* Smith, **SFSA No. 976.** *Halmablennius striatomaculatus:* Smith, 1959: 244*. *Istiblennius striatomaculatus:* Penrith & Penrith, 1972: 81*.

D XII-XIII,19-22; A II,18-22; P 13-14; nape cirri absent; minute canine tooth usually present at rear of lower jaw; males with fleshy crest on top of head, females lack crest; LL without vertical pairs of pores.

Most consistent marking is dark spot distally between 1st 2 D spines in both sexes; male with about 6 pairs of dusky bands on body and broad dusky margins to segmented-ray portions of D and A; body bands in female tend to form vertical rows of dusky spots; numerous rows of dusky spots on D and C; A evenly dusky. Attains 10 cm SL. Widely distributed in Indo-Pacific; south to Bashee River mouth, Transkei.



235.17 *Istiblennius dussumieri:* top: 12 cm male (Seychelles); bottom: 8 cm female (Inhaca Id.).

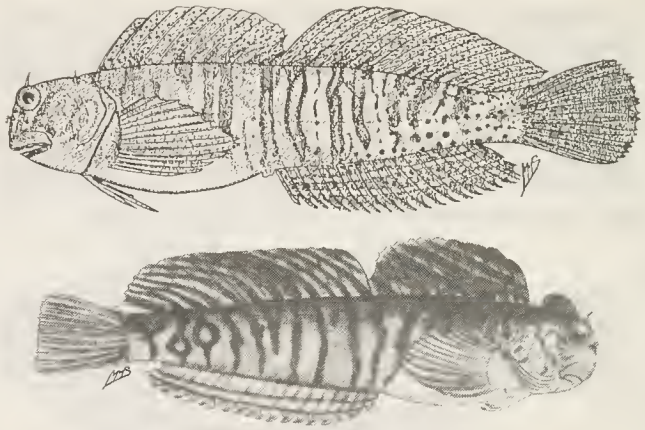
235.18 *Istiblennius edentulus*
(Schneider, 1801)

Rippled rockskipper Gerimpelde klipspringer

Blennius edentulus Schneider, *in* Bloch & Schneider, 1801: 172 (Huahaine). *Alticops oryx* (*non* Ehrenberg): Smith, **SFSA No. 972*.** *Istiblennius edentulus:* Smith, 1959: 243*; Penrith & Penrith, 1972: 80*.

D XIII,20-21; A II,21-23; P 14. Cirrus on each side of nape; fleshy crest on top of head of males, none on females (very large females may have a low fleshy ridge); LL without vertical pairs of pores.

Males darkly dusky with about 5-6 pairs of bands on body, and diagonal, pale stripes in D; females similar to males but paler, posterior band pairs broken into numerous spots; D spotted; very large females sometimes approximating male colour pattern. Attains 13 cm SL. Widely distributed in Indo-Pacific; south to East London.



235.18 *Istiblennius edentulus:* top: 12 cm female (Juan de Nova Id.); bottom: 11 cm male with crest on head (S. Mozambique).

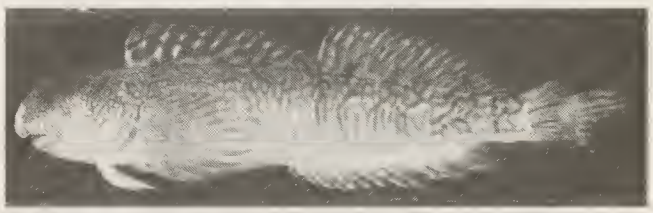
235.19 *Istiblennius flaviumbrinus*
(Rüppell, 1830)
PLATE 116

Pallid rockskipper Bleek klipspringer

Salarias flaviumbrinus Rüppell, 1830: 113 (Mohila, Red Sea). *Halmablennius unicolor:* Smith, **SFSA No. 973*.** *Halmablennius flaviumbrinus:* Smith, 1959: 245*.

D XIII,17-19; A II,16-19; P 14; V I,3-4 (4th ray much reduced and difficult to find); nape cirri absent; no canine teeth in lower jaw; males with fleshy crest on top of head, females lack crest; LL without vertical pairs of pores.

Well-preserved colour pattern usually indicates distinctive dark spot posterior to eye, followed by paler area, then dark crescentic mark (concave anteriorly); alternating broad and pale bands on upper lip; dark band or irregular mark on P base; about 5 or 6 irregular, dark pairs of bands on body; D with numerous dusky markings forming diffuse stripes; A darkly dusky in males, pale in females; attains 12 cm SL. Red Sea and Indian Ocean to Persian Gulf; south to Delagoa Bay.



235.19 *Istiblennius flaviumbrinus:* 10 cm female (Natal; photo by J. E. Randall).

235.20 *Istiblennius gibbifrons*
(Quoy & Gaimard, 1836)
PLATE 116

Picture rockskipper Prent-klipspringer

Salarias gibbifrons Quoy & Gaimard, *in* Cuv. & Val., 1836: 312 (Hawaiian Ids.). *Alticops gibbifrons:* Smith, **SFSA No. 970a.** *Istiblennius gibbifrons insolitus* Smith, 1959: 242, Pl. 16, Fig. 2 (Assumption Id.); 1961: 571, **No. 970a;** Winterbottom, 1976: 66.

D XII-XIII,18-20; A II,18-20; P 14; nape cirri absent; ventral margin of upper lip smooth; well-developed canine tooth at rear of lower jaw.

Dark spot present distally at front of D; vertical fins of females with dark spots, fins of males more evenly coloured; body with about 6 or 7 irregular bands. Attains 10 cm SL. Widely distributed in Indo-Pacific; south to Sodwana Bay.

235.21 *Istiblennius impudens*
Smith, 1959
PLATE 114

Impspringer — Impspringer

Alticops edentulus (*non* Schneider): Smith, **SFSA No. 971*.** *Istiblennius bellus impudens* Smith, 1959: 242, Pl. 16, Fig. 1, Pl. 14, Fig. M (St. Pierre Id.); 1961: 571, **No. 971*.**

D XIII,20-21; A II,20-22; P 14. No cirri on nape; fleshy crest on top of head of males; LL without vertical pairs of pores.

Males mostly uniform or with indications of several paired bands on body and spots posteriorly; row of spots from nape to mouth; segmented-ray portion of D with diagonal dusky stripes. Females with indications of several dusky bands on body; head, body and fins, except V, densely covered with fine, dark specks. Attains 16 cm SL. Western Indian Ocean, south to Sodwana Bay.

235.22 *Istiblennius periophthalmus*
(Valenciennes, 1836)

Bullethead rockskipper — Koeëlkop-klipspringer

Salarias periophthalmus Valenciennes, *in* Cuv. & Val., 1836: 311 (Ticopia, Santa-Cruz Ids.). *Alticops periophthalmus:* Smith, **SFSA No. 970*.** *Istiblennius periophthalmus:* Smith, 1959: 243*.

D XIII,19-21; A II,20-22; P 14; LL without vertical pairs of pores.

Males with up to 6 or 7 dusky bands on body; each band containing 1 or a vertical pair of dark-margined, pale, oblong spots; spinous D with dark spots, rayed D with dusky lines. Body of females similar to that of males but less distinctly marked, except for spotting on C peduncle; body sometimes covered with fine dark specks. Attains 12 cm SL. Widely distributed in Indo-Pacific; south to Durban.

235.22 *Istiblennius periophthalmus:* 13.5 cm (N. Mozambique).

Genus ***Laiphognathus*** Smith, 1955

One species.

235.23 *Laiphognathus multimaculatus*
Smith, 1955
PLATE 115

Spotty blenny — Vlekkies-blennie

Laiphognathus multimaculatus Smith, 1955: 24, Fig. 29 (Bazaruto Id.); 1959: 231; 1961: 571, **No. 958a;** Springer, 1972: 9*.

D XI-XII,18-21; A I,19-25; P 12-14; V I,2. Cirri on rim of both nostrils; none on eye or nape.

Numerous small dark spots on pale body. Attains 4 cm SL, usually less than 3 cm. East coast of Africa to New Guinea and Solomon Ids.; south to Inhaca.

235.23 *Laiphognathus multimaculatus:* 2.5 cm SL male; anus region of female.

Genus ***Mimoblennius*** Smith-Vaniz & Springer, 1971

Four species; 1 in our area.

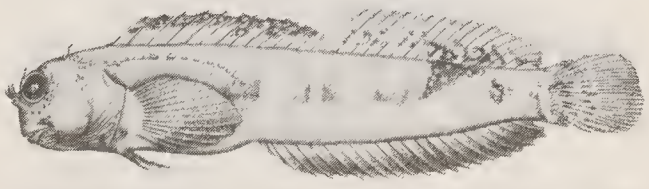
235.24 *Mimoblennius rusi*
Springer & Spreitzer, 1978

Rusi blenny — Rusi-blennie

Mimoblennius rusi Springer & Spreitzer, 1978: 14, Fig. 8 (Natal, 27°13′21″S, 32°47′48″E).

D XII-XIII,17-18; A II,20-21; P 14; V I,3 (3rd ray hidden); upper jaw teeth 34-38; lower jaw teeth 29-32; no posterior canines in jaws; no teeth on vomer; simple cirrus on eye (rarely 2).

Head and body pale with dusky markings; occasionally with several dusky bands on body; dark spot between 1st 2 D spines. Attains 4 cm SL. Known only from Sodwana Bay area.



235.24 *Mimoblennius rusi:* 4 cm SL male paratype (Natal; after Springer & Spreitzer, 1978).

Genus ***Omobranchus*** Ehrenberg, in Cuv. & Val., 1836

Twenty-one species; 6 in our area. Revised by Springer & Gomon (1975).

KEY TO SPECIES

1a Flap of skin posterolaterally on lower lip; bands on body, if present, variably diffuse, incomplete, or decreasing in intensity posteriorly and/or anteriorly 2
1b No flap of skin on lower lip; bands on body, present, distinct, not decreasing in intensity anteriorly or posteriorly ..... *O. banditus*

2a Median pore in interorbital region usually absent (98% of specimens); low fleshy crest usually present on top of head of males more than 3 cm SL; crest absent in females ..... *O. fasciolatus*
2b Median interorbital pore present (97% of specimens); fleshy crest present or absent 3

3a Fleshy crest on top of head in specimens over 35 mm SL ..... *O. woodi*
3b Fleshy crest on top of head absent 4

4a D spines usually 13 (85% of specimens); narrow, dark oblique bands on body; males with numerous small, dark spots on ventral surface of head and dark stripes in segmented-ray part of D ..... *O. elongatus*
4b D spines usually 12 (90% of specimes); bands on body, if present, not inclined (horizontal stripes may be present anteriorly); males without small dark spots on ventral surface of head and without dark stripes in segmented-ray part of D 5

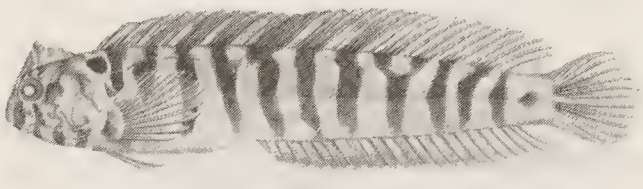
5a Gill opening extends well below dorsalmost P ray; bi-pored LL tubes 0-4; longest V ray longer than longest P ray ..... *O. ferox*
5b Gill opening not extending below dorsalmost P ray; bi-pored LL tubes 4-8; longest V ray shorter than longest P ray ..... *O. punctatus*

235.25 *Omobranchus banditus*
Smith, 1959

Bandit blenny — Bandiet-blennie

Omobranchus striatus (*non* Jatzow & Lenz): Smith, **SFSA No. 955*.** *Omobranchus banditus* Smith, 1959: 232, Pl. 14, Fig. D (Umgazi); 1961: 571, **No. 955;** Penrith & Penrith, 1972: 79; Springer, 1972: 13; Springer & Gomon, 1975: 24*.

D XI-XIII,19-21 = 31-33; A II,21-23; gill opening above level of P base; fleshy crest on top of head only in males > 3 cm SL; median interorbital pore usually present (92% of specimens); LL tubes on body 5-9.



235.25 *Omobranchus banditus:* 5 cm SL male (Durban; drawn by S. L. Chambers).

Prominent dark spot above gill opening; several distinct, dark bands present on body and upper head. Attains 6 cm SL. Bazaruto to Transkei, small juveniles reach Port Alfred. ?Mauritius.

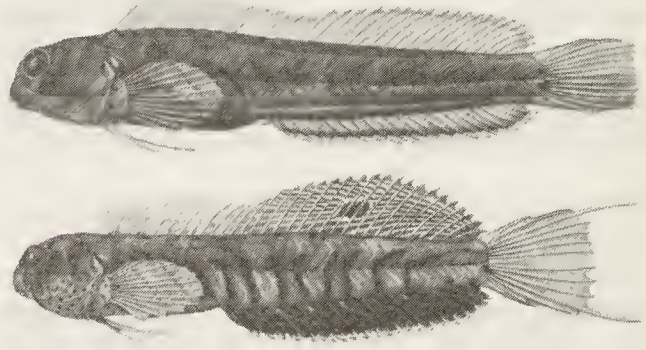
235.26 *Omobranchus elongatus*
(Peters, 1855)
PLATE 114

Cloister blenny — Klooster-blennie

Petroscirtes elongatus Peters, 1855: 249; 1855b: 440 (Mozambique). *Omobranchus kallosoma* (*non* Bleeker): Smith, **SFSA No. 956*.** *Omobranchus elongatus:* Smith, **SFSA No. 958;** 1959: 232*; 1961: 571, **No. 958;** Springer & Gomon, 1975: 28*.

D XII-XIV,17-20 = 30-33; A II,21-23; gill opening extends ventrally to level of upper ½ of P base; no fleshy crest on top of head; median interorbital pore present in 98% of specimens; LL tubes on body 0-9 (0-2 in southern African specimens).

Body with irregular bands; prominent stripes and spot in middle of soft D of males. Attains 5 cm SL. Zanzibar south to Inhaca, Mozambique, and east to New Guinea.



235.26 *Omobranchus elongatus:* top: 3.5 cm SL female; bottom: 4 cm SL male (drawn by J. R. Schroeder).

235.27 *Omobranchus fasciolatus*
(Valenciennes, 1836)
PLATE 115

Arab blenny — Arabiese blennie

Blennechis fasciolatus Valenciennes, *in* Cuv. & Val., 1836: 287 (Red Sea). *Omobranchus striatus:* Smith, 1959: 232*. *Omobranchus mekranen-*

235.27 *Omobranchus fasciolatus:* 4.5 cm SL male; head of 5 cm SL female (drawn by J. R. Schroeder).

sis (*non* Regan): Smith, 1959: 232*; 1961: 571, **No. 955b.** *Omobranchus fasciolatus:* Springer & Gomon, 1975: 34*.

D XI-XII,18-19 = 30-31; A II,20-22; gill opening not extending below 3rd from dorsalmost P ray, above P base in 95% of specimens; LL tubes on body 3-8.

Body usually with irregular broad, dusky bands anteriorly; dusky spot usually in middle of soft D of males. Attains 5 cm SL. Red Sea south to Inhambane, Mozambique, and Persian Gulf to Gulf of Kutch.

235.28 *Omobranchus ferox*
(Herre, 1927)
PLATE 115

Gossamer blenny — Spinnerak-blennie

Petroscirtes ferox Herre, 1927: 277, Pl. 3, Figs. 2-3 (Lake Taal, Philippines). *Omobranchus dealmeida* Smith, 1949: 104 (Ponte Maone, Delagoa Bay); **SFSA No. 956a*.** *Cruantus dealmeida:* Smith, 1959: 234*. *Omobranchus kranjiensis:* Smith, 1975: 71; Skelton et al., 1980: 111. *Omobranchus ferox:* Springer & Gomon, 1975: 38*.

D XI-XIII,20-23 = 32-35; A II,22-26; no fleshy crest on top of head; median interorbital pore present in 98% of specimens.

Body with faint, dusky bands anteriorly; males with a dusky spot distally at rear end of D. Attains 6 cm SL. In our area, known from almost freshwater in Lake Poelela (Skelton et al., 1980) and from Delagoa Bay; otherwise Ceylon, India to New Guinea and the Philippines.

235.28 *Omobranchus ferox:* 3.5 cm SL male (drawn by B. L. Holden).

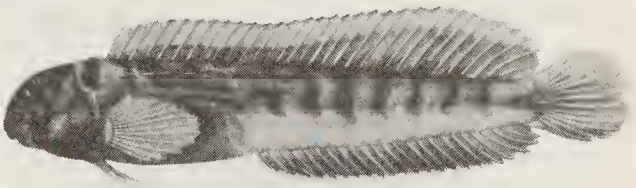
235.29 *Omobranchus punctatus*
(Valenciennes, 1836)
PLATE 115

Muzzled blenny — Muilband-blennie

Blennechis punctatus Valenciennes, *in* Cuv. & Val., 1836: 286 (Bombay). *Omobranchus japonicus:* Smith, **SFSA No. 957*.** *Omobranchus japonicus scalatus* Smith, 1959: 232, Pl. 19, Figs. D & E (Delagoa Bay). *Omobranchus dasson* (*non* Jordan & Snyder): Springer, 1963: 453. *Omobranchus punctatus:* Springer & Gomon, 1975: 53*.

D XI-XIII,19-22 = 31-34; A II,21-24; no fleshy crest on head; median interorbital pore present in 96% of specimens.

Dusky band in predorsal area; faint bands posteriorly on body; short, slender dusky stripes on body in region covered by P. Attains 95 mm SL. Known only from Delagoa Bay and Suez Canal on African coast, otherwise Persian Gulf to Fiji and north to Japan; also southern Caribbean (introduction).



235.29 *Omobranchus punctatus:* 5.5 cm male (drawn by J. R. Schroeder).

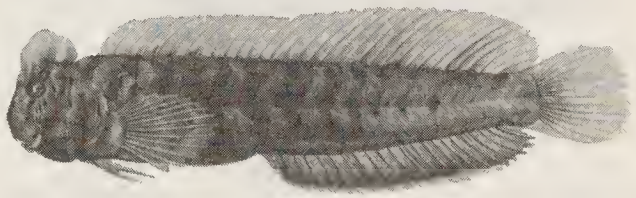
235.30 *Omobranchus woodi*
(Gilchrist & Thompson, 1908)
PLATE 115

Kappie blenny — Kappie-blennie

Aspidontus woodi Gilchrist & Thompson, 1908: 105 (Nahoon River). *Omobranchus woodi:* Smith & Smith, 1966: 112*; Penrith & Penrith, 1972: 78; Springer & Gomon, 1975: 72*.

D XI-XIII,19-21 = 31-33; A II,20-22; gill opening above P base; median interorbital pore present in 95% of specimens, sometimes positioned on fleshy crest; LL tubes on body 2-6.

Body with irregular dusky bands anteriorly; most noticeable dark markings on head are dark marks just above and behind eye. Attains 8 cm SL. Known only from East London to Knysna in estuaries.



235.30 *Omobranchus woodi:* 7 cm SL (Knysna; drawn by J. R. Schroeder).

Genus ***Parablennius*** Ribeiro, 1915

Twenty-two species; 3 in our area.

KEY TO SPECIES

1a Segmented D rays 14-16; segmented A rays 17-18; less than 10 dorsoventrally paired pores (branches) in anterior part of LL ..... *P. lodosus*

1b Segmented D rays 16-24; segmented A rays 16-25; 17-28 dorsoventrally paired pores (branches) in anterior part of LL 2

2a Throat barred; LL restricted to dorsal portion of body, not extending much past tip of P, with 20-28 dorsoventrally paired pores (branches); segmented V rays 3 ..... *P. pilicornis*

2b Throat not plainly barred; LL descending to midside behind tip of P, with 17-19 paired pores (branches) in anterior portion; segmented V rays 4 ..... *P. cornutus*

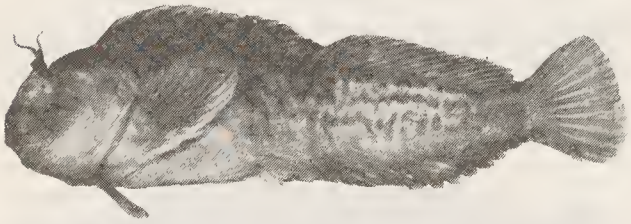
235.31 *Parablennius cornutus*
(Linnaeus, 1758)
PLATE 115

Horned blenny — Horingsman-blennie

Blennius cornutus Linnaeus, 1758: 256 (India); Smith, **SFSA No. 952*;** Smith & Smith, 1966: 112*; Penrith & Penrith, 1972: 67*; Penrith, 1976: 153. *Blennius grandicornis* Valenciennes, *in* Cuv. & Val., 1836: 258 (Cape of Good Hope); Bauchot, 1967: 11*. *Blennius scullyi* Gilchrist & Thompson, 1908: 103 (Walvis Bay). *Pictiblennius cornutus:* Bath, 1977: 202*.

D XI-XII,16-20; A II,16-23; P 13-15; V I,4; orbital cirrus usually a long central stalk with numerous short side branches (central stalk of males much longer than that of females); nasal cirri tiny, consisting of few filaments; LL continuing as bipored tubes from P tip towards C (further posteriorly in larger specimens).

Body irregularly dusky banded (about 6 bands), plain dusky, or broadly vermiculated; underside of head plain dusky; P darkly dusky basally to completely darkly dusky; D variably to completely dusky, dark spot usually present at anterior end. Attains 15 cm SL. Northern Namibia to Sodwana Bay.



235.31 *Parablennius cornutus:* 7.5 cm SL (Natal; photo by K. Bruwelheide).

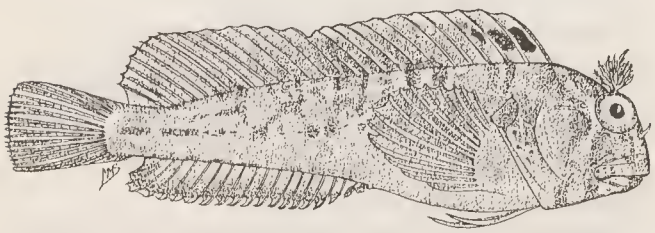
235.32 *Parablennius lodosus*
(Smith, 1959)

Mud blenny — Modder-blennie

Blennius lodosus Smith, 1959: 230, Fig. 1 (Delagoa Bay); 1961: 571, **No. 950a;** Bath, 1977: 198*.

D XI-XII,14-16; A II,17-18; P 13-15; V I,4; orbital cirrus a fleshy flap with numerous filaments; nasal cirrus a small ragged flap; LL descending to midline of body posterior to P, and terminating below middle of D.

Body variably dusky, usually with about 5 broken, dusky bands, sometimes chequered in appearance; underside of head often with 2 faint, dusky bands; P faintly dusky; dark spot or spots at anterior end of D. Attains 4 cm SL. Known only from Delagoa Bay.



235.32 *Parablennius lodosus:* 4 cm male holotype (Maputo Bay).

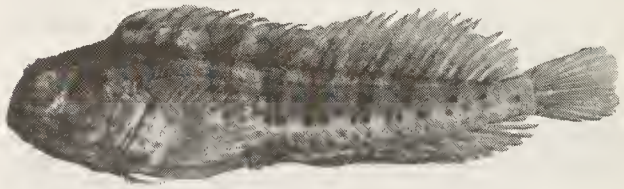
235.33 *Parablennius pilicornis*
(Cuvier, 1829)

Ringneck blenny — Ringhals-blennie

Blennius pilicornis Cuvier, *in* Cuv. & Val., 1829: 237 (no locality); Penrith, 1976: 153. *Blennius fascigula* Barnard, 1927: 73 (South Africa); Smith, **SFSA No. 951*;** Penrith & Penrith, 1972: 72*. *Blennius trifascigula* Fowler, 1936: 404 (Durban, Natal). *Blennius vandervekeni* Poll, 1959: 66, Fig. 24 (Bay of Lobito, Angola). *Parablennius pilicornis:* Bath, 1977: 197*.

D XI-XII,18-24; A II,20-25; P 14; V I,3; orbital cirri consisting of several filaments arising from short, broad base; nasal cirri similar to orbital cirri, but much smaller and fewer.

Body with up to 9 dusky bands dorsally, numerous dark spots ventrally; occasionally body pale with irregular dusky marks; underside of head often with 2 dark bands; P pale or pale dusky; D variably dusky or with numerous spots. Attains 12 cm SL. Western Mediterranean, Angola, South Africa from Knysna to Sodwana Bay, Brazil and Patagonia.



235.33 *Parablennius pilicornis:* 6 cm SL male (Natal; photo by K. Bruwelheide).

Genus ***Pereulixia*** Smith, 1959

One species.

235.34 *Pereulixia kosiensis*
(Regan, 1908)
PLATE 116

Kosi rockskipper — Kosi-klipspringer

Salarias kosiensis Regan, 1908: 254, Pl. 42, Fig. 3 (Kosi Bay, Zululand). *Cirripectes kosiensis:* Smith, **SFSA No. 965*.** *Pereulixia kosiensis:* Smith, 1959: 238*; Smith-Vaniz & Springer, 1971: 36.

D XI-XII,11-12; A II,12-14; P 15-16; V I,4. Canines present in lower jaw; vomer with teeth. Nape cirri in transverse comb-like patch on each side; anterior LL a continuous tube with narrow, imbricate, scale-like flaps covering pores.

Body variably dusky with widely scattered, pale bordered, dark spots and/or white dots. Attains 20 cm SL. Known from Durban north to Pakistan.

Genus ***Petroscirtes*** Rüppell, 1830

Ten species; 2 in our area.

KEY TO SPECIES

1a First D spine distinctly longer than fourth; total D elements 25-27; outer ray of V with dark spot near base ..... *P. mitratus*
1b First D spine not longer than 4th; total D elements 29-31; outer V ray without dark basal spot ..... *P. breviceps*

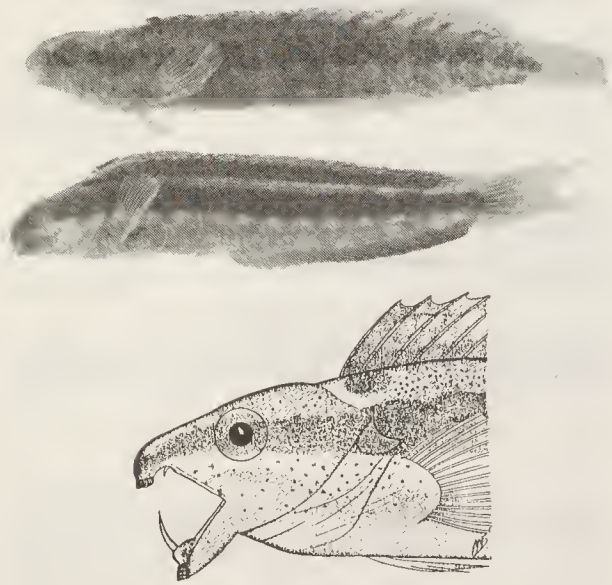
235.35 *Petroscirtes breviceps*
(Valenciennes, 1836)

Sabretooth blenny — Sabeltand-blennie

Blennechis breviceps Valenciennes, *in* Cuv. & Val., 1836: 283 (Bay of Bengal). *Dasson variabilis* (*non* Cantor): Smith, **SFSA No. 960***. *Dasson ancylodon* (*non* Rüppell): Smith, 1959: 233*. *Petroscirtes (Dasson) breviceps:* Smith, 1975: 71; Smith-Vaniz, 1976: 38*.

D X-XI,18-21 = 29-31; A II,18-20; no cirri associated with preopercular pores or pores on nape (simple cirri may be present on other areas of head).

Broad, dark stripe from snout through eye to C; stripe may be broken into segments. Attains 7 cm SL. Natal to Japan and New Guinea.



235.35 *Petroscirtes breviceps:* top: 7.5 cm SL; bottom: 9.5 cm SL, both males (after Smith-Vaniz, 1976). Head to show large canines.

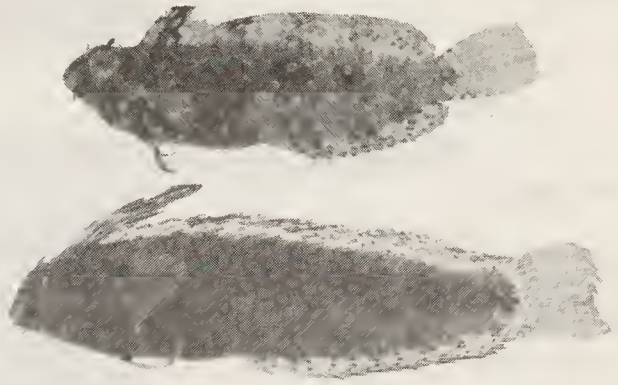
235.36 *Petroscirtes mitratus*
Rüppell, 1830
PLATE 116

Floral blenny — Blom-blennie

Petroscirtes mitratus Rüppell, 1830: 111, Pl. 28, Fig. 1 (Red Sea); Smith, **SFSA No. 959*;** 1959: 231*; Smith-Vaniz, 1976: 32*.

D X-XI,14-17 = 25-27; A II,14-16. Simple cirri associated with preopercular pores and with pores on each side of nape, but not with midpredorsal pore (simple cirri are also present on other areas of head).

Body and head speckled and mottled; 5-6 indistinct, dark blotches or bands on body, usually with dark-edged ocelli dorsally. Attains 6 cm SL. Widely distributed from Red Sea to Gilbert and Samoa Ids.; south to Delagoa Bay.



235.36 *Petroscirtes mitratus:* top: 3.5 cm SL female; bottom: 5.5 cm SL male (after Smith-Vaniz, 1976).

Genus ***Plagiotremus*** Gill, 1867

Ten species; 2 in our area.

KEY TO SPECIES

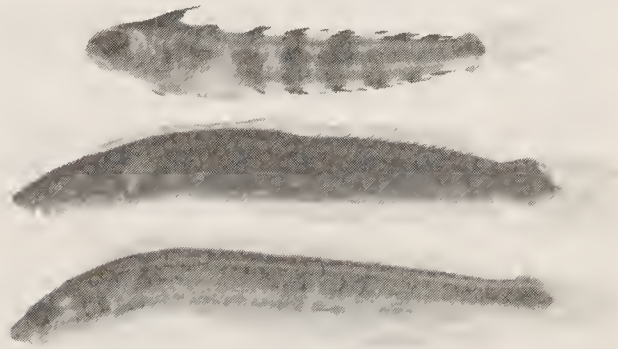
1a Two pores in interorbital region; D spines 7-9; central C ray of adults distinctly darker than adjacent rays ..... *P. tapeinosoma*
1b Four pores in interorbital region; D spines 10-12; central C ray of adults pigmented like adjacent rays ..... *P. rhinorhynchos*

235.37 *Plagiotremus rhinorhynchos*
(Bleeker, 1853)
PLATE 115

Twostripe blenny — Tweestreep-blennie

Petroskirtes rhinorhijnchos Bleeker, 1853: 273 (Wahia, Ceram). *Aspidontus rhinorhynchos:* Smith, **SFSA No. 962***. *Runula rhinorhynchos* Smith, 1959: 234*. *Runula amblyrhynchus:* Smith, 1959: 234*. *Plagiotremus (Runula) rhinorhynchos:* Smith-Vaniz, 1976: 133*.

D X-XII,31-37; A II,29-33; P 11-13; V 1,3.



235.37 *Plagiotremus rhinorhynchos:* top: 3.5 cm SL juvenile; middle: 6.5 cm SL male; bottom: 6 cm male (after Smith-Vaniz, 1976).

The dark midlateral stripe, if present, is not broken into segments in adults, but may appear as 5 or 6 bars in some juveniles. Adults with 2 brilliant blue stripes on body. Attains 9 cm SL. Widely distributed in Indo-Pacific; south to Knysna.

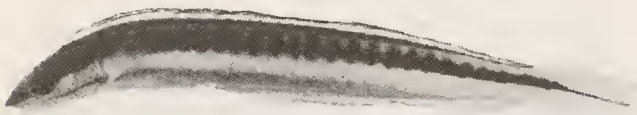
235.38 *Plagiotremus tapeinosoma*
(Bleeker, 1857)
PLATE 115

Piano blenny — Klavier-blennie

Petroskirtes tapeinosoma Bleeker, 1857: 64 (Amboina). *Aspidontus tapeinosoma:* Smith, **SFSA No. 963*.** *Runula tapeinosoma:* Smith, 1959: 234*; Penrith & Penrith, 1972: 83*. *Plagiotremus (Runula) tapeinosoma:* Smith-Vaniz, 1976: 138*.

D VII-IX,34-39; A II,28-33; P 11-13; V I,3.

The dark midlateral body stripe is broken into about 20 oblongish segments. Attains 12 cm SL. Widely distributed in Indo-Pacific; south to False Bay, Cape.



235.38 *Plagiotremus tapeinosoma*: 6.5 cm SL male (after Smith-Vaniz, 1976).

Genus ***Salarias*** Cuvier, 1816

About 10 species; 1 in our area.

235.39 *Salarias fasciatus*
(Bloch, 1786)
PLATE 115

Jewelled rockskipper — Juweel klipspringer

Blennius fasciatus Bloch, 1786: 110, Pl. 162, Fig. 1 (East Indies). *Salarias fasciatus:* Smith, 1959: 241*.

D XII-18-20; A II,19-21; P 14; V I,3 (innermost ray not discernible without dissection); bushy cirri present on nape, eye and nostril; D not notched.

Both sexes with numerous pale spots, dark streaks anteriorly, and indications of several dusky bands. Attains 10 cm SL. Widely distributed in Indo-Pacific; from Bazaruto northwards.

Genus ***Scartella*** Jordan, 1886

Five species; 1 in our area.

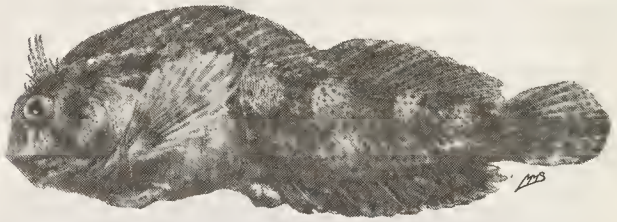
235.40 *Scartella emarginata*
(Günther, 1861)

Maned blenny — Kamkop-blennie

Blennius emarginatus Günther, 1861: 224 (no locality). *Blennius cristatus* (*non* Linnaeus): Smith, **SFSA No. 950*;** Penrith & Penrith, 1972: 70*. *Blennius steindachneri:* Smith, 1959: 230*; 1961: 571, **No. 950.** *Scartella emarginata:* Bath, 1977: 211*.

D XI-XIII,12-16; A II,14-18; P 14; V I,3. Nape cirri do not appear until about 2 cm SL; orbital and nasal cirri consisting of several short filaments; LL with 13-18 dorsoventrally paired branches anteriorly, descending to midline of body and continuing as separate short tubes to C base.

Body with 5-6 dusky bands; fine dark spots sprinkled over body in South African specimens and some Atlantic specimens. Attains 10 cm SL. Southern Angola to India.



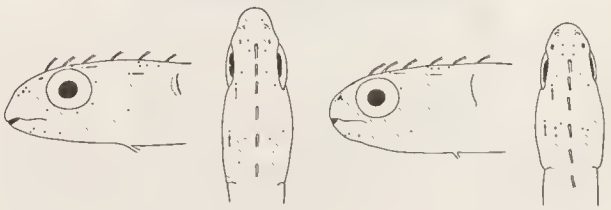
235.40 *Scartella emarginata*: 8 cm male (Transkei).

Genus ***Xiphasia*** Swainson, 1839

Two species, both in our area; notable for their eel-like shape. Total vertebrae 113-135.

KEY TO SPECIES

1a Total P rays (both fins) 20-22; D spines 11 ..... *X. matsubarai*
1b Total P rays 24-28; D spines 13-14 ..... *X. setifer*



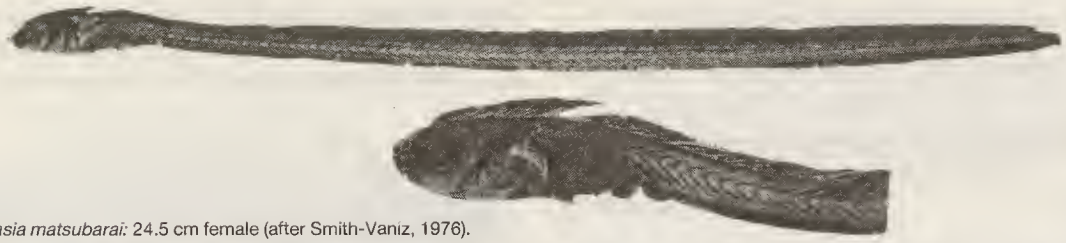
1a *Xiphasia setifer;* 1b *Xiphasia matsubarai* (after Smith-Vaniz, 1976).

235.41 *Xiphasia matsubarai*
Okada & Suzuki, 1952

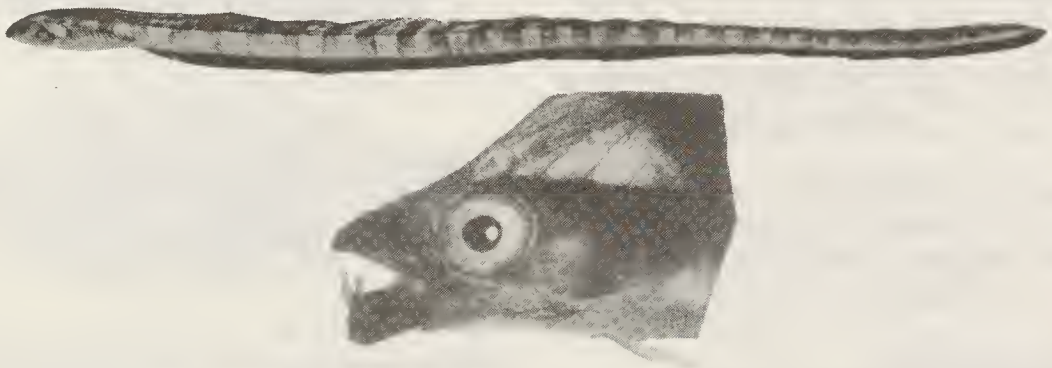
Japanese snakeblenny — Japanse slangblennie

Xiphasia matsubarai Okada & Suzuki, 1952: 75* (Sea of Japan, off Owashi); Smith-Vaniz, 1976: 72*.

D XI,99-104; A II,97-104; P 10-11; V I,3.



235.41 *Xiphasia matsubarai:* 24.5 cm female (after Smith-Vaniz, 1976).



235.42 *Xiphasia setifer:* 29 cm SL female (after Smith-Vaniz, 1976); head to show teeth.

Front part of A white distally. Attains 30 cm SL. Western Indian Ocean to Japan, Mariana and Ellice islands; south to False Bay, Cape.

235.42 *Xiphasia setifer*
Swainson, 1839
PLATE 115

Snakeblenny — Slangblennie

Xiphasia setifer Swainson, 1839: 259 (Visagapatam, India); Smith, **SFSA No. 964***; 1959: 236*; Penrith & Penrith, 1972: 84*; Smith-Vaniz, 1976: 70*.

D XIII-XIV,105-119; A II,107-119; P 12-14; V I,3. Front of A not white distally.

Attains 53 cm SL. Red Sea and Indian Ocean to Japan and New Hebrides; south to False Bay.

Family No. 236: TRIPTERYGIIDAE

by W. Holleman

Threefin blennies — **Drievin-blennies**

Small, cryptically coloured benthic fishes. Dorsal fin in 3 parts: 1st of 3 or 4 spines; 2nd of 8-16 spines; 3rd of 8-12 segmented rays, last ray usually divided to its base. Pelvic fin with 2 rays and 1 short, hidden spine. Principal caudal rays 13, branched rays 11. Band of conical teeth in each jaw. Scales ctenoid, covering body (except belly) in all species; head and belly scaly in some species. Lateral line either a single row of pored scales, or divided into an anterior portion of pored scales and a posterior portion of notched scales (count then given as x + y). Lateral scales counted as continuation of lateral line to base of caudal fin for single lateral line species, or as forward continuation of notched (posterior) portion of lateral line to pectoral fin base in those species with an interrupted lateral line. Transverse scales counted diagonally down and back from 1st spine of 2nd dorsal fin.

Most species attain 30-50 mm. Intertidal to 30 m. Cosmopolitan family occurring in all tropical and temperate regions, most abundant in warm waters. Taxonomy requires much work, and there are several undescribed species. About 16 genera and probably in excess of 130 species. Four genera with a total of 9 species in our area.

KEY TO GENERA

1a Three spines in 1st D, 1 in A 2
1b Four spines in 1st D, 2 in A 3

2a LL a single row of pored scales ending below 2nd D ..... *Helcogramma*
2b LL interrupted, front part of pored scales ending below 2nd D, rear part of notched scales ½ - 2 scale rows below end of front section and continuing to C base ..... *Enneapterygius*

3a Orbital tentacle branched; ring of scales or scale-like spines around edge of eye; palatine teeth present ..... *Cremnochorites*
3b Orbital tentacle a simple flap; no ring of scales around edge of eye; palatine teeth absent ..... *Norfolkia*

Genus ***Cremnochorites*** Holleman, 1982

One species, known only from South Africa.

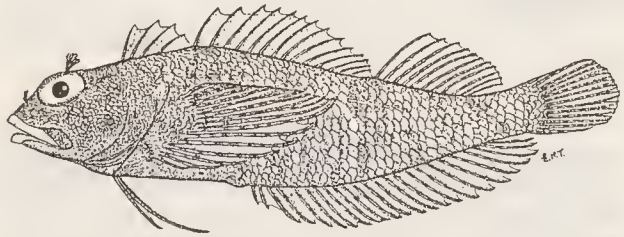
236.1 *Cremnochorites capensis*
(Gilchrist & Thompson, 1908)

Cape triplefin — Kaapse drievin

Tripterygium capense Gilchrist & Thompson 1908: 140 (False Bay). *Gillias capensis:* Barnard, 1927: 867; Smith, **SFSA No. 1005**. *Cremnochorites capense:* Holleman, 1982: 131*.

D IV+XIV-XV+10-11; A II,21-22; P 16; LL (21-24)+(22-23); lateral scales 36-37; transverse scales 5/11. Head covered with small denticle-like scales. Ring of "ctenii" around eye. Orbital tentacle branched.

Body irregularly barred and blotched in russets and browns; males in breeding colours with bright yellow head. Attains 80 mm. False Bay to Port Alfred in 5 - 20 m; taken by trawl in 30 m in False Bay.



236.1 *Cremnochorites capensis:* 8 cm SL male (Cape Point).

Genus ***Enneapterygius*** Rüppell, 1835

Some 30 species, 5 in our area.

KEY TO SPECIES

1a First D higher than 2nd ..... *E. pusillus*
1b First D lower than 2nd 2

2a Row of black spots at base of A; distinct black preanal mark 3
2b No row of black spots at base of A 4

3a Dark bar across C peduncle; body with 4-5 conspicuous dark bars ..... *E. clarkae*
3b No bar across C peduncle; body irregularly blotched ..... *E. ventermaculus*

4a Hourglass-like mark across C peduncle ..... *E. elegans*
4b No peduncular marks ..... *E. abeli*

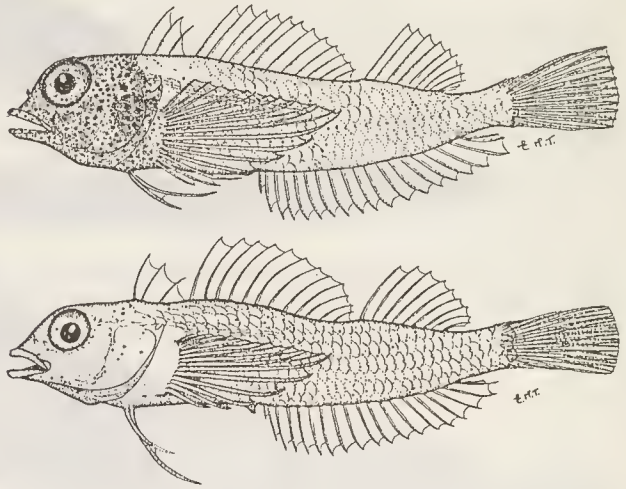
236.2 *Enneapterygius abeli*
(Klausewitz, 1960)

Yellow triplefin — Geel drievin

Tripterygium abeli Klausewitz, 1960: 11, Figs. 1 & 2 (Al Ghardaqa, Red Sea). *Helcogramma abeli:* Lal Mohan, 1971: 222. *Enneapterygius abeli:* Clark, 1979: 97*.

D III+XI-XIII+8-10; A I,17-18; P 14-15; LL (12-14)+(20-22); lateral scales 30-32; transverse scales 3/6. Head, nape and belly naked.

Bright yellow when alive; males with black head and nape. Attains 25 mm. Widespread in Indian Ocean and Red Sea, south to northern Natal.



236.2 *Enneapterygius abeli:* top: 2.5 cm male holotype; bottom: 3 cm female paratype (both Natal).

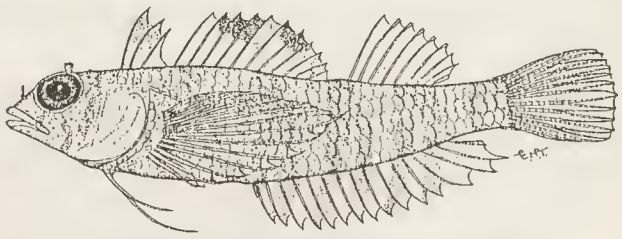
236.3 *Enneapterygius clarkae*
Holleman, 1982

Barred triplefin — Balk-drievin

Enneapterygius n.sp.2 Clark, 1979: 104*. *Enneapterygius clarkae* Holleman, 1982: 121, Fig. 6 (Inhaca Id., Mozambique).

D III+XI-XII+8-10; A I,16-17; P 14-15; LL (11-12)+(20-22); lateral scales 29-30; transverse scales 3/6. Head and nape naked, belly with thin cycloid scales.

Attains 25 mm. Uncommon; Natal to Red Sea and central and western Indian Ocean.



236.3 *Enneapterygius clarkae:* 3 cm male holotype (Inhaca Id.).

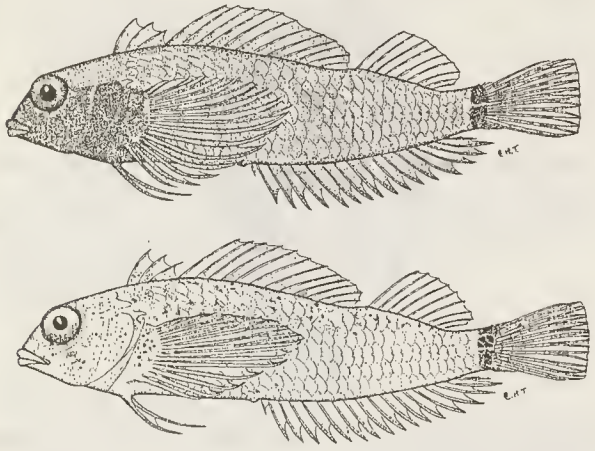
236.4 *Enneapterygius elegans*
(Peters, 1876)
PLATE 116

Hourglass triplefin — Uurglas-drievin

Tripterygium elegans Peters, 1876: 441 (Mauritius); Bleeker, 1879: 21; Moçbius, 1880: 39; Peters, 1883: 54.

D III+XII-XIII+8-10; A I,16-17; P 16; LL (16-18)+17; lateral scales 30; transverse scales 3

Peduncular hourglass mark distinctive even in small individuals. Attains 40 mm. Not uncommon; Kenya to southern Mozambique and islands of western Indian Ocean.



236.4 *Enneapterygius elegans:* top: 3.5 cm male; bottom: 3.5 cm female (St. Brandon's Shoal, N. of Mauritius).

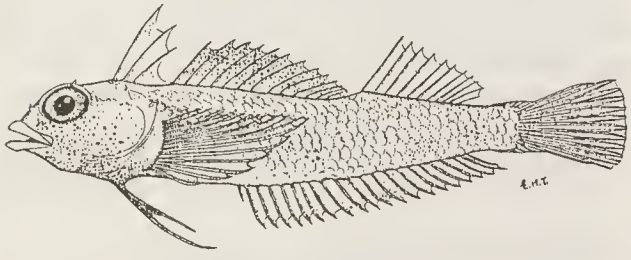
236.5 *Enneapterygius pusillus*
Rüppell, 1835
PLATE 116

Highcrest triplefin — Hoëkuif-drievin

Enneapterygius pusillus Rüppell, 1835: 2 (Red Sea); **SFSA No. 1006;** Clark, 1979: 108*.

D III+XII-XIV+10-11; A I,19-22; P 14-15; LL (9-12)+(25-27); lateral scales 29-30; transverse scales 2/3. Head, nape and belly naked.

Multicoloured when alive; V black; 2nd D and A dusky. Attains 25 mm. Northern Natal to Red Sea.



236.5 *Enneapterygius pusillus:* 2.5 cm male (Natal).

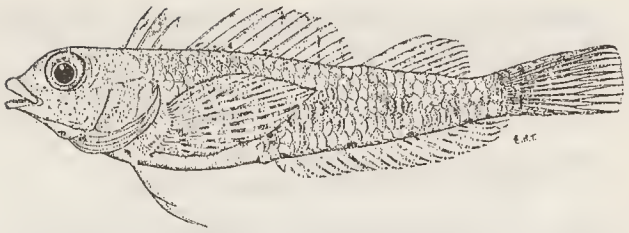
236.6 *Enneapterygius ventermaculus*
Holleman, 1982

Blotched triplefin — Kolpens-drievin

Enneapterygius ventermaculus Holleman, 1982: 123, Fig. 7 (Zululand).

D III+XI-XIII+9-10; A I,18-19; P 14; LL (13-15)+(21-22); lateral scales 33; transverse scales 3/3. Head, nape and belly to under P naked.

Attains 30 mm. Natal to Pakistan, not in Red Sea.



236.6 *Enneapterygius ventermaculus:* 3 cm female holotype (Natal).

Genus ***Helcogramma*** McCulloch & Waite, 1918

Some 13 species, 2 in our area.

KEY TO SPECIES

1a Usually 13 spines in 2nd D; A usually I,18-19; no stipple line across cheek ..... *H. obtusirostre*
1b Usually 14 spines in 2nd D; A usually I,20-21; line of fine stipples from upper lip, below eye, onto preopercle ..... *H. fuscopinna*

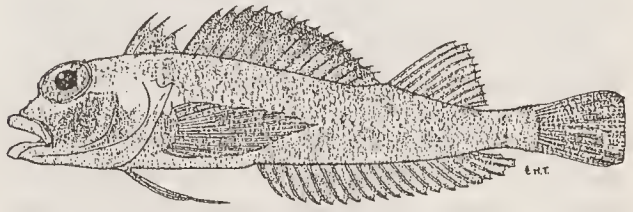
236.7 *Helcogramma fuscopinna*
Holleman, 1982
PLATE 116

Blackfin triplefin — Swartvin-drievin

Helcogramma fuscopinna Holleman, 1982: 115, Fig. 4 (Sodwana Bay, Zululand).

D III+XIV-XV+10-11; A I,19-21; P 16-17; LL 22-28; lateral scales 38-41; transverse scales 6/10. Head, nape and abdomen naked.

Distinct band of fine black stipples from upper jaw under eye to opercle. Heavily pigmented males nearly black. Attains 60 mm. Durban throughout Indian Ocean to Taiwan, Philippines and southern Japan. Not in Red Sea.



236.7 *Helcogramma fuscopinna:* 5 cm male holotype (Natal).

236.8 *Helcogramma obtusirostre*
(Klunzinger, 1871)

Hotlips triplefin — Rooilippies-drievin

Tripterygium obtusirostre Klunzinger, 1871: 498 (Red Sea); Regan, 1918: 77; Norman, 1922: 322. *Helcogramma obtusirostre*: Barnard, 1927: 869; Clark, 1979: 85*. *Enneapterygius obtusirostre*: Smith, **SFSA No. 1007*;** Blaber, 1978: 41.

D III+XIII-XIV+9-11; A I,17-20; P 16-17; LL 19-29; lateral scales 38-43; transverse scales 6/6. Head, nape and abdomen naked.

Attains 45 mm. From Coffee Bay, Transkei to Red Sea and western Indian Ocean.

Genus ***Norfolkia*** Fowler, 1953

Some 10 species, 1 in our area.

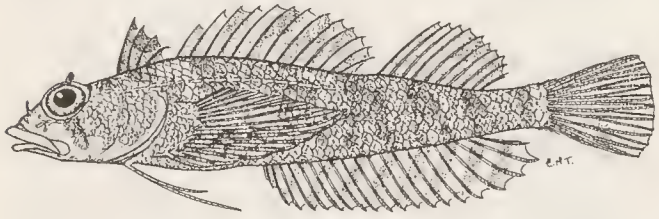
236.9 *Norfolkia springeri*
Clark, 1979

Rough-head triplefin — Rowwekop-drievin

Norfolkia springeri Clark, 1979: 95, Figs 4f, 5d & 9 (Gulf of Aqaba, Red Sea).

D IV+XIII-XIV+9-11; A II,18-19; P 16; LL (15-17)+(22-24); lateral scales 32; transverse scales 3/8. Nape, cheeks, P base and belly with ctenoid scales. Orbital and nasal tentacles crenulate.

Mottled russets and browns. Attains 45 mm. Natal to Red Sea, Sri Lanka, Taiwan, Philippines and southern Japan.



236.9 *Norfolkia springeri*: 5 cm male (Natal).

Family No. 237: CLINIDAE

by M.M. Smith

Klipfishes — **Klipvissies**

Body elongate, compressed posteriorly, with dorsal fin from head to caudal peduncle, of many sharp spines and few to no soft-rays; the first 3 dorsal spines sometimes form an elevated crest and may even be separate from rest of fin. Anal fin long, with 2 spines anteriorly. Pelvic fins inserted anterior to pectorals; V I,2-3, the 3rd ray well developed, minute or absent. Segmented caudal fin rays 13, unless otherwise stated. South African species with all fin rays unbranched. Scales usually present, but small, cycloid, embedded and generally inconspicuous; lateral line generally bent behind tip of pectoral fin, the hind portion usually consisting of a straight midlateral line of disjointed horizontal tubes with a pore each end. Branchiostegal membranes united, forming a free fold across the isthmus, the rays 6-7; a small upturned hook-like projection is visible under the opercular flap on the margin of the shoulder girdle except in *Xenopoclinus leprosus*.

All South African clinids are viviparous, the male having an intromittent organ; young are born from August to October. Small, well-camouflaged fishes found among

Upturned hooklike projection under opercular flap on inner margin of shoulder girdle of *Clinus superciliosus*.

weeds or under stones in estuaries, tide pools, and subtidally down to at least 50 m; they are particularly plentiful in the tide pools between False Bay and East London. All are carnivorous, the larger species often caught by very young anglers. Flesh very delicate in texture and flavour. Twenty genera and about 80 species are recognised, each isolated and endemic to its own region. Southern Africa has 38 species, here placed in 12 genera. Revised by M.L. Penrith in 1969.

KEY TO GENERA

1a V I,3, distinct membrane joining well-developed soft-rays 2
1b V I,2 or 3, rays free from membrane for most of length, 3rd ray small or absent (except in a few species) 3

2a Vomer with teeth; a simple papilla or flap above eye; chin not prominent ..... *Xenopoclinus*
2b Vomer edentate; no papilla or flap above eye; chin juts prominently ..... *Cancelloxus*

3a Body without scales; LL conspicuous, of large pores opening above and below line throughout ..... *Clinoporus*
3b Body scaly; LL not as above 4

4a A tentacle or papilla above eye 5
4b No tentacle or papilla above eye 9

5a Barbels on snout and chin ..... *Cirrhibarbis*
5b No barbels on snout and chin 6

6a D rays 0-1; no scales on cheeks 7
6b D rays more than I 8

7a LL pores all double; D spines 33-38 ..... *Climacoporus*
7b Only front LL pores double; D spines 41-48 ..... *Muraenoclinus*

8a Body elongate, depth 6-8 in SL; scales on cheeks ..... *Blennophis*
8b Body depth 3-5 in SL; no scales on cheeks ..... *Clinus*

9a Last D spine short, rays long, forming a deep notch in margin of D ..... *Blennioclinus*
9b No notch before soft D rays 10

10a Teeth on vomer ..... *Pavoclinus*
10b No teeth on vomer 11

11a No notch between 3rd and 4th D spines; D originates above hind margin of eye; C 13 ..... *Smithichthys*
11b Deep notch between 3rd and 4th D spines; D originates above rear margin of preopercle; C 11 ..... *Fucomimus*

Genus ***Blennioclinus*** Gill, 1860

Body slightly compressed, with small embedded scales; fins naked. Deep notch in D margin before the rays, anterior rays longer than spines. No supraorbital tentacle; front LL with double pores; vomer dentate. V I,3.

Two species.

KEY TO SPECIES

1a D soft-rays 8-11; membrane shallowly notched between 3rd and 4th D spines ..... *B. brachycephalus*
1b D soft-rays 6-7; deep notch in membrane between widely spaced 3rd and 4th D spines ..... *B. stella*

237.1 *Blennioclinus brachycephalus*
(Valenciennes, 1836)
PLATE 117

Lace klipfish — Galon-klipvis

Clinus brachycephalus Valenciennes, *in* Cuv. & Val., 1836: 371 (Cape of Good Hope). *Blennioclinus brachycephalus:* Smith, 1946: 543; **SFSA No. 995*;** Smith & Smith, 1966: 108*; Penrith, 1969: 88*.

D XXVI-XXX,8-11; A II,19-25; P 12-15; V I,3, inner ray short and slender; GR (2-3)+(3-5), vertebrae 17+(28-30); LL with about 30-35 multiple pores in front. Clusters of 3-4 cirri at tips of most D spines.

Belly cream or yellow with dark band from isthmus towards vent having symmetrical branches running up into mottled area on sides; a red-edged, bright blue semicircular spot behind P. Juveniles plain dark red with silver "bubbles" along side. Fades slowly in preservative to uniform yellowish. Attains 15 cm. An isolated collection from Lüderitzbucht, then off Melkbosch beach (northwest coast of Cape Peninsula) to the Kei River; common east of Cape Point in pools on the open coast containing pebbles, sea urchins and sea anemones.

237.2 *Blennioclinus stella*
Smith, 1946
PLATE 117

Silverbubble klipfish — Silwerblasie-klipvis

Blennioclinus stella Smith, 1946: 543, Fig. 4 (Xora Mouth); **SFSA No. 994*;** Penrith, 1969: 90*; Winterbottom, 1976: 179.

D XXIV-XXVIII,6-7; A II,19-21; P 12; V I,3, inner ray minute; GR (1-2)+(4-6); vertebrae 13+(25-27); LL with 20-25 vertical pairs of pores in front; clusters of cirri at tips of 1st 3 D spines.

Colour variable: green, brown, red and orange mottled with silver "bubbles". Preserved: uniform yellowish. The smallest of our clinids, mature at 38 mm and reaches 50 mm in length; sub- and intertidal from Algoa Bay to north of Durban, common subtidally down to 10 m along the Transkei coast.

Genus ***Blennophis*** Swainson, 1839

Swainson erected this genus for a clinid with an elongate eel-like body, which wriggles among rocks and weeds of tide pools. D without crest, spines low and even, without cirri at tips; body, cheek, upper edge of opercle and bases of D, A and C scaly; supraorbital tentacle with flat stalk and fringe of cirri at tip.

Two species from Lüderitzbucht to East London.

KEY TO SPECIES

1a V I,3, inner ray stout; D spines 46-50; no longitudinal body stripes in live specimens ..... *B. anguillaris*
1b V I,2-3, inner ray minute or absent; D spines 40-45; live specimens with longitudinal stripes fading on preservation ..... *B. striatus*

237.3 *Blennophis anguillaris*
(Valenciennes, 1836)
PLATE 117

Snaky klipfish — Slang-klipvis

Blennius rubescens Lichtenstein, 1823: 117 (Cape of Good Hope; *nomen oblitum). Clinus anguillaris* Valenciennes, *in* Cuv. & Val., 1836: 390 ("Rade du Cap"). *Blennophis anguillaris:* Smith, 1946: 539; **SFSA No. 980*.** *Blennophis rubescens:* Smith, 1962: 40. *Blennophis rubellus:* Smith & Smith, 1966: 109* (error for *rubescens*). *Clinus* (*Blennophis*) *anguillaris:* Penrith, 1969: 22*.

D XLVI-L,2-4; A II,33-37; P 13-14; V I,3, rays subequal; GR (2-3)+(5-7); vertebrae 18+(38-40); LL 20-22, vertical pairs of pores in front.

Brown or red with large black blotch below 1st 3 D spines and numerous black dots round eye and on body; juveniles nearly black with red margins to D, A and C; very small juveniles plain purple-black with white C. Preserved uniform buff. Attains 30 cm. In pools and subtidally from Lüderitzbucht to East London, more common in the kelp of the west coast especially north of Lamberts Bay.

237.4 *Blennophis striatus*
(Gilchrist & Thompson, 1908)
PLATE 117

Striped klipfish — Gestreepte klipvis

Clinus striatus Gilchrist & Thompson, 1908: 134 (False Bay). *Blennophis striatus:* Smith, 1946: 539; **SFSA No. 981*;** Smith & Smith, 1966: 109*. *Clinus (Blennophis) striatus:* Penrith, 1969: 24.

D XL-XLV,2-4; A II,28-31; P 12-13; V I,2-3; GR (2-3)+(7-8); vertebrae 17+(34-35). LL with about 22 double pores in front part.

Adults have only faint white longitudinal stripes with light-edged dark ocellus on shoulder; juveniles whitish with

dark longitudinal stripes. Attains 17.5 cm. In tide pools and subtidally from Saldanha Bay to East London; not common.

Genus ***Cancelloxus*** Smith, 1961

Similar to *Xenopoclinus,* this genus has the typical elongate body, naked head and minute embedded scales on body. Vomer edentate; anterior nostril a tube with a flap-like cirrus sometimes terminally notched; P with central rays longest and lower rays thickened.

KEY TO SPECIES

1a Soft D rays 10-14; soft A rays 38-43 ..... *C. burrelli*
1b Soft D rays 3-4; soft A rays 27-32 ..... *C. elongatus*

237.5 *Cancelloxus burrelli*
Smith, 1961

Slender platanna-klipfish — Slank platanna-klipvis

Cancelloxus burrelli Smith, 1961: 355, Figs. 1 & 4 (Lambert's Bay); Penrith, 1969: 103*.

D XXXIII-XXXIX,10-14; A II,38-43; P 13-15; V I,3; GR (0-2)+(5-9); vertebrae: females (20-21)+(44-45), males 19+(43-46); LL slopes gradually from shoulder to midline behind P; front LL of 69-71 single pores opening more or less medially along line; rear LL has the usual clinid disjointed horizontal tubes with a pore each end; V resembles a webbed foot with membranes joining the 3 well-developed rays able to be widely separated at the tips.

Semitranslucent, silvery, with 12 light brown saddles; LL marked by white stripe; odd brownish mottled lines on pinkish head, iris golden with dark blotch in front; two white bars across P base, remaining fins hyaline except for shading of saddles up D. Attains 12 cm. Lives in coarse shingle at lowest part of intertidal zone on west coast from Orange River Mouth southwards, but down to 20 m in the warmer water of the south coast round to Algoa Bay.

237.6 *Cancelloxus elongatus*
Heemstra & Wright, 1986

Whiteblotched klipfish — Witgevlekde klipvis

Cancelloxus elongatus Heemstra & Wright, 1986:00 (off Storms River, Tsitsikama coast).

D XXXVIII-XLIII,3-4; A II,27-32; P 11-12; V I,3; C 11-12; total GR 1-2+5 = 5-7; vertebrae (15-16)+(33-34).

Attains about 5 cm. Found on sandy areas near rocks in 10 - 25 m; from Storms River mouth to Algoa Bay.

Genus ***Cirrhibarbis*** Valenciennes, 1836

Always recognised by the barbels around the mouth. Vomer dentate. Monotypic.

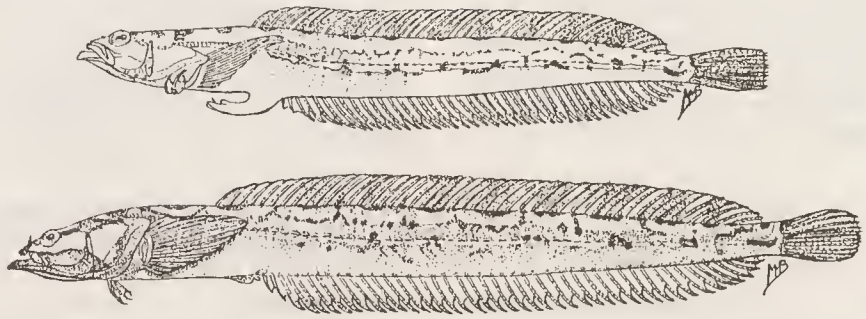
237.7 *Cirrhibarbis capensis*
Valenciennes, 1836
PLATE 117

Barbelled klipfish — Baard-klipvis

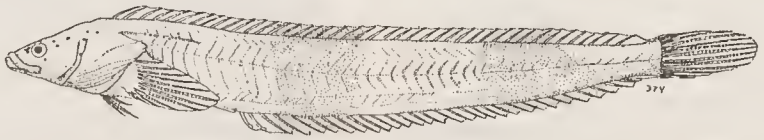
Cirrhibarbis capensis Valenciennes, *in* Cuv. & Val., 1836: 406, Pl. 337 (Cape of Good Hope); Smith, 1946: 538; **SFSA No. 977***; Smith & Smith, 1966: 108*. *Clinus (Cirrhibarbis) capensis:* Penrith, 1969: 26*.

D XXXVII-XLIV,5-9; A II,26-34; P 12-14; V I,2-3; GR (2-3)+(5-7); vertebrae (18-21)+(32-37); LL with about 30 vertical pairs of pores in front; flat supraorbital tentacle with fringe of fine cirri at tip; 3-5 cirri at tip of each dorsal spine; 11 barbels round mouth.

Colour variable, generally milky, cirri and edges of fins generally vermillion; ocellus on shoulder remains long after fish is uniform buff in preservative. Attains 35 cm. In rock



237.5 *Cancelloxus burrelli:* top: 8 cm male paratype; bottom: 10 cm female holotype (both Lambert's Bay).



237.6 *Cancelloxus elongatus:* 4.5 cm holotype (Tsitsikama coast).

pools and subtidally; rare west of Cape Point to Lamberts Bay, common from False Bay to East London.

237.7 *Cirrhibarbis capensis:* front of head to show barbels.

Genus ***Climacoporus*** Barnard, 1935

Head naked; small embedded scales extend onto D, C and A bases. Flat supraorbital tentacle with fringe of fine cirri distally. No cirri at tips of D spines. Vomer dentate. Monotypic.

237.8 *Climacoporus navalis*
Barnard, 1935
PLATE 117

Fleet klipfish — Vloot-klipvis

Climacoporus navalis Barnard, 1935: 646 (Simonstown, False Bay from ship's bottom); Smith, 1946: 538; **SFSA No. 978*;** Smith & Smith, 1966: 109* *Clinus (Climacoporus) navalis:* Penrith, 1969: 30*. *Clinus navalis:* Winterbottom, 1976: 179.

D XXXIII-XXXVIII,0-1; A II,22-24; P 12; V I,2-3; GR (1-2)+5; vertebrae: 15+(27-29); LL about 80 double pores throughout, narrows and may become obscure towards the tail; no cirri at D spine tips; 1st to 4th spines more widely spaced than remainder; 1 specimen examined with no soft dorsal ray. Third V ray reduced or absent.

Colour variable: yellowish brown, reddish or greenish, streaked, mottled or barred darker; dark, light-edged ocellus on shoulder; all fades to uniform buff on preservation. Attains 7 cm. Although originally found among barnacles on a ship's bottom at Simonstown, intensive collecting indicates that it does not normally occur at the Cape; known from Still Bay (west of Mossel Bay) to north of Port St. Johns (Transkei); quite abundant in rock pools but agile and difficult to capture.

Genus ***Clinoporus*** Barnard, 1927

Body and head naked; no scales; no supraorbital tentacle; no D crest; no cirri on D spine tips; LL of large pores opening above and below throughout and ending in single median pore on C peduncle. Vomer dentate. Monotypic.

237.9 *Clinoporus biporosus*
(Gilchrist & Thompson, 1908)

Ladder klipfish — Leer-klipvis

Clinus biporosus Gilchrist & Thompson, 1908: 137 (False Bay). *Clinoporus biporosus:* Smith, 1946: 546; **SFSA No. 1003*;** Penrith, 1969: 92*.

D XXXVIII-XLI,2-3; A II,27-29; P 12-13; V I,3; vertebrae 17+(32-35).

More or less uniform red, brown or orange; uniform buff on preservation. Attains 13 cm. Saldanha Bay to False Bay; rare, subtidal, down to 30 m.

Genus ***Clinus*** Cuvier, 1816

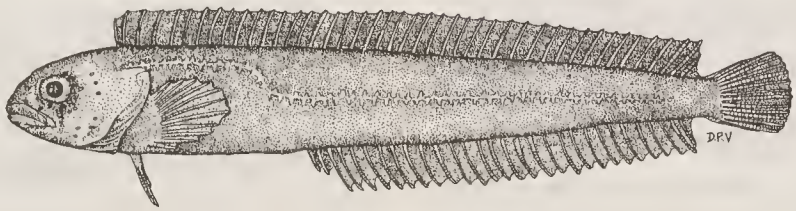
The genera *Blenniomimus* Smith, 1946, *Caboclinus* Smith, 1946, *Gynutoclinus* Smith, 1946 and *Ophthalmolophus* Gill, 1860 are here considered junior synonyms of *Clinus* Cuvier, 1816. Penrith's (1969) subgenera are given generic rank. Supraorbital tentacle present (in form of minute papilla in *C. rotundifrons*); front LL usually of double pores and/or single pores above and below line; behind post-pectoral curve a series of short, separate horizontal tubes with a pore at each end. Body with small embedded cycloid scales; 2 bands of villiform teeth in each jaw, the outer teeth larger; vomer dentate.

KEY TO SPECIES

1a Supraorbital tentacle with more than 2 branches or filaments 2
1b Supraorbital tentacle small, simple or bifid 15

2a Strong bony ridge above eye; front 3 D spines shorter than 5th or 6th 3
2b At most a feeble ridge above eye 4

3a A slight notch between 3rd and 4th D spines; 3rd spine shortest; no ocellus on opercle ..... *C. taurus*
3b No notch between 3rd and 4th D spines, they lengthen gradually from front to rear; large black ocellus on opercle ..... *C. cottoides*



237.9 *Clinoporus biporosus:* 13 cm (False Bay).

4a D with membrane notched between first 10 spines ..... *C. nematopterus*
4b D membrane notched only between 3rd and 4th D spines (if at all) 5

5a 1st 3 D spines elevated, forming a crest, with distinct notch between 3rd and 4th spines 6
5b No crest, or if 1st 3 spines are elevated, no notch between 3rd and 4th spines (slight notch in *C. agilis* 9

6a Membrane from 3rd spine barely, if at all, reaches base of 4th 7
6b Membrane from 3rd spine well attached to 4th spine 8

7a D spines 27-31; V I,2; (Kei Mouth northwards) ..... *C. woodi*
7b D spines 33-36; V I,3; (False Bay to Lamberts Bay) . *C. brevicristatus*

8a V I,2; D crest high: 1st D spine longer than 1st D ray in females and about twice length of 1st D ray in males; lips smooth ..... *C. superciliosus*
8b V I,3; D crest low, shorter than 1st D ray, same in both sexes; lips thick, vertically corrugated ..... *C. robustus*

9a D rays 8-9 ..... *C. latipennis*
9b D rays 2-7 10

10a D rays 5-7; no notch in membrane of D fin 11
10b D rays 2-4 12

11a D spines 30-36; tips of D spines with cirri; (Algoa Bay westwards) 13
11b D spines 34-37; no cirri at tips of D spines; (east of Algoa Bay) ..... *C. helenae*

12a D spines 32-38, slight notch between 3rd and 4th ..... *C. agilis*
12b D spines 37-41, no notch but 2nd D spine elevated ..... *C. venustris*

13a 1st D spine long, 25-37% head length 14
13b 1st D spine shorter, 15-27% head length ..... *C. acuminatus*

14a D spines 30-32, A rays 20-22, P 13 ..... *C. heterodon*
14b D spines 33-36, A rays 22-25, P 11-13 ..... *C. berrisfordi*

15a Supraorbital tentacle minute, difficult to see, no notch in D membrane ..... *C. rotundifrons*
15b Supraorbital tentacle usually simple with spatulate tip, but occasionally bifid; notch between 3rd and 4th D spines ..... *C. spatulatus*

237.10 *Clinus acuminatus*
(Schneider, 1801)
PLATE 117

Sad klipfish — Treurige klipvis

Blennius acuminatus Schneider, *in* Bloch & Schneider, 1801: 169 (no locality). *Ophthalmolophus acuminatus:* Smith, 1946: 542; **SFSA No. 991*.** *Clinus acuminatus:* Hubbs, 1952: 106; Smith, 1966: 73. *Clinus (Clinus) acuminatus* Penrith, 1967: 43*; 1969: 34*.

D XXX-XXXIV,5-7; A II,20-24; P 12-13; V I,2-3; GR (1-2)+(4-6); vertebrae 16+(27-29); at least half of front D spines with 2-3 cirri at tips. LL with 2-4 vertical pairs of pores above opercle, then front part of LL with single pores opening alternately above and below. Base of D scaly, of C and A naked, no scales on head. Flat supraorbital tentacle with short simple branches.

Colour variable: light green with dark crossbars or speckled as shown, all fin tips vermillion, dark ocellus generally on shoulder; small juveniles white with black crossbars; dark areas retained on preservation. Attains 13 cm. West of Algoa Bay subtidally to Lüderitzbucht, common in tide pools of the west coast.

237.11 *Clinus agilis*
Smith, 1931
PLATE 117

Agile klipfish — Rots-klipvis

Clinus agilis Smith, 1931: 154, Pl. 16 (Knysna); 1966: 73. *Ophthalmolophus agilis:* Smith, 1946: 541; **SFSA No. 988*.** *Ophthalmolophus anne* Smith, 1947: 733, Fig. 2 (Lamberts Bay); **SFSA No. 989*.** *Clinus anne:* Smith, 1966: 73. *Clinus (Clinus) agilis:* Penrith, 1969: 37*; Penrith & Penrith, 1983: 145.

D XXXII-XXXVIII,2-4; A II,20-25; P 13-15; V I,2-3; GR (1-2)+(3-5), vertebrae (16-17)+(27-30); about half of front D spines with 3-4 cirri at tips; no scales on head or bases of C, D and A fins; tip of flat supraorbital tentacle with several short simple branches; front LL with vertical pairs then single pores opening above and below.

Colour brown to grey-green with dark crossbars. Attains 10 cm. From 20°49′S on west coast to Port Alfred, common in tide pools on the coast west of the Cape and among seagrass in the Knysna estuary.

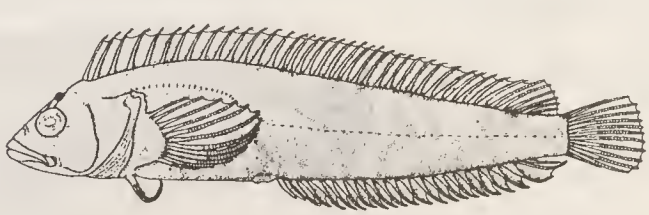
237.12 *Clinus berrisfordi*
Penrith, 1967

Onrust klipfish — Onrust-klipvis

Clinus berrisfordi Penrith, 1967: 48, Figs. 3, 4(c) (Onrust River Mouth); Winterbottom, 1976: 178. *Clinus (Clinus) berrisfordi:* Penrith, 1969: 41*.

D XXXIII-XXXVI,5-6; A II,22-25; P 11-13; V I,3; GR (3-4)+(6-7); vertebrae (16-17)+(28-31); front LL about 23 vertically paired pores with a few single pores above or below LL. Clusters of cirri at tips of D spines; D and C base scaly, A base naked; flat supraorbital tentacle with several long filaments.

Colour reddish orange or yellow with about 7 faint broad darker crossbars and 2 radiating lines from eye across cheek; dark ocellus on shoulder. Fins body colour with faint mottlings; fades to uniform yellow on preservation. Attains 12 cm. Weedy areas of False Bay to Skoenmakerskop (just west of Algoa Bay).



237.12 *Clinus berrisfordi:* 10.5 cm holotype (after Penrith, 1967).

237.13 *Clinus brevicristatus*
Gilchrist & Thompson, 1908
PLATE 118

Cape klipfish — Kaapse klipvis

Clinus brevicristatus Gilchrist & Thompson, 1908: 118 (Kalk Bay). *Petraites brevicristatus:* Smith, 1946: 540; **SFSA No. 985*.** *Clinus (Clinus) brevicristatus:* Penrith, 1969: 43*.

D XXXIII-XXXVI,4-7; A II,21-24; P 12-14; V I,3; GR (1-2)+(3-4); vertebrae (17-18)+(27-31); front LL with 20-25 vertical pairs of pores; 4-6 cirri clusters at tips of all D spines; 4th D spine shorter than 1st; supraorbital tentacle cylindrical with several simple branches on flattened tip.

Often ground colour light grey with vermillion, deep red, brown or green crossbars. Attains 12 cm. From weedy areas, Lamberts Bay to False Bay.

237.14 *Clinus cottoides*
Valenciennes, 1836
PLATE 117

Bluntnose klipfish — Stompkop-klipvis

Clinus cottoides Valenciennes, *in* Cuv. & Val., 1836: 367 (Cape). *Blenniomimus cottoides:* Smith, 1946: 539; **SFSA No. 983*;** Smith & Smith, 1966: 110*. *Clinus (Clinus) cottoides:* Penrith, 1969: 45*.

D XXXI-XXXVI,4-6; A II,21-25; P 12-14; V I,2-3; GR 2+(5-6); vertebrae 15+(29-31); upper LL about 20 vertical pairs of pores with few single pores above or below LL; prominent supraorbital tentacle with numerous long filaments.

Colour variable, but species easily recognised by the shape of the heavy head, no D crest and large opercular blotch; markings remain on preservation. Attains 15 cm. Olifants River Mouth on the west coast to the Kei River in the east; common in tide pools of the Cape south and south-east coasts; larger specimens are found in the cold water of the west coast.

237.15 *Clinus helenae*
(Smith, 1946)
PLATE 118

Helen's klipfish — Helen se klipvis

Ophthalmolophus helenae Smith, 1946: 542, Fig. 3 (Cape Morgan, E. of East London); **SFSA No. 992*.** *Clinus helenae:* Smith, 1966: 73. *Clinus (Clinus) helenae:* Penrith, 1969: 48*.

D XXXIV-XXXVII,5-7; A II,22-25; P 13; V I,3, inner ray minute; vertebrae 16+30; LL 30-32 vertical pairs of pores in front; no cirri at tips of D spines; D, C and A bases scaleless; low bony ridges over eyes and occipital grooves moderate; flattened supraorbital tentacle with fringe of long filamentous cirri; vomer dentate.

Light buff-grey with seven darker broken crossbars, darker spots and white speckles on body and head. Attains 10 cm. A rare fish found in tide pools from Boknes (west of Port Alfred) to the Bashee River.

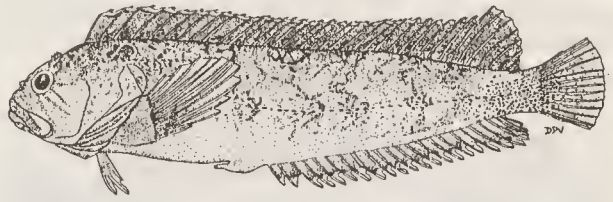
237.16 *Clinus heterodon*
Valenciennes, 1836

Westcoast klipfish — Weskus-klipvis

Clinus heterodon Valenciennes, *in* Cuv. & Val., 1836: 394 (Cape). *Clinus obtusifrons* Penrith, 1967: 46, Figs. 2, 4(b) (Hondeklip Bay). *Clinus (Clinus) heterodon:* Penrith, 1969: 50*.

D XXX-XXXII,6-7; A II,20-22; P 13; V I,2-3; GR (1-2)+(5-6); vertebrae 16+(27-30); front LL of single pores opening above and below; no cirri at tips of D spines; D and C bases scaly, A base naked; flattened supraorbital tentacle terminates in several short, simple branches; vomer dentate.

Slaty with darker irregular crossbars, speckled with white and dark blue; tips of A and V red, tips of D and supraorbital tentacles white; prominent blue-edged ocellus on shoulder; 2 dark radiating bars across cheek. Pattern remains on preservation (Penrith, 1969). Attains 13 cm. West coast only in tidal pools from north of Swakopmund to False Bay.



237.16 *Clinus heterodon:* 12 cm (E. of False Bay).

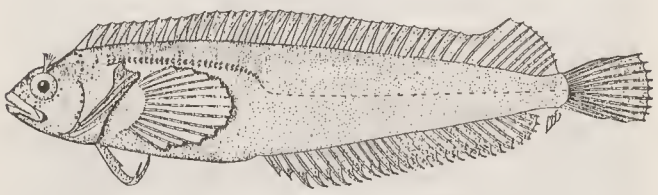
237.17 *Clinus latipennis*
Valenciennes, 1836

False Bay klipfish — Valsbaai-klipvis

Clinus latipennis Valenciennes, *in* Cuv. & Val., 1836: 394 (Cape); Smith, 1946: 542; Hubbs, 1952: 106; Smith, 1966: 73. *Ophthalmolophus latipennis* Smith, **SFSA No. 993*.** *Clinus (Clinus) latipennis:* Penrith, 1969: 53*.

D XXXIII-XXXVI,8-9; A II,23-26; P 13-14; V I,2-3; vertebrae 17+(30-33); LL about 29 vertical pairs of pores in front part, no cirri on D spine tips; D base scaly, C and A bases naked; flattened supraorbital tentacle with expanded tip and fringe of fine filamentous cirri; vomer dentate.

"Pinkish brown with faint irregular darker mottling and speckling. Fins whitish, D with about 7 dark crossbars not reaching upper edge of fin; P and C with clusters of small black dots forming irregular spots. Head grey-brown, mottled.



237.17 *Clinus latipennis:* 11 cm (False Bay).

A few white spots on P base and along side. Pattern remains for a long time after preservation" (Penrith, 1969). Attains 12 cm. This rare fish is known from Table Bay to Cape Agulhas.

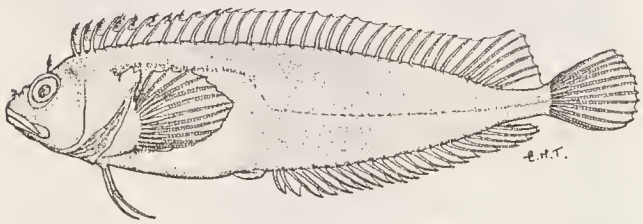
237.18 *Clinus nematopterus*
Günther, 1861

Chinese klipfish — Sjinese klipvis

Clinus nematopterus Günther, 1861: 270 ("Sea of China"); Shen, 1971: 698*; Winterbottom, 1976: 178*.

D XXXI-XXXIV,5-7; A II,20-23; P 13; V I,2-3; C 12-13; GR 2+(7-8); vertebrae 16+(26-28) = 42-44 + urostyle; LL total 49-59, front part 29-30 scales; tufts of cirri on 1st 10 D spines, deeply incised membranes from 1st spine becoming less deep to 10th; D and A bases naked, C and P bases scaly; flattened supraorbital tentacle ends in about 11 long filaments.

In life, light background with broad orange crossbars, fading to uniform buff on preservation. Attains 11 cm. The "Sea of China" locality for the type specimen was erroneous, as this species (like our other clinids) is endemic to southern Africa; 5 specimens have been collected in 13 m and 50 m in False Bay and in Algoa Bay.



237.18 *Clinus nematopterus:* 9 cm SL male (near Cape Point).

237.19 *Clinus robustus*
Gilchrist & Thompson, 1908
PLATE 118

Robust klipfish — Sterk klipvis

Clinus robustus Gilchrist & Thompson, 1908: 128 (False Bay); Smith, 1946: 541; **SFSA No. 987***. *Clinetrachus robustus:* Hubbs, 1952: 107. *Caboclinus robustus:* Smith, 1966: 73; Smith & Smith, 1966: 107*. *Clinus (Clinus) robustus:* Penrith, 1969: 55*.

D XXXII-XXXIV,9-14; A II,26-28; P 12; V I,3 (inner ray well developed); GR (1-2)+(4-5); vertebrae 17+33; front LL vertical pairs and single pores opening above and below; 3-4 cirri on tips of anterior D spines; bases of D and C scaly, A base naked; flattened supraorbital tentacle with expanded tip and several short flat simple branches; lips thick with vertical corrugations; vomer dentate.

Colour variable reddish, green or green-brown with obscure crossbars and fins barred or spotted in life, becomes uniform yellowish on preservation. Attains 50 cm. A large, rare fish, subtidal weed-dwellers, from the Cape to East London.

237.20 *Clinus rotundifrons*
Barnard, 1937

Kelp klipfish — Bamboes-klipvis

Clinus rotundifrons Barnard, 1937: 63, Fig. 4 (near Camps Bay, Oudekraal, Cape Peninsula). *Gynutoclinus rotundifrons* Smith, 1946: 545; **SFSA No. 1002***; Penrith, 1965: 215*; 1969: 94*; Bennett, 1983: 1.

D XXX-XXXII,8-9; A II,22-24; P 12-15; V I,3; vertebrae 16+(28-29); front LL of single pores; no membrane notches in D fin; 1st 4 D spines slightly elevated to form crest, no cirri at tip of D spines; 3rd V ray less than half other two; body compressed; C, D and A bases naked.

In life the adult has about 7 brown irregular crossbars edged with broken lines of iridescent blue which fade to uniform buff on preservation. Penrith (1969: 94) gives detailed descriptions of colour of this rare weed-dwelling fish. Attains over 10 cm. Lüderitzbucht to the Cape in kelp at low tide.

237.20 *Clinus rotundifrons:* 5 cm SL (Lambert's Bay).

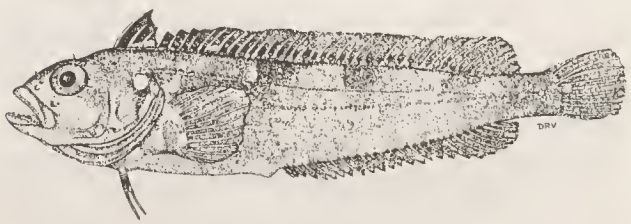
237.21 *Clinus spatulatus*
Bennett, 1983

Bot river klipfish — Botrivier-klipvis

Clinus (Clinus) spatulatus Bennett, 1983: 2, Figs. 1 & 2 (Bot River, southwestern Cape).

D XXXII-XXXV,6-8; A II,23-25; P 13-15; V I,3 (inner ray reduced); GR (2-4)+(6-8); vertebrae (17-18)+(28-29); front LL with paired or single pores above and below line, post-pectoral curve part, typical tubes but becomes indistinct behind; crest of 1st 3 D spines is higher in males, with membrane from 3rd spine leaving 45% to 100% of 4th spine free. No clusters of cirri at D spine tips; D, A and C bases all naked; supraorbital tentacle mostly a small, simple papilla with cylindrical base and spatulate tip, but occasionally tip is elongate and bifid.

Atains 17.5 cm. Plentiful in weeds of the Bot River and Kleinmond estuary in southwestern Cape Province, with ratio of 1 male to 15 females; from March to September the females are gravid.



237.21 *Clinus spatulatus:* 7.5 cm SL paratype (Bot River, Cape).

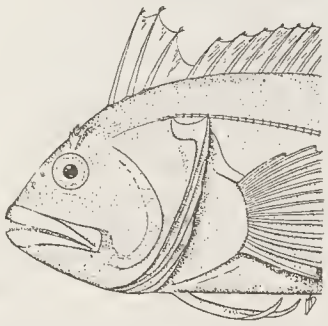
237.22 *Clinus superciliosus*
(Linnaeus, 1758)
PLATE 118

Super klipfish — Superklipvis

Blennius superciliosus Linnaeus, 1758: 257 ("India"). Up to 1861 at least eleven other scientific names had been given to this, the most variable and prolific of our clinids (see Penrith, 1969: 57). *Clinus superciliosus* var. *arborescens* Gilchrist & Thompson, 1908: 115. *Clinus ornatus* Gilchrist & Thompson, 1908: 116. *Clinus superciliosus:* Smith, 1946: 541; **SFSA No. 986*.** *Caboclinus superciliosus:* Smith, 1966: 73; Smith & Smith, 1966: 107*. *Clinus (Clinus) superciliosus:* Penrith, 1969: 57*; Penrith & Penrith, 1983: 146.

D XXXI-XLII,5-10; A II,21-30; P 15-18; V I,2; GR (2-3)+(7-8); vertebrae 18+(30-32); front LL with about 25 single or vertically paired pores; cirri clusters at tips of 1st 3 D spines; D and C bases scaly, A base naked; D crest much higher in males than in females; supraorbital tentacle usually small, subcylindrical with flattened tip and few short simple branches, but in mature males it often has a long stalk with many fine filamentous branches towards the tip. Lips thick; vomer dentate.

Colour extremely variable, from uniform green black with 6 golden dots along centre of body to greatly mottled with the basic 6 bars along the body. Pattern remains on preservation. Attains 30 cm; inter- and subtidally from 18°59′S on the west coast to the Kei River.



237.22 *Clinus superciliosus:* head of large male *"ornatus"* (off Cape).

237.23 *Clinus taurus*
Gilchrist & Thompson, 1908
PLATE 118

Bull klipfish — Bul-klipvis

Clinus taurus Gilchrist & Thompson, 1908: 126 (False Bay). *Blenniominus taurus:* Smith, 1946: 539; **SFSA No. 982*;** Smith & Smith, 1966: 110*. *Clinus (Clinus) taurus:* Penrith, 1969: 62*; Penrith & Penrith, 1983: 146.

D XXX-XXXVI,5-6; A II,20-24; P 12; V I,2-3; GR (3-4)+(7-8); vertebrae 16+(28-30); LL with about 20-25 sets of pores: multiple pores in front then vertical pairs to post-pectoral curve; D and C bases scaly, A base naked; flat supraorbital tentacle with fringe of fine filamentous cirri.

Ground colour can also be pale green or yellow with heavy dark brown bars; fades to uniform yellow in preservative. Attains 23 cm, the male is larger than the female. Möwe Point (Namibia) to Port Alfred at bottom of tidal zone and subtidally; not abundant.

237.24 *Clinus venustris*
Gilchrist & Thompson, 1908
PLATE 118

Speckled klipfish — Gespikkelde klipvis

Clinus venustris Gilchrist & Thompson, 1908: 130 (False Bay); Smith & Smith, 1966: 108*. *Ophthalmolophus venustris:* Smith, 1945: 542; **SFSA No. 990*.** *Clinus (Clinus) venustris:* Penrith, 1969: 64*.

D XXXVII-XLI,2-3; A II,23-28; P 14; V I,2; GR 3+(6-8); front LL about 25 pairs vertical pores; slight crest formed by 2nd (longest) and 3rd D spines, 1st equals 4th and no notch between 3rd and 4th; D, A and C bases naked; flat, short supraorbital tentacle with several short, simple branches at tip.

Colour varies from uniform crimson to mottled, as illustrated. Attains 12 cm. Rare, in tide pools and subtidally from Lüderitzbucht to Port Alfred.

237.25 *Clinus woodi*
(Smith, 1946)
PLATE 118

Oldman klipfish — Ouman-klipvis

Petraites woodi Smith, 1946: 540, Fig. 2 (Xora Mouth); **SFSA No. 984*.** *Clinus (Clinus) woodi:* Penrith, 1969: 66*.

D XXVII-XXXI,4-6; A II,21-24; P 12-14; V I,2; vertebrae 15+27; GR 2+(7-8); front LL with about 20 vertically paired pores with some pores opening above and below line. Clusters of cirri at 1st 3 D spine tips; A base naked, D and C bases scaly; D crest completely separate from rest of fin; cylindrical supraorbital tentacle with fine filamentous branches towards tip. Vomer dentate.

Colour cryptic, variable in olive, browns and reds with obscure crossbars; head markings as illustrated; fades to uniform buff on preservation. Attains 16 cm. Kei Mouth to Inhambane; at Xora subtidally and in Pondoland fairly common in weedy tide pools.

Genus ***Fucomimus*** Smith, 1946

Erected for the single mouse-like species with small mouth, 2 rows of teeth in each jaw; D crest almost separate from remainder of fin; body greatly compressed; C peduncle long; V I,3; inner ray well developed; P 10 and C 11; no supraorbital tentacle; minute embedded scales.

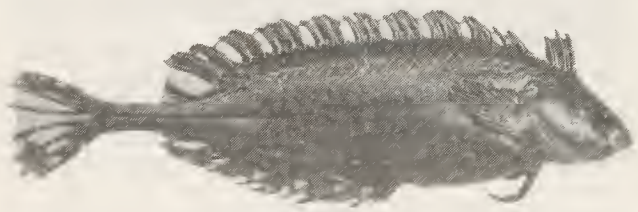
237.26 *Fucomimus mus*
(Gilchrist & Thompson, 1908)
PLATE 118

Mousey klipfish — Muis-klipvis

Clinus mus Gilchrist & Thompson, 1908: 119 (Kalk Bay, Cape). *Fucomimus mus:* Smith, 1946: 544; **SFSA No. 997*;** Smith & Smith, 1966: 110*. *Pavoclinus (Fucomimus) mus:* Penrith, 1969: 72*. *Pavoclinus mus:* Winterbottom, 1976: 179.

D III+XXII-XXV,2-4; A II,14-18; P 10; GR (3-4)+(5-7); vertebrae 14+(27-28); D crest not higher in males; margin of D undulate.

Typical variable cryptic colouring in reddish, green or brown; D and A membranes with 9 and 6 transparent windows respectively, the last in each fin with rays bent to contain the semi-oval window; most of C membrane transparent; young reddish with large silvery patches along side. Attains 10 cm. Intertidal pools from False Bay to Coffee Bay (32°S). Gravid females often with very bloated and distorted belly. A small species that makes no attempt to evade capture beyond writhing slowly.



237.26 *Fucomimus mus:* 7.5 cm (Port Alfred).

Genus ***Muraenoclinus*** Smith, 1946

Body elongate, eel-like, slightly compressed; head pointed with light stripe from tip of snout to D origin; has only 1 soft D ray. Monotypic.

237.27 *Muraenoclinus dorsalis*
(Castelnau, 1860)
PLATE 118

Nosestripe klipfish — Neusstreep-klipvis

Clinus dorsalis Castelnau, *in* Bleeker, 1860: 54; Castelnau, 1861: 54 (Cape). *Muraenoclinus dorsalis:* Smith, 1946: 538; **SFSA No. 979***; Smith & Smith, 1966: 109*. *Clinus (Clinus) dorsalis:* Penrith, 1969: 28*.

D XLI-XLVIII,1; A II,25-31; P 11-13; V I,2-3; GR 2+(0-3); vertebrae 19+(32-35); from LL about 15-20 pores alternately above and below line; no cirri at D spine tips; bases of D, A and C naked; flat supraorbital tentacle ends in fringe of fine cirri.

Colour variably green to brown, sometimes mottled and generally with shoulder ocellus as illustrated; becomes uniform buff on preservation. Attains 10 cm. Commoner on the west coast, this fish usually lives among stones in tidal pools from Lüderitzbucht to southern Natal; a agile as an eel, even crawling out of the water to evade capture.

Genus ***Pavoclinus*** Smith, 1946

Front LL narrow with pores opening medially or above and below; after post-pectoral curve a series of disjointed horizontal tubes with a pore at each end. Intromittent organ with short basal portion, very large conical tip with single pair dorso-lateral lips basally. Vomer toothed. Sluggish, weed-dwelling species with cryptic colouring.

Eight species in 2 subgenera: subgenus *Labroclinus* Smith, 1946 is monotypic for *Pavoclinus (Labroclinus) mentalis*.

KEY TO SPECIES

1a Anal soft rays 27-32; prominent skinny flap on lower jaw at symphysis (subgenus *Labroclinus*) ..... *P. mentalis*
1b Anal soft rays 14-25 (*P. smalei* has 25-27); no flap of skin on lower jaw (subgenus *Pavoclinus*) 2

2a C 12; D origin between eye and preopercle hind margin ..... *P. myae*
2b C 13; D origin over hind margin of preopercle 3

3a D soft-rays 7-8; C peduncle length greater than 58% head length ..... *P. litorafontis*
3b D soft-rays 2-6; C peduncle length less than ½ head length 4

4a 1st 3 D spines not forming crest 5
4b 1st 3 D spines form crest 6

5a D XXX-XXXIII,3-4; A II,20-23 ..... *P profundus*
5b D XXXVI-XXXVIII,2-3; A II,25-27 ..... *P. smalei*

6a D soft-rays 2-4; 3rd V ray minute; no scales on C ..... *P. pavo*
6b D soft rays 4-6; 3rd V ray moderate; scales extend onto C 7

7a Length upper jaw more than 31.6% head length and greater than 70% distance from centre of posterior nostril to D origin; membrane from 3rd D spine barely reaches base of 4th (never well up to 4th) ..... *P. laurentii*
7b Length upper jaw less than 31.5% head length and less than 66% distance from centre of posterior nostril to D origin; membrane from 3rd D spine generally well up 4th ..... *P. graminis*

237.28 *Pavoclinus graminis*
(Gilchrist & Thompson, 1908)
PLATE 119

Grass klipfish — Gras-klipvis

Clinus graminis Gilchrist & Thompson, 1908: 136 (Cape). *Pavoclinus heterodon* (*non* Valenciennes): Smith, 1946: 545; **SFSA No. 1001***; Smith & Smith, 1966: 111*. *Pavoclinus (Pavoclinus) graminis:* Penrith, 1969: 76*. *Pavoclinus graminis:* Christensen, 1978: 7*.

D XXX-XXXV,4-6; A II,21-24; P 12; V I,3; GR (2-3)+(4-5); vertebrae 15+(29-31); D with low crest but usually no notch between 3rd and 4th D spines; inner V ray about half length and half diameter of others; A base and head naked, bases of C and D scaly, small but visible embedded overlapping scales over whole of body.

Colour variable depending on weedy environment, fins of adults with small translucent areas; becomes uniform buff on preservation. Attains 16 cm. Amongst weed, mainly in tide pools from False Bay to Inhambane.

237.29 *Pavoclinus smalei*
Heemstra & Wright, 1986
PLATE 120

Deep-reef klipfish — Dieprif-klipvis

Pavoclinus smalei Heemstra & Wright, 1986: 00, Fig. 00 (Storms River Mouth, Tsitsikama).

D XXXVI-XXXVIII,2-3; A II,25-27; P 12; V I,2; vertebrae (15-16)+(29-31); front LL slopes gently, of single pores; rear LL the usual clinid disjointed tubes with a pore each end.

Head and body buff, with large, irregular, white-edged blotches of russet brown; fins hyaline; anterior fifth of D yellowish brown, rest of D spines with 2 or 3 reddish brown dots. Attains 5.5 cm. Known from one collection in 18 - 22 m off the Storms River Mouth.

237.29 *Pavoclinus smalei:* 2.5 cm SL holotype (Tsitsikama Coast).

237.30 *Pavoclinus laurentii*
(Gilchrist & Thompson, 1908)
PLATE 119

Rippled klipfish — Rimpel-klipvis

Clinus laurentii Gilchrist & Thompson, 1908: 120 (Natal). *Labroclinus laurentii:* Smith, 1946: 544; **SFSA No. 999*.** *Pavoclinus (Pavoclinus) laurentii:* Penrith, 1969: 78*. *Pavoclinus laurentii:* Christensen, 1978: 7*.

D XXIX-XXXIII,4-5; A II,20-22; P 12; V I,3; GR (2-3)+(4-6); vertebrae 15+(27-29); LL of about 20 vertical pore pairs or single pores alternating above and below line; 1st 3 D spines form crest with notch formed by membrane of 3rd spine hardly reaching base of 4th (always greatly incised); 3rd V ray slender and about ½ length of others. Scales overlapping on front of body, bases of D and C scaly, of A naked.

A dainty fish closely related to the more "solid" *P. graminus,* which sometimes has a notch between the 3rd and 4th D spines. *P. laurentii* always has a deep notch. Colour very variable in delicate shades and markings of brown, red, yellow, green, mottled and marbled. Preserved uniform buff. Attains 13 cm. Port Alfred to Inhambane, not uncommon in weedy tide pools and quite visible when "freezing" against a weedy rock.

237.30 *Pavoclinus laurentii:* 12 cm (Transkei).

237.31 *Pavoclinus litorafontis*
Penrith, 1965

Slinky klipfish — Slank klipvis

Pavoclinus litorafontis Penrith, 1965: 212, Pl. 5, Figs. 1 & 2 (False Bay). *Pavoclinus (Pavoclinus) litorafontis:* Penrith, 1969: 80*.

D XXIX-XXXII,7-8; A II,20-23; P 11-12; V I,3; GR (3-4)+(5-6); vertebrae 17+(32-33); front LL of minute double and alternating single pores; 1st 3 D spines elevated to form high crest but no notch between 3rd and 4th D spines, 3rd V ray stout, equals 1st. Recognised by the C peduncle length being more than ½ to ¾ head length.

Colour (Penrith, 1965: 213) "Mainly green, with darker green, yellow and iridescent silver stripes. Usually a longitudinal silver stripe across cheek and operculum. Fins green, D & A sometimes with translucent patches, always translucent patches in C. Underparts green". Colour often like juvenile *P. graminus* illustrated. Attains 21 cm. False Bay: Strandfontein intertidal *Caulerpa* beds, and at Onrust River Mouth tide pool.

237.31 *Pavoclinus litorafontis:* 16.5 cm holotype (after Penrith, 1965).

237.32 *Pavoclinus mentalis*
(Gilchrist & Thompson, 1908)
PLATE 120

Bearded klipfish — Bokbaard-klipvis

Cristiceps mentalis Gilchrist & Thompson, 1908: 139 (East London). *Labroclinus mentalis* Smith, 1946: 544; **SFSA No. 998*.** *Pavoclinus (Labroclinus) mentalis:* Penrith, 1969: 74*.

D III+(XXIV-XL),6-8; A II,27-32; P 11-12; V I,3, inner ray well developed; C 13; vertebrae 16+37; LL upper with mainly single pores opening above, below or on LL tube; lower, after curve, short, separate horizontal tubes with the pore each side.

A brilliant, cryptic coloured fish ranging from maroon to green depending on the weed it inhabits. Young always with brilliant silvery patches along body. Attains 30 cm; mostly subtidal from Algoa Bay to St. Lucia; rare.

237.33 *Pavoclinus myae*
Christensen, 1978

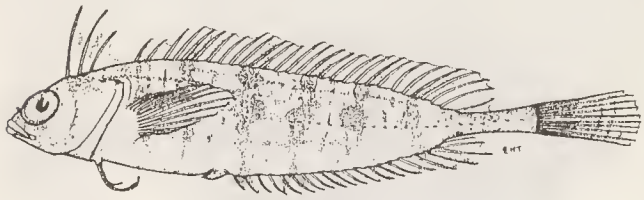
Mya's klipfish — Mya se klipvis

Pavoclinus myae Christensen, 1978: 3, Fig. 2 (32°56′35″S, 28°02′04″E).

D XXVII-XXX,3-5; A II,18-19; P 11-12; V I,3; GR 4+6; vertebrae (12-14)+(26-28) = 39-42; LL with single pores above and below line; 1st 3 D spines form an elevated crest separate from rest of fin; 3rd V ray about ½ length and diameter of others, C peduncle narrow, length greater than ½ head length; C, D and A bases naked.

Ground colour rusty red with dark maroon bars, large silver spot behind eye and at P base partly covered by gill membranes; several smaller spots on preopercle and abdomen; 4 red bars radiating from eye vertically downward,

horizontal on preopercle, to base of D origin and forward over jaws respectively; belly orange-red; D crest maroon; maroon bars on body up into D and A fins, lighter between; P and C red barred; V with basal half maroon and dark red bar ¾ along 2 longest rays. On preservation, body yellowish, bars remaining for some time (Christensen). Attains about 5 cm; N. of East London to Algoa Bay, subtidally.



237.33 *Pavoclinus myae:* 4.5 cm SL holotype (N. of East London).

237.34 *Pavoclinus pavo*
(Gilchrist & Thompson, 1908)
PLATE 120

Peacock klipfish — Pou-klipvis

Clinus pavo Gilchrist & Thompson, 1908: 123 (False Bay). *Pavoclinus pavo:* Smith, 1946: 545; **SFSA No. 1000*;** Smith & Smith, 1966: 111*. *Pavoclinus (Pavoclinus) pavo:* Penrith, 1969: 82*.

D XXX-XXXVI,2-4; A II,20-23; P 11-12; V I,3; GR (2-4)+(4-6); vertebrae 15+(28-31); front LL a series of single pores opening above and below line; D base scaly; C and A bases naked; snout narrow, acutely pointed.

Colour very variable depending on weed in which it lives; sometimes uniform with or without spots of colour, often pearly spots on body. Fades to uniform yellow in preservative. Attains 15 cm. The only *Pavoclinus* found, though rare, on the west coast; from Lüderitzbucht to the Kei River among weed at low tide mark, not uncommon along south and southeast Cape Province coasts.

237.35 *Pavoclinus profundus*
Smith, 1961
PLATE 119

Deepwater klipfish — Diepwater-klipvis

Pavoclinus profundus Smith, 1961: 689, Fig. 1 (off Knysna, dredged from a 40 m rocky bank); Smith & Smith, 1966: 111*. *Pavoclinus (Pavoclinus) profundus:* Penrith, 1969: 83*.

D XXX-XXXIII,3-4; A II,20-23; P 12; V I,3 (3rd ray small); GR 0+(5-6); vertebrae 14+27; front LL with about 19 pores opening above and below, then medially along line; no crest or notch but 4th D spine slightly shorter than 3rd or 5th, D spines increase in length from 4th. No overlapping scales.

Colour as illustrated, goes uniform buff on preservation. Attains 5 cm. In 20 - 40 m from off Knysna to Algoa Bay.

Genus ***Smithichthys*** Hubbs, 1952

Body greatly compressed; D originates above hind margin of eye; 1st 4 or 5 spines elevated to form a high rounded crest; single row of teeth in each jaw; no supraorbital tentacle; small, non-imbricating scales; long C peduncle; C 13, very large. Monotypic.

237.36 *Smithichthys fucorum*
(Gilchrist & Thompson, 1908)
PLATE 119

Leafy klipfish — Blaartjie-klipvis

Clinus fucorum Gilchrist & Thompson, 1908: 121 (False Bay). *Myxodes fucorum:* Smith, 1946: 544; **SFSA No. 996*.** *Smithichthys fucorum:* Hubbs, 1952: 107; Smith, 1953: 356, **No. 996*;** 1961: 91* (juvenile). *Pavoclinus (Smithichthys) fucorum:* Penrith, 1969: 85*.

D XXVIII-XXXI,4-6; A II,19-21; P 12-13; V I,3, inner ray well developed; vertebrae 15+(28-29); LL of single median pores in upper part, short separate horizontal tubes in lower straight part; mouth pug-like.

Colour variable, greenish, brown or yellow with obscure mottlings and bars, an iridescent pearly spot under P. Attains 30 cm. Rare, found mostly in subtidal seaweeds from Cape Point to Bashee River.

Genus ***Xenopoclinus*** Smith, 1948

Head depressed; eyes dorsal, in anterior ¼ of head; a disc-like fleshy papilla above eye; vomer dentate; V I,3 with 3rd ray subequal to others and fin resembling a webbed foot. D origin on head; fin low and more or less even; front rays longer than spines; no cirri at D spine tips; scales minute, embedded but not imbricate; D, C, A and P bases naked. Two species known.

KEY TO SPECIES

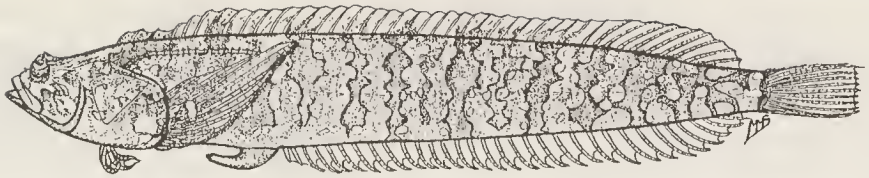
1a Eyes dorsal, head depressed; hook on pectoral girdle beneath opercular flap present; opercular membranes greatly expanded to overlap ventrally ..... *X. kochi*
1b Eyes on side, head normally compressed; hook on pectoral girdle absent or reduced to a knob; opercular membranes normal ..... *X. leprosus*

237.37 *Xenopoclinus kochi*
Smith, 1948

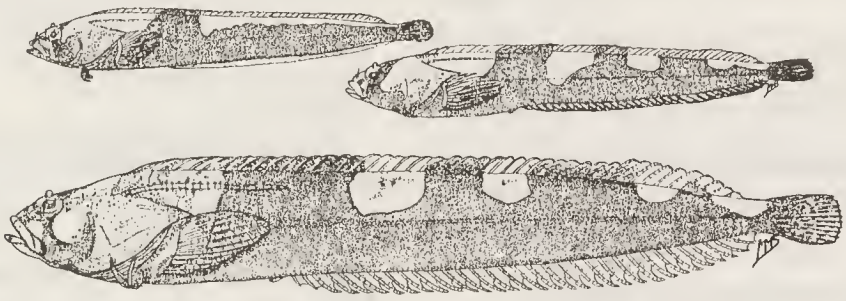
Platanna klipfish — Platannaklipvis

Xenopoclinus kochi Smith, 1947 (1948): 732, Fig. 2 (Lamberts Bay); **SFSA No. 1004*;** Penrith, 1969: 100*; Winterbottom, 1976: 179. *Xenopoclinus (Xenopoclinus) kochi:* Smith, 1961: 352*.

D XXXIII-XXXVII,7-11; A II,29-31; P 12-13; GR 2+(0-2); vertebrae 15+(34-35); LL in 2 parts, front of 25-27 vertical pairs of pores, the lower



237.37 *Xenopoclinus kochi*: 8 cm male (Lamberts Bay).



237.38 *Xenopoclinus leprosus*: 5 cm female holotype; above left 2.5 cm, right 3 cm juvenile paratypes (all Lambert's Bay).

straight median part of 31-34 horizontal typical clinid tubes, the hindmost being feeble grooves; LS about 150 scales; head and nape to below 2nd D spine, belly and chest scaleless.

Colour almost perfectly camouflaged against coarse sand in which it lives: faint dusky olive speckled in pure white to form irregular crossbars, head mottled on pink, iris golden, supraorbital papilla white; C yellow, other fins mainly hyaline with D speckled red and P with basal brown line and silver speckles. Attains 10 cm. Lamberts Bay in intertidal sand near kelp beds open to the sea on west coast; subtidally down to 15 m on south coast to Algoa Bay.

237.38 *Xenopoclinus leprosus*
Smith, 1961

Leprous platanna-klipfish — Melaatse platannaklipvis

Xenopoclinus (Xenopoclinops) leprosus Smith, 1961: 354, Fig. 3 (Lamberts Bay). *Xenopoclinus leprosus:* Penrith, 1969: 101*; Winterbottom, 1976: 179.

D XXXI-XXXVI,7-12, the spines soft and flexible; A II,28-34; P 11-13, lower rays thickened; GR (1-2)+(2-5); LL discontinuous, front portion of LL with vertically paired pores and single pores; lower midline section typical disjointed tubes but generally very obscure.

Body light brown to dark red-brown above with large white saddles; head and anterior body whitish, except sand-coloured area from D origin to eye and vertically down cheek. This area turns dark in preservative. Attains 8 cm. From Orange River Mouth to Algoa Bay, common in coarse sand of intertidal and subtidal areas on the west coast, and has been found by divers to be common in sandy areas 20 m deep on the southeast coast.

Family No. 238: AMMODYTIDAE

by P.C. Heemstra

Sandlances — **Sanddolke**

Small fishes with very elongate cyclindrical body, with or without scales. Dorsal fin continuous, with 49-54 rays and no spines; anal fin half length of dorsal, also without spines; pelvic fins absent (in our species). Mouth large, terminal; lower jaw projecting; upper jaw protrusile; no teeth. More abdominal than caudal vertebrae, total 55-75.

These curious fishes occur in sandy areas of most seas, and are able to burrow rapidly head first. They are excellent bait and good eating, but our species are too small for a meal. Four to 6 genera are recognised; 2 (of the dozen or so) species are represented in our area.

KEY TO GENERA

1a Body completely scaly; LL tubes simple, without branches above and below; D origin over P ..... *Bleekeria*

1b Body mostly naked (only rear fifth with scales); LL canal with pores above and below; D origin behind tip of P ..... *Gymnammodytes*

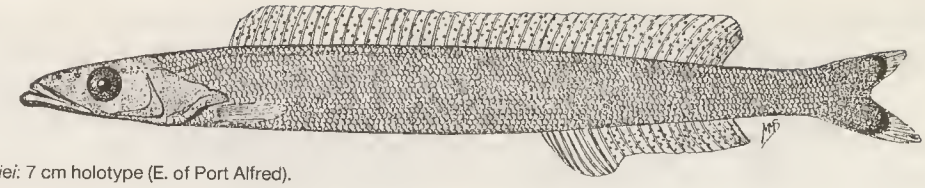
Genus *Bleekeria* Günther, 1862

Five species; 1 in our area.

238.1 *Bleekeria renniei*
Smith, 1957
PLATE 120

Scaly sandlance — Skubbige sanddolk

Bleekeria renniei Smith, 1957: 219, Fig. 2 (Pekweni, eastern Cape Province); 1961: 566, **No. 373d***.



238.1 *Bleekeria renniei*: 7 cm holotype (E. of Port Alfred).

D 50-51; A 23-24; P 15-17; LL 113-115; GR 10+(21-22). Nostrils small, widely separated, about equidistant from eye and tip of snout.

Body pale olive above, silvery white below; D and A with fine black dots. Attains 73 mm. Known only from East London to Port Alfred and the Seychelles. Rare.

Genus ***Gymnammodytes*** Duncker & Möhr, 1935

Three species, 1 in our area.

238.2 *Gymnammodytes capensis*
(Barnard 1927)

Cape sandlance — Kaapse sanddolk

Ammodytes capensis Barnard, 1927: 66 (Table Bay, False Bay, "Kaffrarian" coast); Smith, **SFSA No. 373*.**

D 49-54; A 24-27; P 13-15; GR 3+22; LL canal opening by a series of 45-47 pores above the line and twice as many below; scales rudimentary, isolated, beginning on body at about middle of A; nostrils close together.

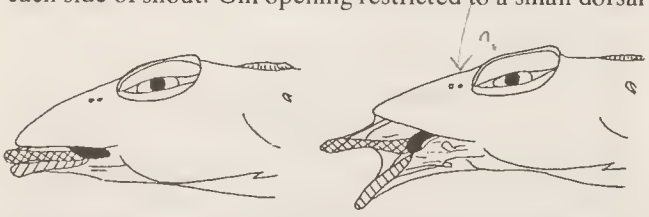
Bluish or greenish above, more or less silvery, a brilliant silver lateral stripe. Attains 17 cm. Angola to Delagoa Bay. Plentiful along the south Cape coast.

Family No. 239: CALLIONYMIDAE

by R. Fricke

Dragonets — **Drakies**

Body elongate, moderately depressed. Head usually broad and depressed, often triangular when seen from above. No scales. Dorsal fin divided into separate spinous and soft-rayed fins. Anal fin with soft-rays only. Pelvic fins jugular in position, widely separated from each other, each with 1 spine and 5 rays. Jaws with villiform teeth; none on palate. Upper jaw very protrusible. Preopercle with a stout spine; opercle and subopercle spineless. A single nostril on each side of snout. Gill opening restricted to a small dorsal or sublateral pore. Gill-rakers few or absent. Vertebrae 20-22 (23-24 in species of *Draculo*). N.B.: standard length, head length and snout length are measured from front of snout and do not include upper jaw; the last dorsal and anal fin rays are double (split to their base) but counted as a single ray.



Head to show protrusible mouth. Maxilla black, premaxilla cross hatched, dentary diagonally hatched.

Eggs, larvae and postlarvae planktonic; adults benthic, from shore to depths of 400 m. Found on sandy and muddy substrates, among seaweeds or in coral reefs. Occurring in all oceans, but usually not of commercial importance. In some areas used for production of fish meal. Nine genera, with a total of about 125 valid species; 5 genera and 10 species in our area. Indo-Pacific species revised by Fricke (1983).

KEY TO GENERA

1a Opercle with a free flap of skin 2
1b Opercle without free flap of skin 3

2a Body with lateral fold of skin below LL; lower lip without fleshy papillae; A rays unbranched ..... *Diplogrammus*
2b Body without lateral fold of skin below LL; dorsal margin of lower lip with a row of erect fleshy papillae; A rays branched ..... *Draculo*

3a LL with numerous long branches above and below; preopercular spine simple, without accessory spines ..... *Paracallionymus*
3b LL mostly unbranched; preopercular spine with 1 or more accessory spines 4

4a Snout shorter than eye diameter; soft D rays branched (in specimens longer than 3 cm); gill opening sublateral; no antrorse spine at preopercular spine base ..... *Synchiropus*
4b Snout equal to, or longer than, eye diameter; soft D rays unbranched; gill opening dorsal; antrorse spine at base of preopercular spine ..... *Callionymus*

Genus ***Callionymus*** Linnaeus, 1758

Soft D and A rays unbranched. About 80 species; 3 in our area. *C. stigmatopareius* Fricke, 1981, which is known only from northern Mozambique, can be distinguished by its fin formulae (D IV+8; A 7), its unusually enlarged A and its preopercular spine with 5 accessory spines on the dorsal margin. *C. persicus* Regan, 1906 (which has been found from Comores northward and may also occur in our area) differs from *C. gardineri* in its much smaller preopercular spine with 3-6 antrorse dorsal serrae, a much smaller dark blotch in 1st D on distal parts of 2nd spine and characteristic lines on thorax and on the membrane between V and P.

KEY TO SPECIES

1a Main tip of preopercular spine upcurved, lower margin of spine straight, dorsal margin with 3-6 large curved accessory spines ..... *C. marleyi*
1b Main tip of preopercular spine straight, lower margin convex; dorsal margin with 4-11 small straight antrorse serrae 2

2a C elongate in males and females; A 8; 1st D spine connected to 2nd spine by a membrane ..... *C. gardineri*
2b C rounded, not elongate (except in males with 1 or 2 long filaments); A 9; 1st D spine detached from rest of fin in males ..... *C. filamentosus*

239.1 *Callionymus filamentosus*
Valenciennes, 1837

Blotchfin dragonet — Vlekvin-drakie

Callionymus filamentosus Valenciennes, *in* Cuv. & Val., 1837: 303, Pl. 359 (Celebes); Smith, 1963: 556*. *Callionymus stigmapteron* Smith, 1963: 555, Fig. 4 (Zanzibar).

D I+III+9 (male) or IV+9 (female); A 9; P 18-20. LL with 2 ventral branches in postorbital region; lines of opposite sides connected across occiput and across dorsal part of C peduncle. Head 3.1-4.0. Preopercular spine with a strong antrorse spine at its base and dorsal margin with 4-9 straight antrorse serrae.

Light brown, with dark spots on sides. Fins spotted with dark brown. D_1 in males with black stripes or blotches, in females with a black blotch on 3rd membrane. Attains 20 cm. Delagoa Bay northwards to Red Sea and Indo-West Pacific. Sand and mud bottoms, from shore to 100 m.

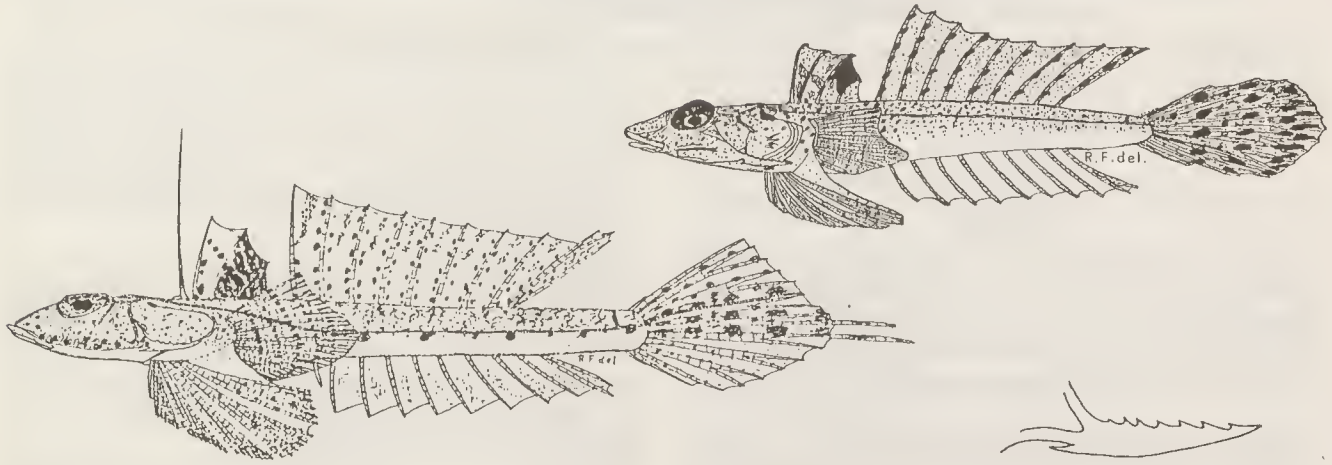
239.2 *Callionymus gardineri*
Regan, 1908

Longtail dragonet — Langstert-drakie

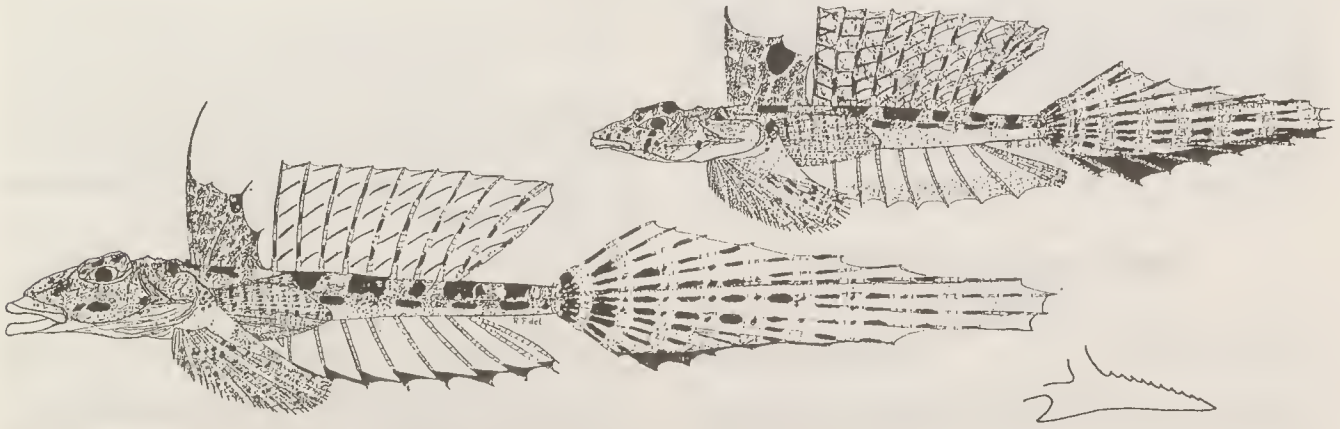
Callionymus gardineri Regan, 1908: 248, Pl. 30, Fig. 5 (Cargados Carajos). *Calliurichthys gardineri:* Smith, **SFSA No. 391.** *Callionymus japonicus* (*non* Houttuyn): Smith, 1963: 556*.

D IV+9; A 8; P 18-20. LL with 2-3 ventral branches in postorbital region; lines of opposite sides connected by a branch across occiput and 2 branches across dorsal part of C peduncle. Head 3.4-3.9. Preopercular spine with a strong antrorse spine at its base and 6-12 small antrorse serrae along dorsal margin. C elongate but not filamentous.

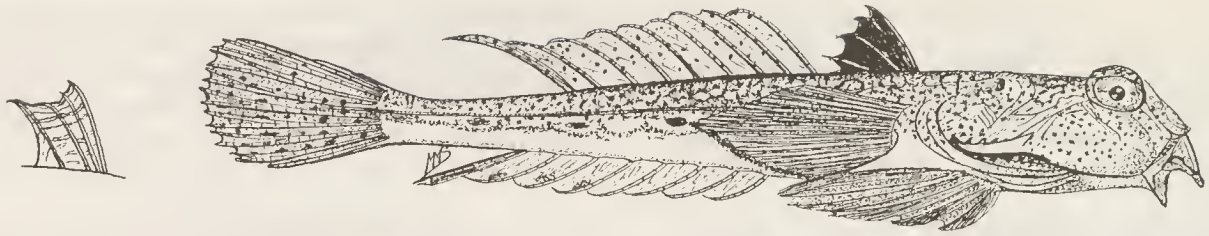
Body colour light to dark brown; usually black blotch on distal part of 3rd D spine; A with black submarginal band. Attains 28 cm. Natal northwards, in most parts of western Indian Ocean. Occurs on mud bottoms in 30 - 180 m, mostly in deeper water.



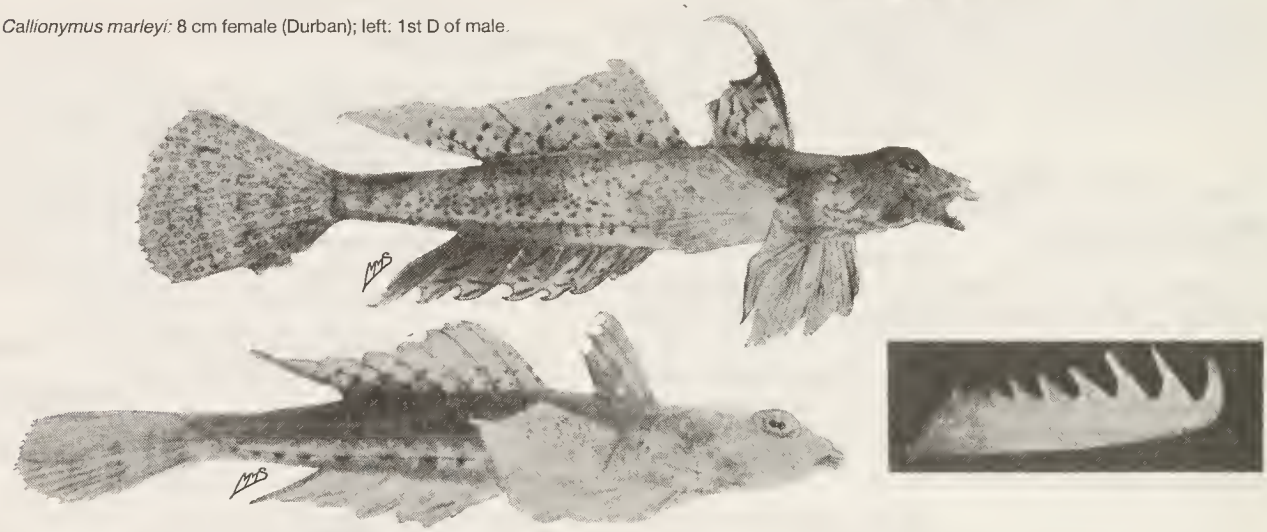
239.1 *Callionymus filamentosus:* top: 9 cm SL female; bottom: 8 cm SL male; right: preopercular spine.



239.2 *Callionymus gardineri:* top: 8.5 cm SL female; bottom: 10.5 cm SL male; right: preopercular spine.



239.3 *Callionymus marleyi:* 8 cm female (Durban); left: 1st D of male.



239.4 *Diplogrammus infulatus:* top: 9 cm male holotype; bottom: 8 cm female paratype; inset: preopercular spine (Inhaca Id.).

239.3 *Callionymus marleyi*
Regan, 1919
PLATE 121

Sand dragonet — Sand-drakie

Callionymus marleyi Regan, 1919: 201, Fig. 4 (Durban); Smith, **SFSA No. 390*;** 1963: 554*; Day, 1974: 95. *Callionymus cooperi* (*non* Regan '1908): Regan, 1918: 77.

D IV+9; A 8; P 17-19. LL with 2 ventral branches in postorbital region; lines of opposite sides connected across occiput. Head 3.0-3.2.

Colour variable, yellow to dark brown. First D in males light grey with dark lines; 1st and 4th spines longest. In females 1st D black, 1st spine longest, 4th shortest. Attains 10 cm. From Cape eastward; quite abundant in Delagoa Bay; most areas of western Indian Ocean to Persian Gulf and southwestern India. Shallow sand bottoms to 20 m.

Genus ***Diplogrammus*** Gill, 1865

Five species; 1 in our area.

239.4 *Diplogrammus infulatus*
Smith, 1963
PLATE 121

Sawspine dragonet — Saagstekel-drakie

Diplogrammus (Climacogrammus) infulatus Smith, 1963: 550, Pl. 83, Figs. E-I (Inhaca).

D IV+8; A 7 (D & A rays unbranched); P 18-19. LL with many short dorsal and ventral branches; lines of opposite sides connected across occiput and between eyes. Head 3.5-3.8. Preopercular spine often with 1 or 2 small antrorse spines at its base, an upcurved main point, and 5-9 curved points along dorsal margin.

Males with a filamentous 1st D spine. Males dorsally golden, with silvery mottlings and darker spots, laterally with dark blue spots. Females mostly buff. Males attain 12 cm (females smaller). Delagoa Bay northwards, most parts of western Indian Ocean to Red Sea; tide pools with seaweeds and shallow waters down to 20 m.

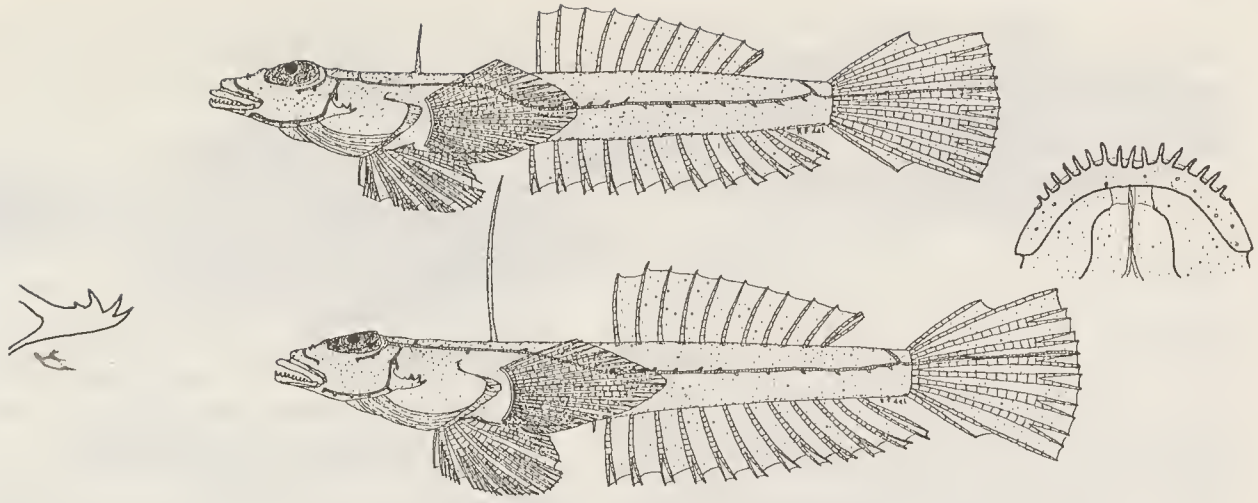
Genus ***Draculo*** Snyder, 1911

Synonyms: *Pogonymus* Gosline, 1959, *Charibarbitus* Smith, 1963, and *Clathropus* Smith, 1966. Five species, 1 in our area. *Draculo maugei* (Smith, 1966) from Madagascar is distinguishable by its 1st D with 4 spines.

239.5 *Draculo celetus*
(Smith, 1963)

Dainty dragonet — Fyn-drakie

Charibarbitus celetus Smith, 1963: 562, Fig. 8 (Inhaca); Christensen, 1977: 145*; Smith, 1980: 176.



239.5 *Draculo celetus:* 3 cm male and female; left: preopercular spine, right: lower lip to show papillae (Durban).

D I+11 (soft-rays unbranched); A 12 (all branched); P 19-21. LL with many dorsal and ventral branches; lines of opposite sides connected between eyes, on occiput and dorsally on C peduncle. Head 3.0-3.4. Preopercular spine without antrorse spine at base; main point upcurved; 3 curved points on dorsal margin. In males D spine 3 times eye diameter or more, in females as long as eye diameter.

Colour: almost uniform buff or darker, with few black pigment spots. Attains 4-5 cm. Rocky tide pools and shore, intertidal zone. Known only from eastern Cape Province, Durban and Inhaca Id.

Genus ***Paracallionymus*** Barnard, 1927

Two species; 1 in our area. *Paracallionymus fowleri* Poll, 1949 with 31-32 branches above and below LL is known only from northwestern Africa.

239.6 *Paracallionymus costatus*
(Boulenger, 1898)
PLATE 121

Ladder dragonet — Leer-drakie

Callionymus costatus Boulenger, 1898: 9 (Cape). *Paracallionymus costatus:* Barnard, 1927: 448*; Smith, **SFSA No. 392*;** 1963: 558*; Day, Field & Penrith, 1970: 92.

D IV+9-10; A 9 (D & A rays unbranched); P 19-21. LL with 33-40 long branches above and 25-29 smaller branches below. Head 3.3-3.7.

Life colour yellow, fugitive. Female less brightly coloured, with D_1 black. Attains 15 cm. Endemic in our area, from Lüderitz Bay to Inhaca, mostly in deepish water, 55 - 400 m.

Genus ***Synchiropus*** Gill, 1860

Recently revised by Fricke (1981); 26 species, 4 in our area.

KEY TO SPECIES

1a Dorsal margin of preopercular spine with 2-5 accessory spines 2
1b Preopercular spine with 1 accessory spine 3

2a Preopercular spine with 2 accessory spines; 7-8 soft D rays ..... *S. marmoratus*
2b Preopercular spine with 3-5 accessory spines; 9 soft D rays ..... *S. postulus*

3a A rays unbranched; V with 1 distal dark area ..... *S. monacanthus*
3b A rays branched; V with 2 dark areas ..... *S. stellatus*

239.7 *Synchiropus marmoratus*
(Peters, 1855)
PLATE 121

Marbled dragonet — Marmer-drakie

Callionymus marmoratus Peters, 1855: 255 (Mozambique); Smith, **SFSA No. 389*.** *Callionymus perelegans* Bianconi, 1859: 263, Pl. 9 (Mozambique). *Synchiropus marmoratus:* Smith, 1963: 561*; Smith, 1980: 176; Fricke, 1981: 73*.

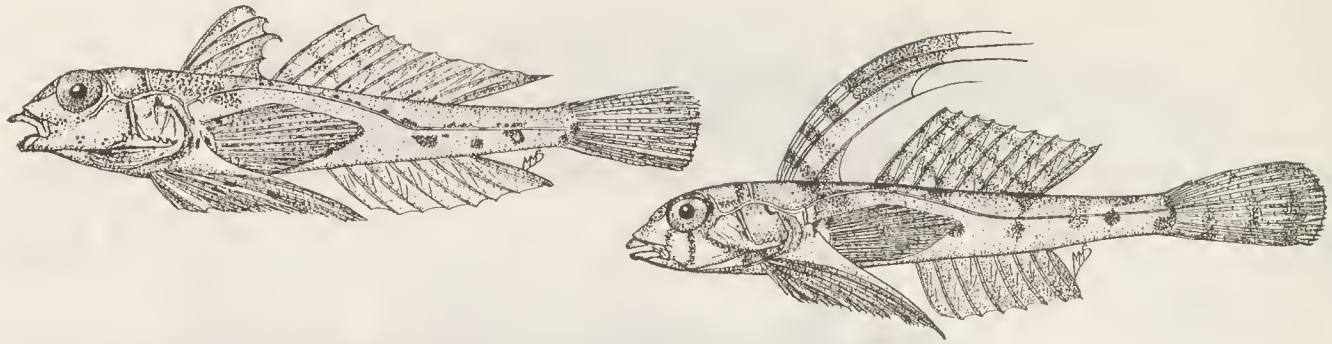
D 1V+7-8; A 6-8 (D + A rays branched); P 18-21. LL without branches, line of opposite side connected across occiput. Head 3.0-3.2. First D high in males.

Body marbled with grey; P and distal parts of V rose or red. ("In life, the spinous D blue stripes are so vivid that despite the black in between, the fin looks blue in both males and females." – M.M. Smith.) Attains 11 cm (females) to 13 cm (males). Delagoa Bay northward; abundant in estuarine seaweed.

239.8 *Synchiropus monacanthus*
Smith, 1935
PLATE 121

Deep-water dragonet — Diepwater-drakie

Synchiropus monacanthus Smith, 1935: 187 (Port Alfred); Smith, **SFSA No. 388*;** 1963: 559*; Smith, 1980: 176; Fricke, 1981: 61*.



239.9 *Synchiropus postulus:* left: 2.5 cm female holotype (N. Mozambique); right: 2.5 cm male paratype (Aldabra Id.).

D IV+8 (rays branched); A 7; P 19-21. LL without branches, connected across occiput. Head 3.0-3.9. Preopercular spine with one slightly recurved spine near tip.

First D of male high, with oblique dark bands. Body greenish and reddish brown above, whitish below. Fins with distal violet streaks. Attains 15 cm. Port Alfred northwards to Zanzibar, at depths of 175 - 428 m, on mud bottoms. Rare, specimens wanted.

239.9 *Synchiropus postulus*
Smith, 1963

Dwarf dragonet — Dwerg-drakie

Synchiropus postulus Smith, 1963: 560, Fig. 7 (Aldabra); Fricke, 1981: 116*. *Synchiropus* sp.: Smith, 1980: 176.

D IV+9 (last or all rays branched); A 8 (unbranched); P 20-21. LL connected across occiput and with 3-4 ventral branches in postorbital area. Head 2.5-4.0. First D high, all rays filamentous in males; in females low.

In alcohol: body light brownish with several vague darker crossbars dorsally; 1st D in males light, with darkish bars, in females dusky. Attains only 26 mm. Sodwana Bay to Tanzania and Aldabra; tide pools and coral reefs to 12 m.

239.10 *Synchiropus stellatus*
Smith, 1963
PLATE 121

Starry dragonet — Sterretjie-drakie

Synchiropus stellatus Smith, 1963: 559, Pl. 85, Figs. A & B (Pinda, Mozambique); Smith, 1980: 176; Fricke, 1981: 107*.

D IV+8; A 7 (D + A rays branched); P 19-24. LL without branches, connected across occiput. Head 3.0-3.6. Preopercular spine with an accessory spine on dorsal margin.

Body mottled pink or straw-gold above with round silvery spots between characteristic dark sepia stellate blotches, silvery white below with dark red spots. First D in males with lines and ocelli, in females black, with a white distal margin. Attains 6 cm. Sodwana Bay to northern Mozambique, Cargados Carajos and Sri Lanka. Shallow water among seaweeds and coral reefs.

Family No. 240: GOBIIDAE

by D.F. Hoese

Gobies — **Dikkoppe**

Some extralimital species will not conform with all characters given here. Branchiostegal rays 5. Body scaled (with 20 to about 150 scale rows) or naked. Usually 2 dorsal fins, but sometimes one; first dorsal fin with 0-17 flexible spines; second dorsal fin with 5-37 segmented rays, last split to base in most species; second dorsal base subequal to or longer than caudal peduncle (except in *Pandaka* and *Redigobius*). Segmented caudal rays 16 or 17. Pectoral fin rays 12-25. Pelvic fins completely separate, partly connected, or connected to form a plate or cup-shaped disc; membrane connecting 2 pelvic spines (= V frenum) present or absent, sometimes thick and fleshy; pelvic fins connected in freshwater and estuarine species, often separate in coral reef forms. Head canals and pores present or absent. Teeth variable in size, generally small and conical in one to several rows in jaws.

Small fishes, most species less than 10 cm, but *Glossogobius giuris* attains 50 cm. Mostly benthic fishes, but some free-swimming and schooling species. Few freshwater species, numerous estuarine and coral reef species. Worldwide with about 220 genera and 1 600 species; about 160 genera and 1 200 species in the Indo-Pacific, and 107 species in our area. Numerous additional species can be expected from warmer areas, particularly on coral reefs and mangroves. Few studies have been made recently of Indo-Pacific species, consequently many of the names used here are based on accepted names for the area and are provisional.

Identification to genus is often difficult, requiring microscopic examination.

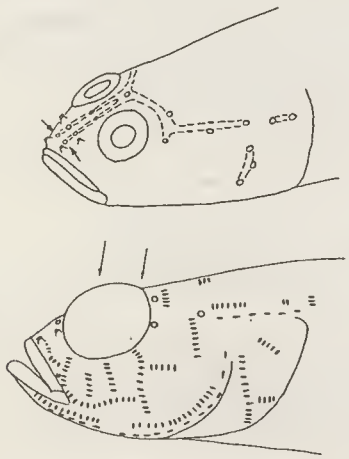
Scale counts: see Eleotridae (Family No. 241).

Gill opening: opercular membrane attaches to body just above pectoral base; lower margin of opening varies from lower end of pectoral base (= pectoral base) to below eye; in most species lower membrane attached to sides of isthmus, but in some the membranes connect across the

isthmus, forming a fold with a free posterior margin.

Mental frenum: on chin a V-shaped, truncate or curved fold with a free posterior margin; often collapses in poorly preserved material.

Head pores: microscopic openings in lateral-line head canals; canals run from front or rear nostrils (nasal canal) between eyes (interorbital canals), behind eye (postorbital), then along upper margin of opercle and preopercle (lateral canal); lateral canal sometimes broken above opercle, with a short detached tube; preopercular canal along rear margin of preopercle with 2-3 pores. Two basic pore patterns: a primitive pattern (= Type B) with an anterior nasal pore and paired anterior interorbital pores, and a more advanced pattern (= Type A) without an anterior nasal pore and a single anterior interorbital pore. Reduction of pores common in both types. Few genera with Type B pattern in our area (*Awaos, Oligolepis, Gnatholepis, Oxyurichthys, Redigobius* and *Stenogobius*).



Top: Type B head pore pattern: anterior interorbital pores black, anterior nasal pores indicated by arrows. Bottom: Transverse pattern of sensory papillae.

Sensory papillae: microscopic bumps on side of head, two basic patterns: Transverse Pattern with 4 or more vertical rows of papillae on cheek below eye, one longitudinal row from end of jaw and an upper longitudinal row on mid cheek; Longitudinal Pattern with 3 to 5 longitudinal or oblique rows of papillae extending from behind upper lip along cheek. Several variations occur: (a) Reduced Transverse Pattern – with few papillae scattered on head; (b) Multiple Longitudinal Pattern – with 3 or more horizontal rows between other longitudinal rows, superficially resembles a transverse pattern. Cheek scales often obscure patterns; papillae often difficult to see, especially if specimen is not well preserved.

KEY TO GENERA

1a A and single D confluent with C; total A rays 30-51; (mud bottoms) 2
1b C separate from 2nd D and A; total A rays 6-36 3

2a Body naked; head with numerous small barbels ventrally, no pit over opercle ..... *Taenioides*
2b Body scaled; head without small barbels; a small pit opening into cavity at upper edge of opercle ..... *Trypauchen*

3a Body naked or with a few scales on C peduncle 4
3b Body completely scaled 7

4a First gill slit closed by membrane; (V fused or separate) ..... *Hetereleotris*
4b First gill slit open 5

5a V separate ..... *Austrolethops*
5b V united 6

6a Body elongate, depth 7 in SL; no A spine, first ray segmented; gill opening to under rear margin of preopercle; (estuarine) ..... *Croilia*
6b Body deep, depth 3-4 in SL; A with a flexible spine; gill opening not reaching below P base; (coral reefs) ..... *Gobiodon*

7a D VI+I,24-37; (V separate; coral reefs) 8
7b Total 2nd D rays 6-20 9

8a V I,5; posterior scales ctenoid ..... *Nemateleotris*
8b V I,4; scales cycloid or rarely a few weakly ctenoid scales on caudal peduncle ..... *Ptereleotris*

9a Barbels present on ventral surface of head 10
9b Head without barbels 13

10a Head compressed; only 2 barbels on chin; D VI+I,12-13; (west coast) ..... *Sufflogobius*
10b Head depressed or rounded; barbels more numerous; D VI+I,8-11 11

11a Head rounded; cheek and opercle scaled; large black spot present dorsally on C; (trawls) ..... *Parachaeturichthys*
11b Head depressed; cheek and opercle naked; no large black spot on C; (reefs) 12

12a Anterior body scales cycloid; LS 32-60; horizontal fold present on chin ..... *Gobiopsis*
12b Anterior body scales ctenoid; LS 23-25; no horizontal fold on chin ..... *Barbuligobius*

13a Eyes elevated, with lower eyelid and deep sockets; first D spines 7-17; P base elongate; (mangroves) ..... *Periophthalmus*
13b Eyes not elevated, without eyelid; 1st D spines 6; P base short 14

14a First spine in 1st and 2nd D stiff and thickened; (preopercle with 1-3 flat spines) ..... *Oplopomus*
14b D spines all thin and flexible 15

15a Preopercle with 1-9 spines; (cheek scaled; coral reefs) ..... *Asterropteryx*
15b No preopercle spines 16

16a First gill slit closed by membrane; (coral reefs) ..... *Hetereleotris*
16b First gill slit open or at least partly open 17

17a Cheek with prominent vertical flaps; (coral reefs) ..... *Callogobius*
17b Cheek without raised flaps 18

18a Shoulder girdle (under opercle) with 1-3 finger-like flaps; (freshwater) 19
18b Shoulder girdle smooth or with minute bumps 20

19a Head broader than deep; PD 23-32 ..... *Awaos*
19b Head compressed, narrower than deep; PD 12-15; body with transverse bands ..... *Stenogobius*

20a Cheek with large scales; teeth at sides of upper jaw directed medially; anterior interorbital pore paired; mouth horizontal, inferior; (coral reefs) ..... *Gnatholepis*
20b Cheek naked; teeth at sides of jaws vertical or directed posteriorly 21

21a V thick, with fleshy lobes at tips of V spines 22
21b V thin, without fleshy lobes at tips of spines 24

22a Upper P rays free, silk-like; chin with transverse or curved mental frenum ..... *Bathygobius*
22b Upper P rays not free; chin without a mental frenum; (coral reefs) 23

23a Head rounded, the ventral surface with numerous small bumps ..... *Paragobiodon*
23b Head broad, without bumps ..... *Pleurosicya*

24a Head pores absent; size not greater than 50 mm 25
24b Head pores present 28

25a Interorbital broader than pupil; gill opening equals P base; V frenum present; (estuaries) 26
25b Interorbital narrower than pupil; gill opening to below eye or preopercle; V frenum absent; (coral reefs) 27

26a D VI+6-7; no spine in 2nd D or A; segmented C rays 17; head rounded; (size not greater than 20 mm) ..... *Pandaka*
26b D VI+I,7-8; A and 2nd D with flexible spine; segmented C rays 16; head depressed ..... *Mugilogobius*

27a Gill opening ends below rear margin of preopercle; head broader than deep, with distinct dark vertical bars ..... *Priolepis*
27b Gill opening extends to below eye or rarely to below rear of preopercle; head compressed, deeper than broad, uniform, spotted or with irregular faint bands ..... *Trimma*

28a V completely separate; (coral reefs and harbours) 29
28b V partly or completely connected 31

29a V fringe-like; D VI+I,7-11; LS 21-26; (size less than 30 mm) ..... *Eviota*
29b V normal; D VI+I,11-20; LS 58-146; 30

30a Snout equal to or less than eye; upper jaw teeth in 3 or more rows; gill opening extends to below preopercle ..... *Amblyeleotris*
30b Snout much greater than eye; upper jaw teeth in 1 row; gill opening equals P base ..... *Valenciennea*

31a Lower jaw curved upward at tip; C longer than head in adult; head pores Type B 32
31b Lower jaw normal; C longer or shorter than head; head pores Type A 34

32a Head compressed; D VI+I,6-8; (size less than 50 mm) ..... *Redigobius*
32b Head rounded; D VI+I,10-13 33

33a Upper jaw teeth in 1 row; D VI+I,12-13; LS 42-75 ..... *Oxyurichthys*
33b Upper jaw teeth in 2 or 3 rows; D VI+I,10-11; LS 25-27 ..... *Oligolepis*

34a Gill opening extending to below rear margin of preopercle (or farther forward) 35
34b Gill opening restricted to P base or slightly below 41

35a Scales small; LS 47-110; D VI+I,9-14 36
35b Scales large; LS 25-39; D VI+I,10-19 38

36a D VI+I,9-12; scales cycloid or ctenoid ..... *Cryptocentrus*
36b D VI+I,13-14; posterior scales ctenoid, anterior cycloid 37

37a C pointed, longer than head; snout profile at an angle less than 40° with body axis; papillae pattern longitudinal ..... *Vanderhorstia*
37b C rounded, shorter than head; snout steep, forming an angle of more than 50° with body axis; papillae pattern transverse ..... *Amblyeleotris*

38a Tongue tip bilobed or branchiostegal membranes forming free fold across isthmus; predorsal scaled at least to above opercle; (freshwater and estuarine) 39
38b Tongue tip truncate; branchiostegal membranes attached to sides of isthmus; predorsal naked 40

39a Snout much greater than eye; tongue bilobed; (freshwater and estuarine, Algoa Bay northwards) .. *Glossogobius*
39b Snout subequal to or less than eye; tongue weakly notched; (estuarine, Natal to Port Nolloth) ..... *Psammogobius*

40a Head depressed; A I,12-13 ..... *Silhouettea*
40b Head compressed; A I,9 ..... *Mahidolia*

41a D VI+I,13-15; upper gill arch with finger-like projections; 10-15 short vertical papillae rows under eye; operculum with several scales dorsally ..... *Amblygobius*
41b D VI+I,7-15; upper gill arch without finger-like projections; 4-6 long vertical papillae rows or longitudinal rows only under eye; operculum naked or with 1 scale 42

42a Mouth small, almost horizontal; snout broadly rounded, ending above front of upper lip; PD 6-9, reaching eyes; (body with several longitudinal light lines; midside with series of round spots; tropical sandy estuaries and coral reefs) ..... *Istigobius*
42b Mouth small to large, oblique; snout gently or steeply sloping, not broadly curved in lateral view, ending behind upper lip; PD 0-20, usually small (except in *Fusigobius*, which has pointed snout), often not reaching eyes 43

43a D VI+I,7-9; several longitudinal rows of head papillae; (sandy tropical estuaries and coral reefs) ..... *Favonigobius*
43b D VI+I,9-15; head papillae pattern transverse or longitudinal 44

44a Snout pointed in dorsal view; head triangular in cross-section; V frenum low; PD 5-7, reaching to or near eye; D VI+I,10; (body translucent to white, with scattered blue and small black spots; sand or coral reefs) ..... *Fusigobius*
44b Snout rounded in dorsal view; head rounded, depressed or compressed; V frenum well developed; predorsal scales small, if reaching eyes, PD greater than 15 45

45a Head papillae pattern longitudinal 46
45b Head papillae pattern transverse 47

46a Upper P rays free, silk-like; small bump under anterior nostril; cheek with a fold behind upper lip; a prominent truncate or curved mental frenum; predorsal at least partly scaled; (reefs) ..... *Bathygobius*
46b Upper P rays normal; no bump under anterior nostril; cheek without a fold; mental frenum indistinct 49

47a LS 33-63; D VI+I,9-15; (estuarine, tide pools and coastal subtidal) ..... *Caffrogobius*
47b LS 25-34; D VI+I,9-11; (Algoa Bay northwards) 48

48a Mouth reaching below rear half of eye; upper P rays often free; anterior nostril often with a small flap; no white spot on upper P base; (tidepools and coral reefs) ..... *Monishia*
48b Mouth reaching below front half of eye; no free P rays; no flap on anterior nostril; white spot at upper P base; (mangroves; Delagoa Bay northwards) ..... *Drombus*

49a Predorsal naked 50
49b Predorsal scaled ..... *Acentrogobius*

50a C peduncle and midsides with dark spots larger than eye ..... *Yongeichthys*
50b C peduncle without enlarged spots ..... *Amoya*

Genus ***Acentrogobius*** Bleeker, 1874

Scales large, ctenoid; PD scales to near eyes; operculum often scaled. Easily confused with *Amoya* and *Yongeichthys*. Gill opening to just below P base; V a disc. A low mental frenum, usually with clusters of papillae behind, or a transverse row. D VI+I,9-10; A I,8-9; P 16-19; LS 26-34. Vertebrae 26. Tropical species found on mud and sand bottoms in mangroves and coastal bays. Several species, 1 in our area.

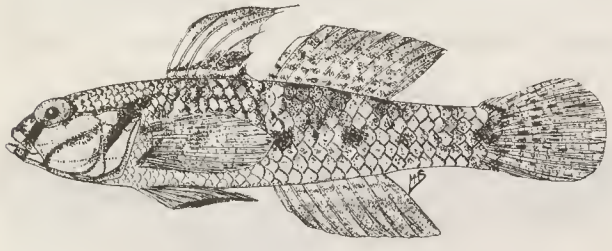
240.1 *Acentrogobius audax*
Smith, 1959

Mangrove goby — Mangrove-dikkop

Acentrogobius audax Smith, 1959: 201, Fig. 17 (Ibo, Mozambique).

D VI+I,9; A I,9; P 17; LS 26; TRB 8; PD 12; GR 2+9. PD scales to above mid-opercle. No cheek or opercular scales.

C peduncle with a curved dark bar, followed by a dark bar on C base. Attains 6.5 cm. Ibo and Natal.



240.1 *Acentrogobius audax:* 5.5 cm holotype (N. Mozambique).

Genus ***Amblyeleotris*** Bleeker, 1874

Body slender; gill opening reaching to below middle of preopercle; head pores Type A; transverse cheek papillae pattern; anterior body scales cycloid, posterior scales ctenoid; V separate, partly connected or united; V frenum present or absent. D VI+I,12-19; A I,12-19; P 18-21; LS 58-110. Vertebrae 26. Most easily confused with *Cryptocentrus* and *Vanderhorstia*. Lives in burrows with alphaeid shrimps on coral reefs. About 25 species, 2 in our area.

KEY TO SPECIES

1a A I,14; midline of nape naked; scales mostly cycloid, ctenoid from behind about mid second D ..... *A. aurora*
1b A I,12; midline of nape scaled; scales ctenoid from below origin of second D posteriorly ..... *A. wheeleri*

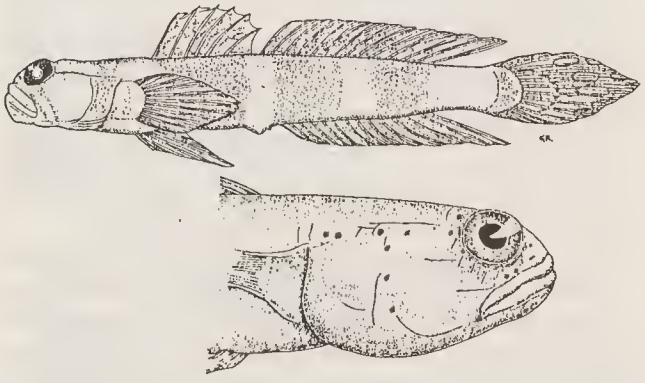
240.2 *Amblyeleotris aurora*
(Polunin & Lubbock, 1977)
PLATE 126

Pinkbar goby — Pienkbalk-dikkop

Cryptocentrus aurora Polunin & Lubbock, 1977: 84, Fig. 13 (Aldabra).

D VI+I,13; A I,14; P 18-19; LS 64-82; TRB 23-27; PD 0; GR (2-4)+(10-12). Breast scaled; P base partly scaled; V connected at base only, no frenum. Midline of nape naked, sides scaled forward to above end of operculum.

Body with 3 broad pinkish bars; C with 3-9 oval to round spots, red in life. Attains 9 cm. Known only from islands of western Indian Ocean from Maldives southwards and northern Natal.



240.2 *Amblyeleotris aurora:* 7.5 cm SL holotype; head enlarged to show pores (Aldabra; after Polunin & Lubbock, 1977).

240.3 *Amblyeleotris wheeleri*
(Polunin & Lubbock, 1977)
PLATE 126

Gorgeous goby — Mooidikkop

Cryptocentrus wheeleri Polunin & Lubbock, 1977: 88, Figs. 16 & 17 (Aldabra).

D VI+I,12; A I,12; P 18-20; LS 50-58; TRB 18-21; PD 12-20; GR (1-3)+(8-10). P base scaled; V connected for about half length, no frenum; midline of nape scaled to above operculum.

Body with 6 broad black or reddish subvertical bands; D with scattered red spots; A with blue or reddish stripe near middle of fin; C with scattered spots and a reddish oblique

stripe ventrally; V with elongate blue spots. Close to *A. fasciata* (Herre, 1953) which has narrower bands and separate V. Indo-West Pacific, south to Sodwana Bay.

Genus ***Amblygobius*** Bleeker, 1874

Gill opening just below P base; V a disc; 10-15 short vertical papillae rows under eye; head pores Type A; filamentous projections on upper part of first gill arch. D VI+I,13-17; A I,12-16; P 18-22; LS 46-69, cycloid or ctenoid. Vertebrae 26. Found on coral reefs. About 15 species; 2 in our area.

KEY TO SPECIES

1a First D margin rounded, 5th spine longest; no dark spot above P base ..... *A. sphynx*
1b First D with middle spines distinctly prolonged; enlarged brown spot above P base ..... *A. albimaculatus*

240.4 *Amblygobius albimaculatus*
(Rüppell, 1830)
PLATE 112

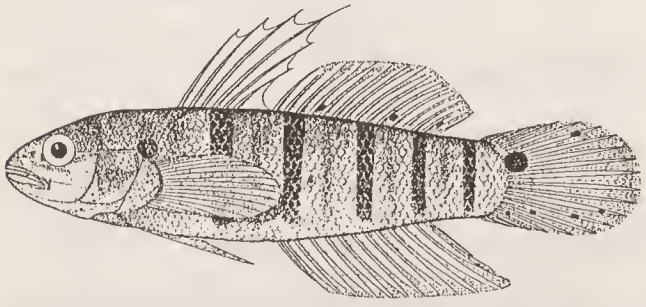
Butterfly goby — Vlinder-dikkop

Gobius albimaculatus Rüppell, 1830: 135 (Red Sea). *Gobius albomaculatus*: Smith, **SFSA No. 933*.** *Amblygobius albimaculatus*: Smith, 1959: 204*; 1960: 308; 1961: 570, **No. 933*.** *Gobius vonbondei* Smith, 1936: 259 Fig. or Pl. (Natal).

D VI+I,13-15; A I,12-14; P 19-21; LS 47-51; TRB 17-20; PD 21-25, to above middle of eye; operculum scaled dorsally; body scales ctenoid.

Males with 3 black spots near base of 2nd D, and small round light spots on cheek. Females with a brown-edged light band from end of upper lip to upper operculum. Attains 18 cm. Red Sea and east Africa to Durban.

A second colour form (not yet recorded from South Africa) from Mozambique and the Seychelles differs in having the C spot farther back, head spotted in both sexes, thinner body bands, a faint black spot on 1st D, and 3-4 pairs of thin black vertical bars on belly in female. This may be a separate species (*semicinctus*), or an intermediate form between *albimaculatus* and the eastern *phalaena*.



240.4 *Amblygobius albimaculatus:* 13.5 cm male holotype of *Gobius vonbondei* (Natal).

240.5 *Amblygobius sphynx*
(Valenciennes, 1837)
PLATE 122

Sphinx goby — Sfinks-dikkop

Gobius sphynx Valenciennes, *in* Cuv. & Val. 1837: 93 (New Guinea). *Gobius stagon* Smith, 1946: 808 (Delagoa Bay); **SFSA No. 932*.** *Amblygobius sphynx*: Smith, 1958: 204*; 1959: 308; 1961: 570, **No. 932*.**

D VI+I,13-15; A I,13-15; P 17-19; LS 46-52; TRB 18-20; PD 18-21, to above end of pupil; operculum scaled dorsally; body scales ctenoid.

Body with 5-7 broad dark bars; black spot dorsally at base of C. Attains 18 cm. Maputo to western tropical Pacific.

Genus ***Amoya*** Herre, 1927

Scales large, ctenoid; longitudinal papillae pattern; gill opening to just below P base; V a disc. A low mental frenum with a transverse row of papillae behind; enlarged outwardly curved tooth each side in outer row of lower jaw. Easily confused with *Yongeichthys* and *Acentrogobius*. D VI+I,8-10; A I,9-11; P 15-19; LS 24-38. Vertebrae 26. Tropical species, typically found in estuaries and bays over fine sand and mud, often in burrows. Several species, one in our area.

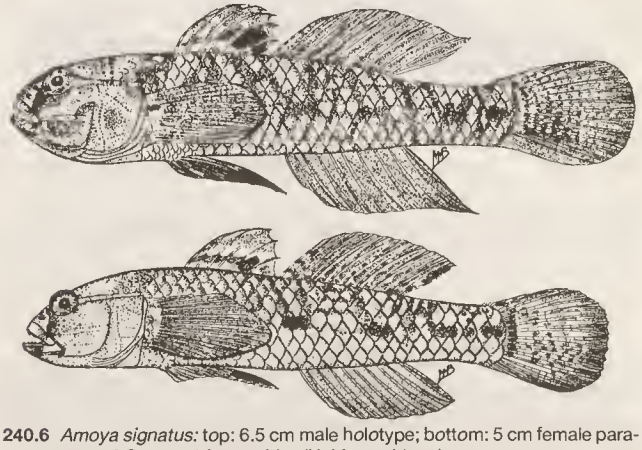
240.6 *Amoya signatus*
(Peters, 1855)

Tusk goby — Slagtand-dikkop

Gobius signatus Peters, 1855: 253 (Mozambique); Smith, **SFSA No. 922.** *Acentrogobius signatus:* Smith, 1959: 202. *Ctenogobius pavidus* Smith, 1959: 196, Figs. 9 & 10 (Palma, Mozambique).

D VI+I,8-9; A I,9; P 15-16; LS 25-27; TRB 8-9; GR (2-4)+(7-9). Midline of predorsal naked; sides scaled to above rear of opercle; P base and breast scaled. An outwardly curved tooth near middle of lower jaw. A single transverse papillae row behind low mental frenum. Closely related to *A. madraspatensis* (Day, 1868).

Sides of body with dark spots about equal to eye along midline; male with dark spot on upper P base; 1st D with a



240.6 *Amoya signatus:* top: 6.5 cm male holotype; bottom: 5 cm female paratype of *Ctenogobius pavidus* (N. Mozambique).

dark stripe near base and a black spot at rear of fin; V with black band just inside outer margin, more intense at rear of fin in male. Attains 5.5 cm. Known only from Mozambique (Palma to Inhaca).

Genus ***Asterropteryx*** Rüppell, 1830

Rear margin of preopercle with 1-9 rounded spines; cheek and operculum with large scales; V separate or united, frenum present or absent; head pores Type A; gill opening equals P base. D VI+I,9-10; A I,8-9; P 16-20; LS 23-26. Vertebrae 26. Sometimes confused with *Oplopomus*, which has stiff 1st spine of both D, and flattened preopercle spines. Found on coral reefs. About 7 species, 1 in our area.

240.7 *Asterropteryx semipunctatus*
Rüppell, 1830
PLATE 122

Starryfin goby — Stervin-dikkop

Asterropteryx semipunctatus Rüppell, 1830: 138, Pl. 34, Fig. 4 (Red Sea); Smith, 1958: 143*; 1961: 570, **No. 937a.**

D VI+I,9-10; A 1,8-9; P 16-18; LS 23-25; TRB 7-8; PD 6-8. Preopercle with 3-9 short spines; V separate; 3rd D spine filamentous.

Colour variable, body tan to almost black with numerous light spots; midside with small elongate dark spots, often with short vertical bars or saddles dorsally. Attains 6.5 cm. Likes dirty water. Indian Ocean, tropical western and central Pacific Ocean, south to Durban.

Genus ***Austrolethops*** Whitley, 1935

Scales completely absent; V I,4, separate; no spine in 2nd D and A; head compressed; gill opening to below mid-operculum; head pores absent; papillae reduced, transverse. One tropical species from coral rubble.

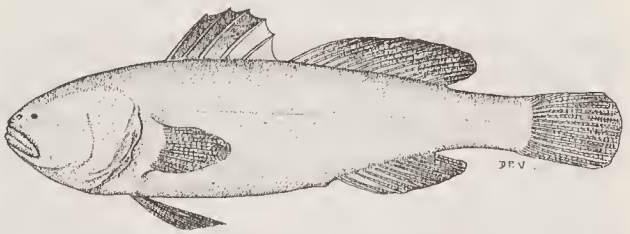
240.8 *Austrolethops wardi*
Whitley, 1935

Nudey goby — Kaaltjie-dikkop

Austrolethops wardi Whitley, 1935: 243, Fig. 10 (Queensland, Australia); Smith, 1958: 155*; 1961: 570, **No. 939a.**

D VI+14-15; A 13-14; P 16-17. Mouth reaches below front to middle of eye.

Body and head brown; 1st D dark; front of 2nd D and A pale, rest of these fins dark; C pale; P light to dusky, often with dark bar along upper ½; V black. Attains 6 cm. Inhaca to Shimoni and Aldabra; Philippines and Great Barrier Reef.



240.8 *Austrolethops wardi:* 6 cm (Kenya).

Genus ***Awaous*** Valenciennes, 1837

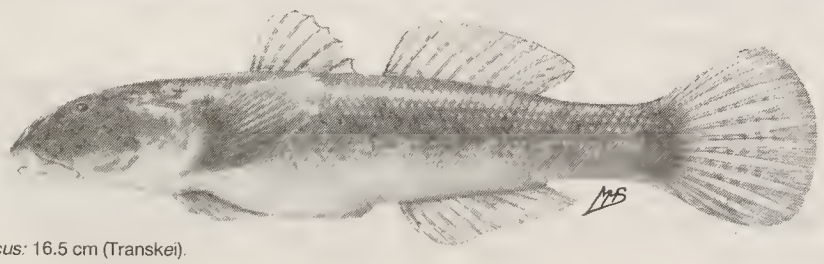
Small finger-like flaps on shoulder girdle; upper lip thick; tongue tip notched or bilobed; interorbital broad; head pore pattern Type B; head papillae pattern transverse; V a disc; gill opening subequal to P base; scales ctenoid. D VI+I,9-11; A I,10-11; P 15-18; LS 45-65. Vertebrae 26. Most easily confused with *Stenogobius*, which has a compressed head and thin upper lip. Often confused with *Platygobius* from Madagascar, which has cheek scales but may be synonymous. Tropical species, primarily found in freshwater and upper parts of estuaries. Few species, one in our area.

240.9 *Awaous aeneofuscus*
(Peters, 1852)
PLATE 122

Freshwater goby — Varswater-dikkop

Gobius aeneofuscus Peters, 1852: 681 (Mozambique); Peters, 1868: 18*; Smith, SFSA **No. 925*.** *Platygobius aeneofuscus*: Smith, 1959: 191*; 1960: 301; 1961: 570, **No. 925*.**

D VI+I,9-11; A I,10-11; P 15-17; LS 50-62; TRB 15-18; PD 23-32. Tongue fused to floor of mouth in adult. Mouth small in female, not reaching eye; male with larger mouth, reaching to below eye. Head broadens with age; tongue and roof of mouth with enlarged papillae. No scales on cheek or operculum.



240.9 *Awaous aeneofuscus:* 16.5 cm (Transkei).

Greenish with irregular blotches along midside and back. Attains 26 cm. Estuaries and freshwaters from Algoa Bay to Zambezi, possibly more widespread.

Genus ***Barbuligobius*** Lachner & McKinney, 1974

Head depressed; numerous elongate barbels on snout, chin and sides of head; interorbital narrow; V a disc, frenum reduced. Head pores Type A; anterior interorbital pore absent; head papillae reduced and obscure. Gill opening equals P base. One species.

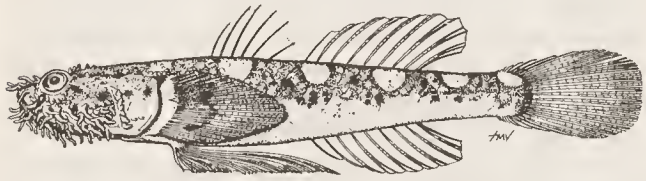
240.10 *Barbuligobius boehlkei*
Lachner & McKinney, 1974

Bearded goby — Baard-dikkop

Barbuligobius boehlkei Lachner & McKinney, 1974: 871, Figs. 1-4 (Taiwan); Hoese & Winterbottom, 1979: 4.

D VI+I,8-9; A I,8-9; P 19-21; LS 23-25; TRB 9-10; PD 0. Vertebrae 26. Body scales ctenoid, none on head or breast.

Body pale white with faint crossbands on back. Burrows in sand adjacent to coral or rock. Widespread in tropical Indo-West Pacific, south to Sodwana Bay.



240.10 *Barbuligobius boehlkei:* 3 cm (Natal).

Genus ***Bathygobius*** Bleeker, 1878

Uppermost P rays free from membrane near tips; a small bump below anterior nostril bordered below by a longitudinal groove; cheek papillae pattern longitudinal; head pores Type A; V a disc; gill opening equals P base; scales cycloid or ctenoid. D VI+I,8-11; A I,7-10; P 16-25; LS 28-50. Vertebrae 27. Easily confused with *Drombus* and *Palutris*, which lack free P rays, and *Monishia* and *Caffrogobius*, which have a transverse cheek papillae pattern. Tropical species, normally found intertidally around coral, rocks, or mangroves. About 25 species, 8 in our area. The specimens referred to *Acentrogobius bontii* (Bleeker) by Smith (1959: 199*; 1961: 570, **No. 921j**) are abnormal specimens of *Bathygobius*.

KEY TO SPECIES

1a Anterior nostrils usually with a small flap; lateral canal behind eye continuous to above end of operculum; cheek with a distinct fold behind upper jaw covering part of papillae 2

1b No flap on nostrils; lateral canal with a detached tube over operculum; cheek without a fold or (rarely) with a low fold 6

2a Scales cycloid; interorbital appears broad; operculum naked; body black ..... *B. niger*

2b Scales ctenoid; interorbital narrow; operculum scaled or naked; body tan to brown 3

3a Operculum scaled; V frenum with a median projection; predorsal scales reach to or near eyes 4

3b Operculum naked; V frenum margin smooth; predorsal scales reach to above rear preopercle margin or mid-opercle 5

4a PD 21-32, extending to between eyes; uppermost P rays with 5-7 branches; adults with scales on cheek ..... *B. cotticeps*

4b PD 12-20, end behind eye; uppermost P rays with 2-4 branches; no scales on cheek ..... *B. cyclopoterus*

5a Mental frenum curved, with long lateral lobes; head distinctly depressed; body of male without longitudinal lines; a small flap on anterior nostril ..... *B. laddi*

5b Mental frenum with straight margin and short lateral lobes; head not much depressed; body with numerous dark longitudinal lines; usually no flaps on nostrils ..... *B.* sp 9

6a Predorsal scales extending forward to above rear preopercular margin; mental frenum distinctly curved with long free lateral lobes; body with elongate midlateral blotches and no large ventral blotches ..... *B. cocosensis*

6b Predorsal scales extending almost to eyes; mental frenum with straight margin, and no or short lateral lobes; body with large irregular-shaped blotches, extending dorsally and/or ventrally from midline 7

7a Snout profile steep; 1st D with a broad black stripe; tips of uppermost 3 P rays free; blotches extending ventrally on body ..... *B. fuscus*

7b Snout profile gently rounded; 1st D with dark spots forming rows; tips of uppermost 4-5 P rays free; blotches on sides not extending ventrally ..... *B. albopunctatus*

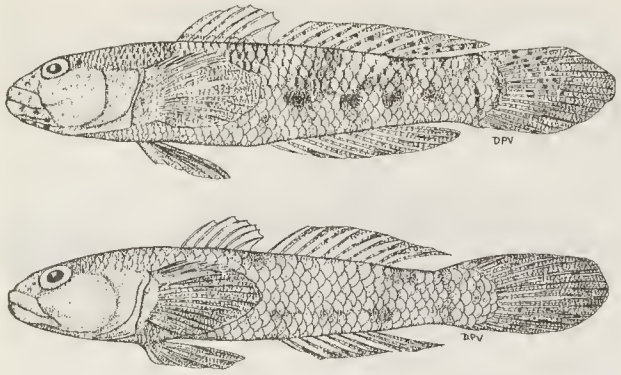
240.11 *Bathygobius albopunctatus*
(Valenciennes, 1837)

Whitespotted goby — Witspikkel-dikkop

Gobius albopunctatus Valenciennes, 1837: 57 (Mauritius). *Bathygobius fuscus*: Smith, 1959: 212 (in part); 1960: 307 (in part).

D VI+I,9; A I,8; P 18-21; LS 31-34; TRB 12-14; PD 15-20. Upper 4 or 5 P rays partly free from membranes; mental frenum broad, without free lobes.

Body brownish, with elongate dark blotches and white spots forming longitudinal rows; 2nd D with black spots forming rows, spots intense along spine; C spots slightly smaller than pupil. Attains 12 cm. Western Indian Ocean, common from Inhaca to Transkei. *B. padangensis* (Bleeker, 1851) may be identical.



240.11 *Bathygobius albopunctatus:* top: 7 cm SL male (Mauritius); bottom: 6.5 cm female (Cosmoledo Id.).

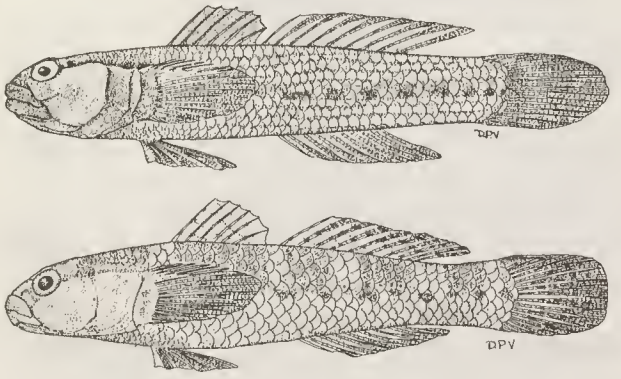
240.12 *Bathygobius cocosensis*
(Bleeker, 1854)

Coco frillgoby — Coco-karteldikkop

Gobius cocosensis Bleeker, 1854: 47 (Cocos Ids., off Australia). *Bathygobius cocosensis*: Akihito & Meguro, 1980: 225*. *Bathygobius fuscus*: Smith, 1959: 212 (in part); 1960: 307 (in part).

D VI+I,9; A I,8; P 18-20; LS 33-35; TRB 10-12; PD 8-12. Upper 3 or 4 P rays free from membrane; prepelvic area scaled; head depressed.

Midsides with about 6-8 elongate black spots; males with numerous longitudinal lines; females mottled; C spots small; horizontal dark line near base of 1st D. Our most abundant species of *Bathygobius*. Attains 5 cm, rarely to 8 cm. Indo-Pacific, south to Transkei.



240.12 *Bathygobius cocosensis:* top: 6 cm SL male; bottom: 3.5 cm SL female (both Transkei).

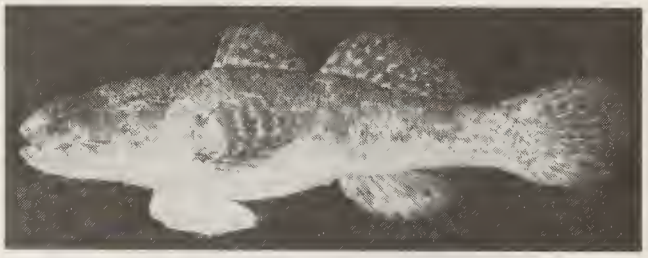
240.13 *Bathygobius cotticeps*
(Steindachner, 1880)

Cheekscaled frillgoby — Wangskub-karteldikkop

Gobius cotticeps Steindachner, 1880: 137 (Society Ids.). *Bathygobius fuscus*: Smith, 1959: 212 (in part); Winterbottom, 1976: 8*. *Bathygobius cotticeps*: Akihito & Meguro, 1980: 229*.

D VI+I,9; A I,8; P 23-24; LS 35-38; TRB 14-16; PD 21-32. Head distinctly depressed; upper 5-7 P rays partly free from membrane; mental frenum curved, with long lateral lobes; prepelvic area scaled.

Head and body brown, with irregular mottling; a broad dark saddle below each D, prominent in young, becoming obscure in large fish; D, P and C with mottling forming bands in young, becoming dusky to black in adults. Common in our area. Attains 11 cm. Indo-Pacific south to Coffee Bay.



240.13 *Bathygobius cotticeps:* 10.5 cm (Natal; photo by J. E. Randall).

240.14 *Bathygobius cyclopterus*
(Valenciennes, 1837)
PLATE 126

Spotted frillgoby — Gespikkelde karteldikkop

Gobius cyclopterus Valenciennes, *in* Cuv. & Val., 1837: 59 (New Ireland). *Bathygobius cyclopterus*: Akihito & Meguro, 1980: 228*; Goren, 1979: 26*.

D VI+I,9; A I,8; P 20-22; LS 31-37; TRB 11-14; PD 12-20. Upper 5 or 6 P rays partly free from membrane. Head distinctly depressed; mental frenum slightly curved with short lateral lobes; prepelvic area scaled.

Head and body brown, often with irregular spotting, D and C with mottling forming bands in females, fins dusky in males. Often with a broad dark saddle below 1st D and another below 2nd D. Easily confused with *B. cotticeps*. Rare in our area. Attains 7 cm. Widely distributed in tropical Indo-West Pacific, south to Transkei.

240.15 *Bathygobius fuscus*
(Rüppell, 1830)
PLATE 122

Dusky frillgoby — Donker karteldikkop

Gobius fuscus Rüppell, 1830: 137 (Red Sea). *Bathygobius fuscus*: Smith, **SFSA No. 910*** (in part), 1959: 212* (in part); 1960: 307 (in part: includes Bazaruto & figured specimen from Pinda); Akihito & Meguro, 1980: 221*.

D VI+I,9; A I,8; P 17-19; LS 29-36; TRB 11-13; PD 13-18. Upper 3 P rays free from membrane; uppermost ray with 2-3 branches; head rounded; body robust; mental frenum with straight margin; prepelvic area scaled; PD scales reach to just behind eye or over mid-preopercle.

D dusky, without small spots, often with a broad stripe. Rare in our area. Attains 8 cm. Indo-Pacific, south to Bazaruto.

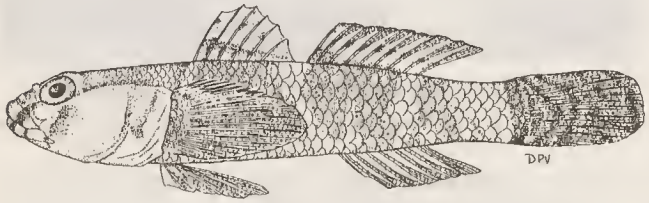
240.16 *Bathygobius laddi*
(Fowler, 1931)

Brownboy goby — Bruin dikkop

Rhinogobius laddi Fowler, 1931: 362, Fig. 6 (Fiji). *Bathygobius fuscus*: Smith, 1959: 212 (in part); Winterbottom, 1976: 8 (in part).

D VI+1,9; A I,8; P 21-24; LS 28-32; TRB 9-11; PD 9-13. Upper 5 or 6 P rays partly free from membranes; head distinctly depressed; mental frenum curved, with long lateral lobes; prepelvic area largely naked.

Males: head and body uniformly dark brown; fins dusky to black. Females: body light brown with 3-4 irregular crossbars; crescentic dark bar at C base; D and C mottled; other fins clear. Attains 5 cm. Common in our area from Inhaca to Coffee Bay, also known from tropical Indo-West Pacific.



240.16 *Bathygobius laddi*: 3 cm SL (Inhaca Id.).

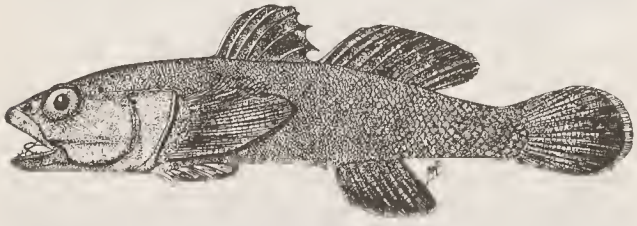
240.17 *Bathygobius niger*
(Smith , 1960)

Black minigoby — Swart dikkoppie

Pyosicus niger Smith, 1960: 312, Fig. 13 (Bizana coast, Pondoland); 1961: 570, **No. 910c.** *Bathygobius niger*: Winterbottom, 1976: 8*.

D VI+1,10; A I,8; P 22-23; LS 48-50; TRB 23-24; PD 14-18. Upper 6 or 7 P rays free from membrane, with 4-7 branches; head very depressed; upper jaw (distinctly) protrudes; mental frenum usually with a straight or slightly curved margin; V frenum with a smooth margin; prepelvic area naked.

Attains 6 cm. Known from Transkei to Natal, also India and Sri Lanka.



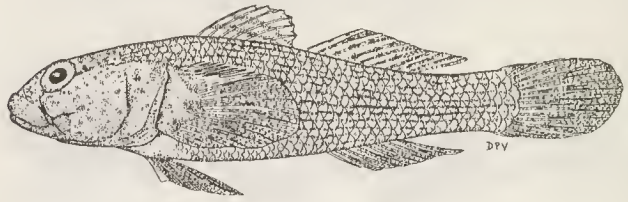
240.17 *Bathygobius niger*: 4 cm holotype (Transkei).

240.18 *Bathygobius* sp. 9
Brownlined goby — Bruinstreep-dikkop

Bathygobius fuscus: Smith, 1959: 212 (in part).

D VI+I,9; A I,8; P 19-21; LS 29-35; TRB 12-13; PD 12-17. Upper 4 or 5 P rays partly free from membranes; mental frenum broad, with short lateral lobes, rarely curved; prepelvic area naked in front.

Body with numerous brown longitudinal lines; 2-3 brown saddles under D; fins and lower surface of head dark brown in male; D, C and P spotted in female. Attains 6.5 cm. Indo-West Pacific (common in Mozambique), south to Xora.



240.18 *Bathygobius* sp. 9: 4 cm SL (Inhaca Id.).

Genus ***Caffrogobius*** Smitt, 1899

Cheek papillae pattern transverse; head pores Type A; lips thick; V a disc; gill opening to just below P base; upper P rays free in some species; mental frenum variably developed. D VI+I,9-14; A I,9-12; P 17-23; LS 33-63. Vertebrae 27. Temperate and subtropical species found in estuaries, tide pools and subtidally. Seven species, 6 in our area.

KEY TO SPECIES

1a Head depressed; anterior nostrils with an elongate flap; 1st D often with a black spot at rear of fin; a broad truncate mental frenum 2
1b Head rounded, anterior nostrils without flap or with a short broad flap; 1st D with stripes; mental frenum low, usually triangular (except in *C. nudiceps*) 3

2a Second D usually I,11; A usually I,10; LS 36-45; prepelvic area naked; oblique comma-shaped mark ventrally at C base; body with 3-5 elongate dark bars laterally ..... *C. agulhensis*
2b Second D usually I,10; A usually I,9; LS 33-37; prepelvic area with some scales; no oblique bar on C base; body with small spots often forming longitudinal stripes and ventral bars ..... *C. saldanha*

3a D VI+1,12-14 (rarely 12); A usually I,11; LS 53-63; pale vertical bar at P base, interrupted dorsally by a longitudinal dark stripe ..... *C. caffer*
3b D VI+1,10-12 (rarely 12); A usually I,9-10; LS 39-52; P base with complete pale vertical bar or no vertical bar 4

4a PD (5-16) to above front of opercle (midline with few scales in fish from Cape region); vertical stripes on body often interrupted along midside; head of adult with numerous dark spots ..... *C. multifasciatus*
4b PD (0-7) naked or with a few scales before 1st D; vertical bars if present not interrupted; no small dark spots on head 5

5a D VI+I,9-10; A usually I,9; P 18-20; P base usually with 2 dark stripes ..... *C. natalensis*
5b D VI+I,11-12; A I,10-11; P 19-23; P base with a pale vertical bar ..... *C. nudiceps*

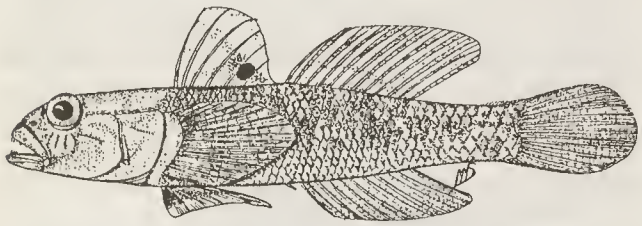
240.19 *Caffrogobius agulhensis*
(Barnard, 1927)

Agulhas goby — Agulhas-dikkop

Gobius agulhensis Barnard, 1927: 821 (False Bay); Smith, **SFSA No. 924*.** *Coryphopterus agulhensis*: Smith, 1960: 308; 1961: 570, **No. 924*.**

D VI+1,10-12; A I,9-11; P 20-22; LS 36-45; TRB 11-13; GR (1-2)+(8-9). Vertebrae 10+17. Predorsal, P base and prepelvic naked, midline of belly naked in young, often scaled in adults; anterior nostrils with a short flap; mental frenum well developed; tips of upper 2-3 P rays free.

Often a black spot at rear of 1st D; males with dusky to black V, A and branchiostegal membranes; prepelvic often dusky. Attains 7.5 cm. East London to False Bay; generally in 15 - 75 m.



240.19 *Caffrogobius agulhensis:* 7.5 cm SL (Transkei).

240.20 *Caffrogobius caffer*
(Günther, 1874)
PLATE 122

Banded goby — Band-dikkop

Gobius caffer Günther, 1874: 453 (Port Elizabeth). *Coryphopterus caffer*: Smith, 1960: 310; 1961: 570, **No. 927b;** Smith & Smith, 1966: 104*.

D VI+I,12-14; A I,10-12; P 19-21; LS 53-63; TRB 18-23; GR 1+(8-9). Vertebrae 11+16. Predorsal scaled laterally to above operculum, midline naked; P base with cycloid scales; prepelvic with a triangular naked patch in front. Anterior nostrils with a broad short flap; mental frenum indistinct.

Body with 8-12 dark vertical bars. Attains 18 cm. Natal to False Bay.

240.20 *Caffrogobius caffer:* 12 cm (Transkei).

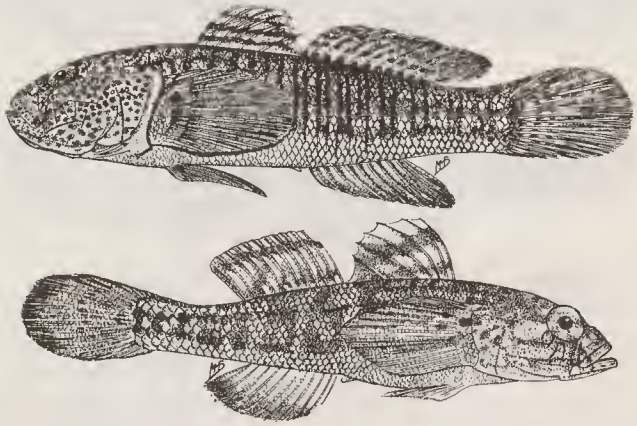
240.21 *Caffrogobius multifasciatus*
(Smith, 1959)

Prison goby — Tronk-dikkop

Acentrogobius multifasciatus Smith, 1959: 199, Fig. 13 (Mozambique Id.). *Coryphopterus multifasciatus*: Smith, 1960: 310*; 1961: 570, **No. 927a.** *Caffrogobius multifasciatus*: Hoese & Winterbottom, 1979: 4.

D VI+I,11-12; A I,9-10; P 17-19; LS 43-52; TRB 14-17; PD 5-16; GR 2+9. Vertebrae 10+17. Predorsal scales to above front of opercle or rear of preopercle; midline sometimes naked in front; P base with cycloid scales; prepelvic partly scaled, a triangular naked patch in front; mental frenum triangular, low. Anterior nostrils without a flap. Head and body robust; head depth subequal to width.

Body with irregular thin vertical dark bars, usually broken along midside, forming 2 broad irregular longitudinal bands; P base dusky, sometimes with a light bar in fish from Cape. Estuaries and rock pools. Attains 15 cm. Mozambique Id. to Table Bay.



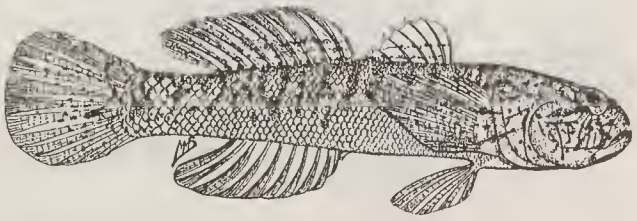
240.21 *Caffrogobius multifasciatus:* top: 11 cm (Knysna); bottom: 4 cm holotype (Mozambique Id.).

240.22 *Caffrogobius natalensis*
(Günther, 1874)

Baldy — Kaalkop

Gobius natalensis Günther, 1874: 453 (Natal). *Coryphopterus natalensis*: Smith, 1960: 309*; 1961: 570, **No. 927c.** *Gobius melanocephalus*: Smith, **SFSA No. 926.**

D VI+I,9-10; A I,9-10; P 18-20; LS 39-47; TRB 13-15; PD 0-3; GR 1+9. Vertebrae 10+17. Predorsal midline naked or with few scales before D origin; sides scaled to above mid-opercle; P base with cycloid scales; prepelvic with naked triangular patch in front. Anterior nostrils without a flap; mental frenum triangular.



240.22 *Caffrogobius natalensis:* 9.5 cm (Knysna).

Body spotted posteriorly; with irregular crossbars anteriorly; D with 2-3 stripes formed by small black spots. Rare. Attains 10 cm. Natal to Knysna.

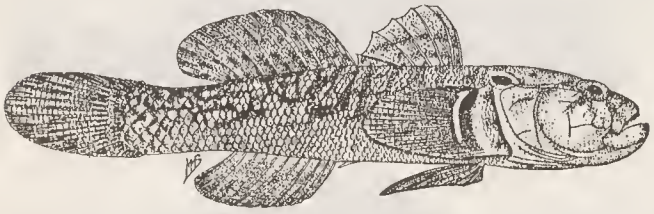
240.23 *Caffrogobius nudiceps*
(Valenciennes, 1827)

Barehead goby — Bles-dikkop

Gobius nudiceps Valenciennes, *in* Cuv. & Val., 1827: 65 (Cape); Smith, SFSA **No. 927.** *Gobius gilchristi* Boulenger, 1898: 8 (Brak River, Cape). *Coryphopterus nudiceps*: Smith, 1960: 309*; 1961: 570, **No. 927.**

D VI+I,11-12; A I,10-11; P 19-23; LS 33-37 (east coast), 43-50 (west coast); TRB 14-17; PD 0-6; GR (2-4)+9. Vertebrae 10+17. Predorsal scaled at sides to above midopercle; midline mostly naked; P base with cycloid scales; prepelvic with naked patch in front. Head rounded; anterior nostrils without a flap; mental frenum low and triangular.

Pale vertical bar at P base bordered in front by a dark bar, more intense dorsally. Attains 14 cm. East London to Cape and north to Walvis Bay.



240.23 *Caffrogobius nudiceps:* 8 cm (Knysna).

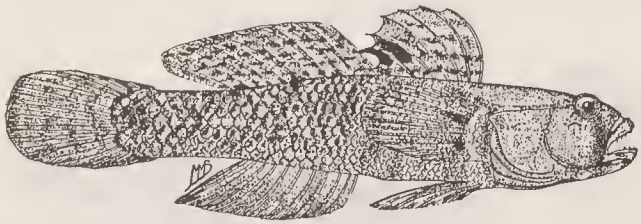
240.24 *Caffrogobius saldanha*
(Barnard, 1927)
PLATE 122

Commafin goby — Kommavin-dikkop

Gobius saldanha Barnard, 1927: 823 (Saldanha Bay). *Bathygobius saldanha*: Smith, SFSA **No. 912*.** *Monishia saldanha*: Smith, 1960: 304. *Ctenogobius cloatus* Smith, 1960: 302, Fig. 1 (Knysna); 1961: 570, **No. 916c;** Smith & Smith, 1966: 105*. *Ctenogobius saldanha:* Talbot & Penrith, 1965: 190*.

D VI+I,9-11; A I,9-10; P 20-22; LS 33-37; TRB 10-12; GR (1-2)+(1-7). Vertebrae 10+17. Predorsal naked; P base with cycloid scales; prepelvic incompletely scaled, naked in young; midline of belly usually scaled, but sometimes with a thin naked area along midline. Anterior nostrils with a short flap; mental frenum well developed; tips of upper 5-7 P rays free.

Body with spots, smaller than pupil, often forming irregular longitudinal rows; 1st D often with a large black spot posteriorly. Large males often with faint vertical bands anteriorly; branchiostegal membrane in front of isthmus with a triangular dark patch; fins, except C, dusky. Attains 12 cm. Saldanha Bay to southern Transkei.



240.24 *Caffrogobius saldanha:* 8.5 cm holotype of *Ctenogobius cloatus* (Knysna).

Genus ***Callogobius*** Bleeker, 1874

Head with large vertical flaps; rear nostrils tubular; V separate, partly connected, or united, frenum present or absent. Head pores Type A or absent, number of pores often reduced; papillae in transverse pattern. Gill opening equals P base. Scales cycloid, ctenoid, or rarely absent (present in our species). D VI+I,9-15 (9-10 in our species); A I,6-13 (6-8 in our species); P 15-19; LS 22-70. Vertebrae 26 or 27. Tropical and subtropical species, found on coral or rocky reefs. Easily confused with *Gobiopsis*, which has longitudinal ridges on side of head. *Mucogobius* is a synonym of *Callogobius*; many species incorrectly placed in *Drombus*. Several species, 4 in our area.

KEY TO SPECIES

1a V separate, no frenum 2
1b V united, frenum present 3

2a A I,7; LS 27-28; all but anterior 3-4 ctenoid; TRB 9-10; body with dark vertical bars contrasting with body colour ..... *C. sclateri*
2b A I,8; LS 33-36; anterior 11-12 cycloid, TRB 13-17; body dark brown without contrasting bars ..... *C. flavobrunneus*

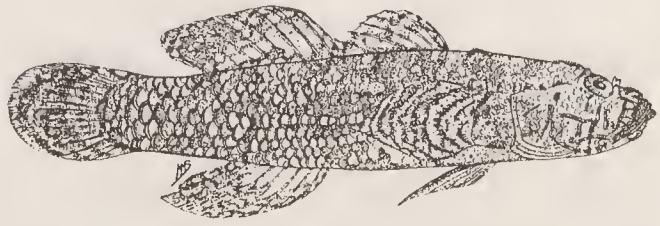
3a LS 7-9 cycloid + 16-17 ctenoid; anterior nostrils short; body with dark bands contrasting with body colour; no prolonged D spines ..... *C. plumatus*
3b LS 3-4 cycloid + 20-22 ctenoid; anterior nostrils elongate; body dark brown to black with numerous small pale spots; 1st 2 D spines often prolonged ..... *C. maculipinnis*

240.25 *Callogobius flavobrunneus*
(Smith, 1958)
PLATE 122

Slimy goby — Slym-dikkop

Mucogobius flavobrunneus Smith, 1958: 145, Fig. 6 & Pl. 1Ic (Pinda); 1961: 570, **No. 938c.** *Callogobius flavobrunneus*: Hoese & Winterbottom, 1979: 4.

D VI+I,10; A I,8; P 15-16; LS 33-36 (anterior 11-12 cycloid, posterior 21-24 ctenoid); TRB 13-17; PD 14-17; GR 0+6. Head pores present dorsally; no preopercular pores; nostrils subequal. No V frenum.



240.25 *Callogobius flavobrunneus:* 6.5 cm holotype (N. Mozambique).

Body dark brown with faint saddles under D; median fins dark, with numerous white spots; P pale, with wavy dark stripes; V clear. Attains 7 cm. Red Sea south to Bazaruto Id. and to Seychelles.

240.26 *Callogobius maculipinnis*
(Fowler, 1918)
PLATE 122

Ostrich goby — Volstruis-dikkop

Drombus maculipinnis Fowler, 1918: 69, Fig. 27 (Philippines). *Drombus irrasus* Smith, 1959: 211, Pl. 10, Fig. E, Fig. 31 (Mahé, Seychelles); 1961: 570, **No. 909a.** *Callogobius irrasus*: Hoese & Winterbottom, 1979: 4.

D VI+I,9; A I,7; P 17-19; LS 22-25; (2-3 cycloid + 20-22 ctenoid); TRB 10; PD 6-7; GR (2-3)+9. Head pores present dorsally; 3 preopercular pores; V frenum well developed.

Transverse papillae rows form black rows on cheek. Attains 6.8 cm. Red Sea south to Bazaruto, Seychelles to western Pacific.

240.26 *Callogobius maculipinnis*: 5 cm holotype of *Drombus irrasus* (Seychelles).

240.27 *Callogobius plumatus*
(Smith, 1959)

Feather goby — Veer-dikkop

Drombus plumatus Smith, 1959: 212, Fig. 32 (Cape Delgado, Mozambique).

D VI+I,9; A I,6-7; P 18-19; LS 23-25 (anterior 7-9 cycloid, posterior 16-17 ctenoid); TRB 9-10; PD 9-10; GR 0+8. Head pores present dorsally plus 3 preopercular pores; V frenum developed.

Head and body tan (white when alive) with dark (black) marks as illustrated. Attains 5 cm. From Kenya to Inhaca, and Cosmoledo.

240.27 *Callogobius plumatus*: 5 cm holotype (N. Mozambique).

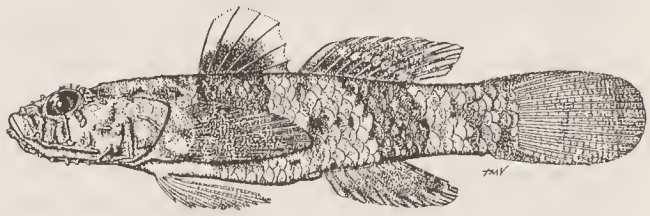
240.28 *Callogobius sclateri*
(Steindachner, 1880)

Pacific goby — Stille oseaan-dikkop

Eleotris sclateri Steindachner, 1880: 157 (Society Ids., Pacific Ocean). *Callogobius sclateri*: Akihito & Meguro, 1977: 120*.

D VI+I,9; A I,7; LS 27-28 (anterior 3-4 cycloid, posterior 23-25 ctenoid); TRB 9; PD 12-13. Head pores present dorsally; no preopercular pores; nostrils subequal; no V frenum.

Dark bar from eye to upper lip, a vertical bar under eye, and a broad band from eye to opercle; vertical bar under 1st D; C with wavy dark stripes. Attains 3 cm. Sodwana Bay and tropical Pacific.



240.28 *Callogobius sclateri*: 3.5 cm SL (Natal).

Genus ***Croilia*** Smith, 1955

Scales completely absent; head compressed; gill opening extends to under end of preopercle; no spine in A or 2nd D; V united, with frenum. Head pores Type A, anterior interorbital pore absent; head papillae pattern longitudinal, rarely visible. One species, restricted to southern Africa.

240.29 *Croilia mossambica*
Smith, 1955

Naked goby — Kaal dikkop

Croilia mossambica Smith, 1955: 106, Fig. 1 (Polela Lake, Inharrime); 1955: 23*; 1959: 186*; 1961: 570, **No. 904a*;** Hoese & Winterbottom, 1979: 4; Bruton, 1980: 232.

D VI,11-12; A 12; P 13-15; GR 4+10. D separate or partly connected by membrane. Tongue emarginate to truncate. Head and body tan with small dark spots dorsally.

Sides of body with 6-10 vertical lines; shorter in young. Margins of D and A often black in large individuals; C with dark oblique bands ventrally; dark bar under eye. Attains 6 cm. Sandy areas of coastal freshwater lakes and estuaries from southern Mozambique to south of Durban.

240.29 *Croilia mossambica*: 4.5 cm SL (Natal).

Genus ***Cryptocentrus*** Valenciennes, 1837

Gill opening reaching to below or just behind end of preopercle; head pores Type A; cheek papillae pattern transverse; D origin behind V origin; V a disc. Scales sometimes ctenoid but more commonly entirely cycloid. D VI+I,9-12; A I,9-11; P 15-19; LS 47-110. Vertebrae 26. Tropical species living in burrows with alphaeid shrimps in mangrove areas, bays and coral reefs. Easily confused with *Amblyeleotris* and *Vanderhorstia*, which are more slender bodied and have a broader gill opening. About 40 species, 3 in our area.

KEY TO SPECIES

1a Body scales largely ctenoid; large dark ocellus below 1st D ..... *C. strigilliceps*
1b Body scales entirely cycloid; no large dark spot on body below 1st D 2

2a Lower operculum with a ventrally directed spine; body with 7-9 dark bars; 1st D low ..... *C. cryptocentrus*
2b Operculum without a spine; body with scattered light spots; 1st D elongate ..... *C. pretoriusi*

240.30 *Cryptocentrus cryptocentrus*
(Valenciennes, 1837)
PLATE 122

Eightbar goby — Agbalk-dikkop

Gobius cryptocentrus Valenciennes, *in* Cuv. & Val., 1837: 111, Fig. 346 (Red Sea). *Cryptocentrus octofasciatus*: Smith, **SFSA No. 914*;** 1959: 193*; 1960: 303. *Cryptocentroides cryptocentrus*: Smith, 1959: 213*.

D VI+I,10; A I,9; P 16-17; LS 71-84; TRB 28-33; PD 0-18; GR (1-2)+(11-13). P base and prepelvic with a few scattered cycloid scales; PD scales to above middle of preopercle (east Africa south to Natal), or with few or no scales on midline (Seychelles, Aldabra and Chagos); D spines 2 & 3 longest, sometimes slightly prolonged.

Head with numerous small blue spots. Attains 9 cm. May be confused with *C. lutheri* Klausewitz (1960) (not yet recorded from our area), which lacks the opercular spine and has PD scales reaching to eyes.

240.31 *Cryptocentrus pretoriusi*
Smith, 1958

Sailfin goby — Seilvin-dikkop

Cryptocentrus pretoriusi Smith, 1958: 127, Fig. 2 (Pondoland); 1959: 193*; 1960: 303*; 1961: 570, **No. 914a*.**

D VI+I,11; A I,11; P 17; LS 96; GR 2+15. Gill opening to rear preopercular margin. Midline of nape naked; sides scaled to above end of operculum. Breast and P base naked.

Head and body brown; head and front of body with irregular small blue ocelli, a series of similar spots along body above midline; 1st D with a large ocellus, near base anteriorly. Attains 7.5 cm. Known only from Pondoland, South Africa.

240.31 *Cryptocentrus pretoriusi*: 6 cm SL holotype (Transkei).

240.32 *Cryptocentrus strigilliceps*
(Jordan & Seale, 1906)
PLATE 122

Target goby — Teiken-dikkop

Mars strigilliceps Jordan & Seale, 1906: 408, Fig. 95 (Samoa). *Obtortiophagus koumansi*: Smith, 1959: 194*; 1961: 570, **No. 931a.** *Cryptocentrus strigilliceps*: Hoese & Winterbottom, 1979: 4.

D VI+I,9-10; A I,9-10; P 16-17; LS 47-53 (14-16 cycloid + 32-37 ctenoid); TRB 17-18; PD 11-17; GR (3-4)+(10-12). P base and prepelvic area with a few scattered cycloid scales; PD scales to above middle of operculum; 2nd and 3rd D spines slightly prolonged in adult.

Body with broad oblique dark bars; 4 large dark round spots along midside; head with irregular mottling and thin bands ventrally. Attains 5 cm. Widespread in tropical Indo-West Pacific, south to Bazaruto.

Genus ***Drombus*** Jordan & Seale, 1905

Mandibular frenum present; head papillae in transverse pattern; head pores Type A; gill opening equals P base; no free P rays; V a disc. D VI+I,9-10; A I,8-11; P 16-19; LS 27-31. Vertebrae 26. Predorsal scaled. Easily confused with *Bathygobius*, which has the upper P rays free and a longitudinal head papillae pattern. About 10 tropical species inhabiting mangroves and coastal bays; 2 species in our area.

KEY TO SPECIES

1a D VI+I,9; A I,8; body depth at A origin 5.5-6.5 in total length ..... *D. key*
1b D VI+I,10; A I,9; body depth 6.5-7.5 ..... *D. simulus*

240.33 *Drombus key*
(Smith, 1947)

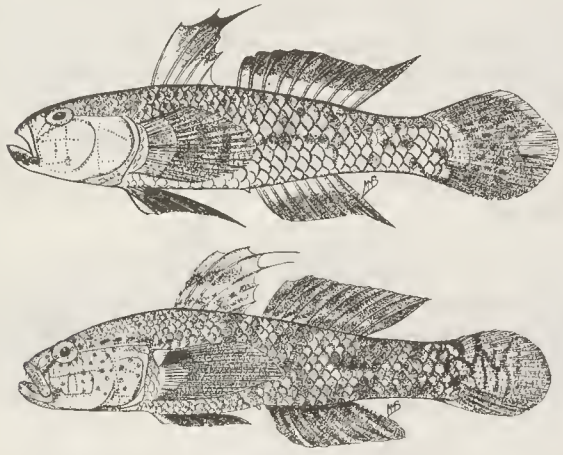
Key goby — Sleutel-dikkop

Gobius key Smith, 1947: 807 (Inhaca); **SFSA No. 916*.** *Ctenogobius key:* Smith, 1959: 195*; 1960: 301; 1961: 570, **No. 916.** *Drombus key:* Hoese & Winterbottom, 1979: 4. *Acentrogobius triangularis* (*non*

Weber): Smith, 1959: 199*; 1960: 307*, 1961: 507, **No. 921b***. *Drombus triangularis* (*non* Weber): Hoese & Winterbottom, 1979: 4.

D VI+I,9; A I,8; P 16-18; LS 25-28; TRB 10-11; PD 14-16; GR (1-2)+(6-8). Third and fourth dorsal spines longest, prolonged in adult.

Colour dark brown, with dark mottling as shown. A white spot dorsally on pectoral base. Attains 7 cm. Seychelles to Delagoa Bay.



240.33 *Drombus key:* top: 6 cm holotype (Inhaca Id.); bottom: 6 cm (S. Mozambique).

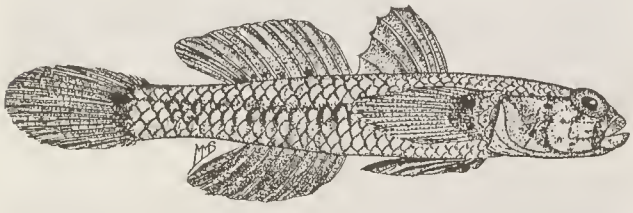
240.34 *Drombus simulus*
(Smith, 1960)

Pinafore goby — Voorskoot-dikkop

Acentrogobius simulus Smith, 1960: 307, Fig. 6 (Delagoa Bay); 1961: 570, **No. 921e.**

D VI+I,10; A I,9; P 16-17; LS 26-28; TRB 7-8; PD 12-14; GR 1+7. P base with large scales; prepelvic scaled. No P rays free.

Body yellowish brown, with irregular faint dark mottling. Attains 3.5 cm. Known only from Delagoa Bay in tide pools.



240.34 *Drombus simulus:* 3.5 cm holotype (Delagoa Bay).

Genus ***Eviota*** Jenkins, 1903

Very small fishes. V separate, the rays with short fringe-like multiple lateral branches; gill opening equals P base; head compressed; teeth in outer row of upper jaw enlarged; head pores Type A, often reduced; sensory papillae reduced, transverse pattern, often not visible. Size 1.2-2.8 cm. D VI+I,7-11; A I,6-10; P 13-19; V I,4-5; LS 21-26. Vertebrae 25 or 26. Most easily confused with *Trimma*, which has smaller teeth, no head pores and a broader gill opening. About 64 species, found on coral reefs; 2 species in our area, but many others can be expected.

KEY TO SPECIES

1a Each V ray largely separate; large dark spots on C peduncle; 1 or 2 black spots behind eye ..... *E. prasina*
1b V rays joined by membrane; no large dark spots on C peduncle or behind eye ..... *E. albolineata*

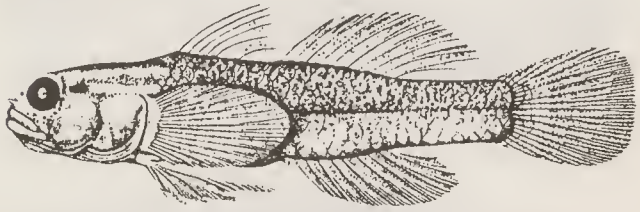
240.35 *Eviota albolineata*
Jewett & Lachner, 1983

Spotted fringefin goby — Gespikkelde fraiingvin-dikkop

Eviota albolineata Jewett & Lachner, 1983: 783, Figs. 1-2 (Tahiti).

D VI+I,8-9; A I,8; P 15-18; LS 22-24; TRB 6-7. Some P rays branched; 2 preopercular pores, pores around eye and a pore above end of preopercle.

Back with numerous small black spots; 7 subcutaneous dark spots along A base to C base; 1st 1 or 2 D spines filamentous in males. Attains 2.8 cm. Indo-West Pacific, south to Inhaca.

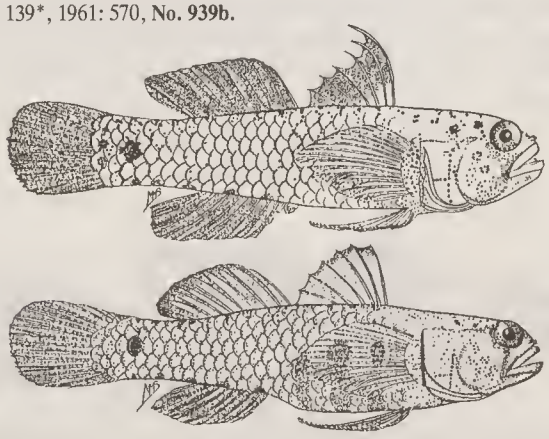


240.35 *Eviota albolineata:* 2.5 cm male (after Jewett & Lachner, 1913).

240.36 *Eviota prasina*
(Klunzinger, 1871)
PLATE 123

Greenbubble goby — Groenblaas-dikkop

Eleotris prasina Klunzinger, 1871: 481 (Red Sea). *Eviota verna* Smith, 1958: 139*, 1961: 570, **No. 939b.**



240.36 *Eviota prasina:* top: 2.5 cm male holotype (Aldabra Id.); bottom: 2 cm female paratype of *E. verna.*

D VI+I,9-10; A I,8; P 15-18; LS 23-25; TRB 6-8. Some P rays branched. Two preopercular pores, pores around eye, none above end of preoperculum.

Five subcutaneous spots along A base to C base. Attains 2.5 cm. Recorded from Bazaruto northwards; widespread in Indian Ocean and western tropical Pacific.

Genus ***Favonigobius*** Whitley, 1930

Gill opening extending to below mid-operculum; scales ctenoid, none on opercle or preopercle; V a disc; head pores Type A; papillae pattern longitudinal (multiple longitudinal in our species); tongue truncate. D VI+I,7-10; A I,7-10; P 14-18; LS 24-31. Vertebrae 26. Easily confused with *Silhouettea,* which has A I,13 and a broader gill opening; also similar to *Fusigobius*. About 10 species, found in sandy areas around mangroves and coral reefs; 2 species in our area.

KEY TO SPECIES

1a Body scales to above mid-opercle; prepelvic completely scaled in 6-8 rows; branchiostegal membranes pale, meeting on isthmus below edge of eye ..... *F. reichei*

1b Body scales to above end of opercle; prepelvic usually with a naked area anteriorly, scales in 4-6 rows; branchiostegal membranes meet on isthmus below rear of preopercle; membranes black or dusky anteriorly at sides of isthmus in adult ..... *F. melanobranchus*

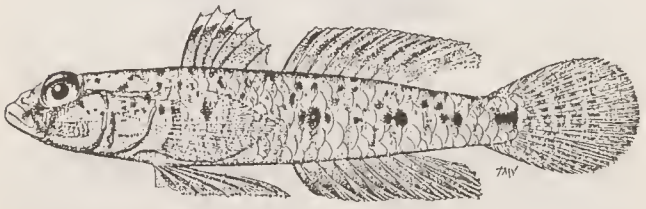
240.37 *Favonigobius melanobranchus*
(Fowler, 1934)

Blackthroat goby — Swartkeel-dikkop

Rhinogobius melanobranchus Fowler, 1934: 82, Figs. 24 & 25 (Bali).

D VI+1,8-9; A I,8-9; P 15-17; LS 26-29; TRB 7-8; PD 0; 2-3 at side of nape; GR 1+(7-8). Snout steep in lateral view, bar from eye to upper jaw at an angle of about 60° with body axis.

Body with numerous small spots; midside with 4 or 5 slightly enlarged groups of black spots, last spot on C peduncle often paired, with a thin vertical bar at base of C. Males often with 6-8 dark vertical lines on belly and lower side; D, A and V dusky to black; upper margin of C with 1 or 2 black spots, rest of fin with thin wavy bars. Females with all fins except V spotted. Attains 4 cm. Indo-West Pacific, south to Natal.



240.37 *Favonigobius melanobranchus:* 3 cm (Natal).

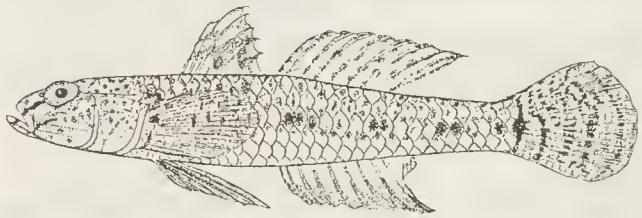
240.38 *Favonigobius reichei*
(Bleeker, 1953)
PLATE 122

Tropical sand goby — Tropiese sand-dikkop

Gobius reichei Bleeker, 1853: 509 (Padang, Indonesia). *Rhinogobius robinsoni* Fowler, 1934: 428, Fig. 13 (Natal). *Acentrogobius reichei*: Smith, 1959: 201*; 1961: 570, **No. 921c**. *Acentrogobius neilli* (*non* Day): Smith, 1959: 200*.

D VI+I,8; A I,7-8; P 16-17; LS 25-26; TRB 7-8; PD 0-4; side of nape 7-8; GR 1+(6-8). Snout gently sloping; bar from eye to upper jaw at an angle of about 40° with body axis; 2nd D spine sometimes prolonged in large males.

Body with numerous small spots; midside with 4 or 5 slightly enlarged groups of black spots, last spot on peduncle often paired, without a vertical extension; median fins spotted, other fins pale. In large males V, A and 1st D dusky. Attains 6.5 cm. Indo-West Pacific, south to Natal.



240.38 *Favonigobius reichei:* 5 cm (Seychelles).

Genus ***Fusigobius*** Whitley, 1930

Eyes elevated; gill opening equals P base; first gill arch partly closed; V separate or united, frenum present or absent; head pores Type A; papillae pattern reduced transverse; scales ctenoid; operculum scaled or naked. D VI+I,9-10; A I,9-10; P 17-20; LS 23-25. Vertebrae 26. Easily confused with *Favonigobius*, which has a slightly broader gill opening and P rays 14-18. About 10 species, found only in sandy areas on coral reefs; 3 species in our area.

KEY TO SPECIES

1a Nape largely naked; 1st D with an anterior and a posterior enlarged black spot ..... *F. duospilus*

1b Nape scales to near eye; 1st D with a large black spot anteriorly, or no enlarged spots 2

2a First 2 D spines distinctly prolonged in adult; 2 lateral canal pores above preopercle margin; C peduncle with a large median round spot; P rays usually 19-20 ..... *F. longispinus*

2b No prolonged D spines; 3 lateral canal pores above preopercle; C peduncle with a dark vertical bar followed by a small elongate spot; P rays 18 ..... *F. neophytus*

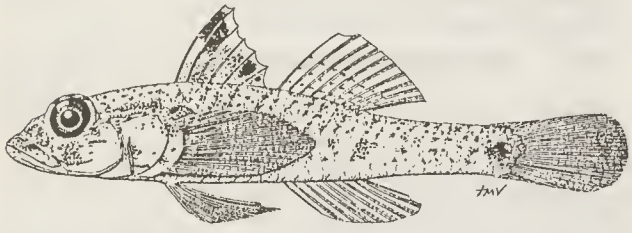
240.39 *Fusigobius duospilus*
Hoese & Reader, 1985

Barenape goby — Kaalhoof-dikkop

Fusigobius neophytus africanus Smith, 1959: 208 (in part, Pinda and Aldabra). *Fusigobius duospilus* Hoese & Reader, 1985: 2, Figs. 1 & 2 (Escape Reef, Queensland, Australia).

D VI+I,9; A I,8; P 18-20; LS 23-25; TRB 7-8; GR 1+(5-6). Lower ½ of 1st gill arch joined to gill cover; V partly connected, membrane often torn; frenum rudimentary. Two lateral canal pores over preopercle and a tube over opercle.

Body with dark dots in longitudinal rows; peduncle with spot much smaller than pupil diameter. Attains 6 cm. Indo-West Pacific, south to Sodwana Bay.



240.39 *Fusigobius duospilus:* 3 cm SL paratype (Natal).

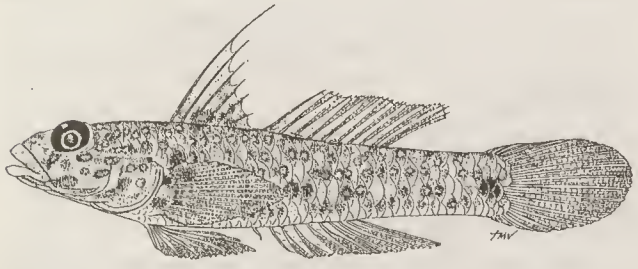
240.40 *Fusigobius longispinus*
Goren, 1978

Longspine goby — Langstekel-dikkop

Fusigobius longispinus Goren, 1978: 201, Fig. 7 (Elat, Red Sea); 1979: 38*.

D VI+I,9; A I,7-8; P 18-20; LS 24-26; TRB 7; PD 6-8; GR (0-1)+(6-7). Lower ¼ of 1st gill arch connected to gill cover; V normally united, sometimes partly separate in female, frenum often low; PD scales ctenoid posteriorly, cycloid near eye; first 2 D spines only slightly prolonged in small females.

Elongate ocellated spots forming oblique rows on head; a series of small dark spots along midside. Ocellated spots on body arranged in 3 or 4 longitudinal rows. A faint blotch above P base. Attains 8 cm. Red Sea, Mauritius, Seychelles, Kenya to Durban; probably more widespread.



240.40 *Fusigobius longispinus:* 6 cm SL (Inhaca Id.).

240.41 *Fusigobius neophytus*
(Günther, 1877)
PLATE 123

African fusegoby — Afrikaanse smeltdikkop

Gobius neophytus Günther, 1877: 174, Pl. 108, Fig. E (Tahiti, Ponape, Huahine). *Fusigobius neophytus africanus* Smith, 1959: 208 (in part), Pl. 11F (Ibo). *Fusigobius africanus*: Smith, 1961: 570, **No. 912b.**

D VI+I,9; A I,8; P 18; LS 22-24; TRB 7; PD 5-6 (at side of nape); GR 1+(6-7). Lower ¼ of 1st gill arch connected to gill cover; V united, but frenum very low; predorsal midline naked; 1 scale on opercle.

Small black spot between 1st 2 D spines; body with numerous small dark spots. Attains 7.5 cm. Indo-Pacific south to Bazaruto.

Genus ***Glossogobius*** Gill, 1862

Snout elongate; head depressed; gill opening from below rear of preopercle to below eye. Tongue bilobed; maxilla reaching to below front ½ of eye; head pores Type A; cheek papillae pattern longitudinal (transverse in one species); GR poorly developed; V form disc; scales ctenoid; operculum and cheek naked. D VI+I,7-11; A I,7-9; P 14-22; LS 25-35. Vertebrae 27-29 (27 in our area). Juveniles easily confused with *Favonigobius*, which has a truncate tongue and a small mouth, reaching to below front of eye. About 20 species found in tropical/subtropical freshwater and estuaries; 3 species in our area.

KEY TO SPECIES

1a Branchiostegal membranes form a free fold across isthmus; body dark with many longitudinal lines and saddles on back; iris with a lappet dorsally covering part of pupil ..... *G. biocellatus*
1b Branchiostegal membranes attached to sides of isthmus; body pale, without longitudinal lines, sometimes with saddles; iris without a lappet 2

2a PD scales 15-19, reaching to eyes; body with 5 or 6 large dark blotches; P 19-20; (attains 50 cm) ..... *G. giuris*
2b PD scales 0-13, not reaching in front of end of preopercle; body with 6-10 small X-shaped dark marks; P 14-19; (attains 12 cm) ..... *G. callidus*

240.42 *Glossogobius biocellatus*
(Valenciennes, 1837)

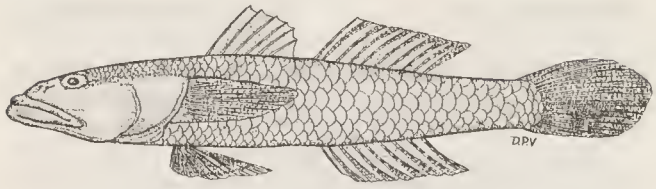
Sleepy goby — Vaak dikkop

Gobius biocellatus Valenciennes, 1837: 73 (Pondicherry, India). *Glossogobius giuris* (*non* Hamilton-Buchanan): Smith, 1959: 214 (in part). *Glossogobius biocellatus*: Hoese & Winterbottom, 1979: 4.

D VI+I,9; A I,8; P 17-19; LS 25-33; TRB 8-10; PD 13-16; GR 1+(7-8), rudimentary PD scales to just behind eye.

Body dark brown to black; with small black spots in longitudinal rows; 2 or 3 broad saddles on back and side; 1st D

black; V with dark crossbands. Estuarine. Attains 10 cm. Indo-Pacific, south to East London.



240.42 *Glossogobius biocellatus*: 7.5 cm SL (Seychelles).

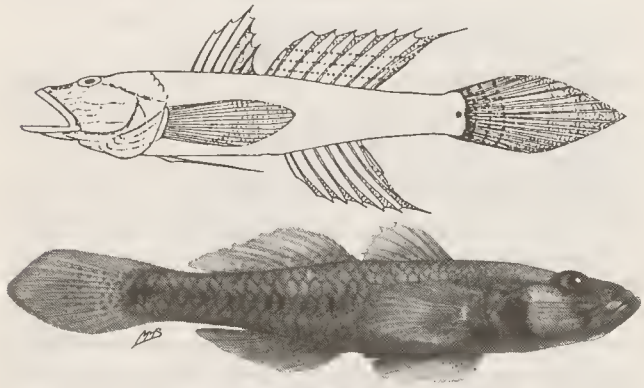
240.43 *Glossogobius callidus*
(Smith, 1937)
PLATE 123

River goby — Rivier-dikkop

Gobius gulosus Smith, 1936: 49 (Bushman's River, Alicedale; preoccupied). *Gobius callidus* Smith, 1937: 197 (replacement for *Gobius gulosus* Smith). *Gobius giuris* (*non* Hamilton-Buchanan): Smith, **SFSA No. 919*** (in part). *Glossogobius giuris*: Smith, 1959: 214* (in part); 1960: 311 (in part); 1961: 570, **No. 919;** Bruton, 1980: 232* (in part). *Glossogobius callidus*: Hoese & Winterbottom, 1979: 4.

D VI+1,8-10; A I,7-9; P 14-19; LS 28-32; TRB 8-9; GR (1-3)+(11-13). short and thin. Cheeks becoming bulbous in large individuals.

D with some spotting, but spots not prominent along front edge of 2nd D; a thin dark stripe from eye to upper lip; enlarged vertical bar or spot at C base. A dark stripe appears near base of 1st D in summer. Close to *G. minutus* Geevarghese and John, 1983. Attains 12 cm. Aldabra, Mozambique, south to Port Elizabeth.



240.43 *Glossogobius callidus*: top: 9 cm holotype (Bushman's River); bottom: 10.5 cm (Sundays River, Algoa Bay).

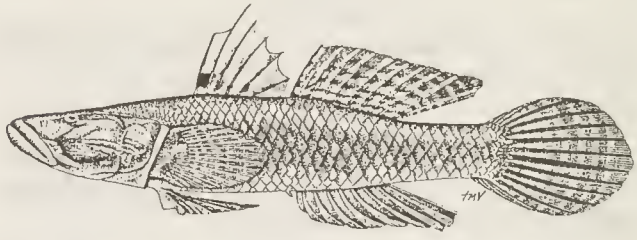
240.44 *Glossogobius giuris*
(Hamilton-Buchanan, 1822)

Tank goby — Tenk-dikkop

Gobius giuris Hamilton-Buchanan, 1822: 51, Pl. 33 (Gangetic provinces, India); Smith, **SFSA No. 919** (in part). *Glossogobius tenuiformis* Fowler, 1934: 496, Fig. 49 (Zululand). *Glossogobius giuris*: Smith, 1959: 214 (in part); 1960: 311 (in part); 1961: 570, **No. 919** (in part); Hoese & Winterbottom, 1979: 4; Bruton, 1980: 232* (in part).

D V1+1,9; A I,8; P 19-20; LS 29-33; TRB 9-10; GR (1-2)+9, short and stubby.

D with small spots forming longitudinal stripes, spots darkest along spine of 2nd D. Primarily freshwater. Attains 50 cm. Indo-West Pacific, south to Port St. Johns.



240.44 *Glossogobius giuris*: 23.5 cm (Natal).

Genus ***Gnatholepis*** Bleeker, 1874

Mouth terminal or subinferior; cheek and opercular scales large; head pores Type B, with 2 anterior interorbital pores; papillae pattern transverse. Gill opening equals P base. V a disc. Scales ctenoid. D VI+I,11; A I,11; P 15-18; LS 24-31. Vertebrae 26. Dark spot above P base, and a dark vertical bar from under eye. Easily confused with *Istigobius*, which lacks cheek and opercular scales and has a single anterior interorbital pore. Several species, found in tropical areas on sand and coral reefs; 2 species in our area; *Gnatholepis* is in need of revision, and the species names are uncertain.

KEY TO SPECIES

1a Prepelvic scales extending to under eye; P 15-16; body depth at V origin 4.3-5.0 in total length; head scales largely ctenoid; stripe from eye extends onto underside of head; a short bar behind mouth on lower surface of head ..... *Gnatholepis* sp. 1

1b Prepelvic scales ending below end of preopercle; P 17-18; body depth at V origin 5.3-6.0 in total length; head scales largely cycloid; stripe from eye extends slightly onto underside of head; no second stripe behind jaws ventrally ..... *Gnatholepis* sp. 2

240.45 *Gnatholepis* sp. 1
PLATE 123

Weeper — Huiler

Gobius capistratus: Smith, **SFSA No. 931*** (in part). *Acentrogobius caurensis*: Smith, 1959: 202* (in part; Pl. 11c); 1960: 307 (in part); 1961: 570, **No. 931** (in part).

D VI+I,11; A I,11; P 15-16; LS 25-28; TRB 10-11; PD 10-11. Cheek scales extend forward to in front of eye; ctenoid in rear, cycloid in front; P base scales cycloid and ctenoid; opercular scales ctenoid; PD scales cycloid on midline, ctenoid at sides.

Body yellow to brown, often with longitudinal dark lines and irregular blotches along midside; spot above P base

elongate and diffuse, often indistinct. Attains 11 cm. Western Indian Ocean, south to Transkei; possibly in Pacific.

240.46 Gnatholepis sp. 2
PLATE 123

Slender weeper — Slank huiler

Gobius capistratus: Smith, **SFSA No. 931** (in part). *Acentrogobius caurensis*: Smith, 1959: 202 (in part, Pl. 11D); 1961: 307 (in part); 570, **No. 931** (in part).

D VI+I,11; A I,11; P 17-18; LS 23-25; TRB 9-10; PD 9-11. Cheek scales extend forward to just behind front edge of eye; cheek, opercle and nape with cycloid scales; P base with cycloid and ctenoid scales.

Body pale white to yellow, often with dark longitudinal lines dorsally and faint blotches along midside; a large diffuse spot above P base. Attains 6 cm. Indo-Pacific, south to Sodwana Bay.

Genus ***Gobiodon*** Bleeker, 1856

Head and body compressed; scales absent (present on caudal peduncle of some extralimital species). V small, united. Head pores Type A; sensory papillae reduced, often not visible. Gill opening equal to or less than P base. A VI+I,10-13; A I,8-11; P 15-20. Vertebrae 26. About 15 species, found in tropical waters among branches of coral (mainly *Acropora*); 2 species in our area.

KEY TO SPECIES

1a Front of 1st D elevated; gill opening ends opposite 7th or 8th ray from bottom of P; lips thin, width about 4 in suborbital; eye subequal to or greater than suborbital; usually a black spot at upper end of opercular membrane; 2-4 vertical stripes on head, none on body ..... *G. citrinus*

1b First D margin rounded; gill opening ends opposite 3rd or 4th P ray from bottom; lips thick, width about 2 in suborbital; eye less than suborbital; no black opercular spot; usually more than 4 vertical stripes on head, and several on body ..... *G. rivulatus*

240.47 *Gobiodon citrinus*
(Rüppell, 1830)
PLATE 123

Coralgoby — Koraaldikkop

Gobius citrinus Rüppell, 1830: 139, Pl. 32, Fig. 4 (Red Sea). *Gobiodon citrinus*: Smith, 1959: 219*; 1961: 570, **No. 905a.**

D VI+I,10; A I,8-9; P 17-19. Several enlarged teeth in innermost row of lower jaw.

Attains 6 cm. Indo-West Pacific, south to Delagoa Bay.

240.48 *Gobiodon rivulatus*
(Rüppell, 1830)
PLATE 123

Rippled coralgoby — Gerimpelde koraaldikkop

Gobius rivulatus Rüppell, 1830: 136 (Red Sea). *Gobiodon citrinus* (*non* Rüppell): Smith, **SFSA No. 905***. *Gobiodon rivulatus*: Smith, 1959: 219*; 1961: 570, **No. 905.**

D VI+I,10-11; A I,8; P 19-21. A pair of enlarged teeth in inner row of lower jaw.

Attains 5 cm. Indo-West Pacific, south to Sodwana Bay.

Genus ***Gobiopsis*** Steindachner, 1860

Head broad, depressed, with small barbels on lower surface and sides; horizontal fleshy fold on mid-cheek; interorbital narrow. V a disc. Head pores absent or Type A; no postorbital pore; sometimes other pores reduced; head papillae in longitudinal pattern. Gill opening to, or slightly below P base. Tongue tip rounded. Scales cycloid or ctenoid. D VI+I,10-11; A I,9-10; P 18-23; LS 32-60. Vertebrae 26. Superficially similar to *Callogobius*, which lacks barbels and has transverse folds on head. Thirteen species found in tropical waters around rocks, coral or mangroves; 1 species in our area.

240.49 *Gobiopsis pinto*
(Smith, 1947)
PLATE 123

Snakehead goby — Slangkop-dikkop

Abranches pinto Smith, 1947: 813 (Delagoa Bay, Mozambique); **SFSA No. 909***; 1959: 211*; 1960: 305. *Gobiopsis pinto*: Lachner & McKinney, 1978: 16*.

D VI+I,10-11; A I,9; P 20-21; LS 50-60; TRB 20-26. Body scales cycloid. Upper jaw 15-22% SL, reaching to under middle of eye or beyond. Head pores present.

Attains 6.5 cm. Known only from Delagoa Bay, beneath stones in tide pools in muddy areas.

Genus ***Hetereleotris*** Bleeker, 1874

First gill slit closed by membrane; anterior and posterior nostrils tubular; cheek papillae pattern transverse; head pores Type A or absent; interorbital and preopercular pores absent. Gill opening equals P base. V united. D VI+I,8-13; A I,7-12; P 15-19; LS 0-52; vertebrae 10+17. Easily confused with *Monishia* and *Corygalops* which have an open first gill slit. About 16 species found in tropical/subtropical areas around coral and rocky reefs; rare outside Indian Ocean; 6 species in our area.

KEY TO SPECIES

1a Body scales begin under 1st D 2
1b Body completely naked or with a few scales on C peduncle 4

2a Scales ctenoid; V partly or completely connected; frenum low; D VI+I,9 ..... *H. zanzibarensis*
2b Scales cycloid; V completely separate; D VI+I,11-12 3

3a Scales small and embedded, LS 35-48; one dark vertical bar below 1st D; head pores present ..... *H. zonata*
3b Scales large; LS 28-30; about 6 dark vertical bars on body; no head pores ..... *H. margaretae*

4a Elongate tentacle over eye (rear nostrils an elongate tube) ..... *H. tentaculata*
4b No tentacle over eye 5

5a No head pores; nostrils subequal; C peduncle with a few ctenoid scales; operculum with 2 D spines; D VI+I,10-11 ..... *H. apora*
5b Head pores present; rear nostrils about twice length of anterior nostrils; peduncle naked; operculum without spines; D VI+I,12-13 ..... *H. caminata*

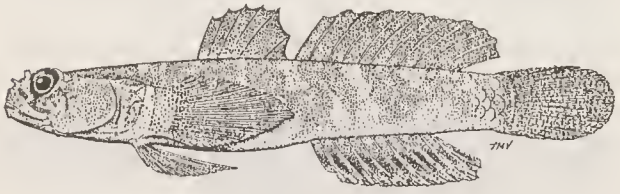
240.50 *Hetereleotris apora*
(Hoese & Winterbottom, 1979)

Poreless goby — Gaatjievry dikkop

Lioteres aporus Hoese & Winterbottom, 1979: 2, Figs. 1 & 2 (Sodwana Bay, Natal). *Hetereleotris aporus*: Akihito & Meguro, 1981: 336.

D VI +I,10-11; A I,10-11; P 15-16; V I,4. LS 3-5.

Head and body with 8 diffuse dark saddles dorsally. Attains 3 cm. Sodwana Bay, St. Brandon's Shoals and Chagos Archipelago.



240.50 *Hetereleotris apora:* 2 cm SL (Natal).

240.51 *Hetereleotris caminata*
(Smith, 1958)

Mourner — Roudraer

Lioteres (*Lioteres*) *caminatus* Smith, 1958: 156, Fig. 11 (Shimoni); 1961: 570, **No. 944d.** *Hetereleotris caminatus*: Akihito & Meguro, 1981: 336.

D VI+I,11-13; A I,9-11; P 17-18; V I,5. D connected basally.

Body brownish with several incomplete dark vertical bars. Attains 4 cm. Shimoni to Bazaruto.

240.51 *Hetereleotris caminata:* 4 cm holotype (Kenya).

240.52 *Hetereleotris tentaculata*
(Smith, 1958)

Locusthead — Sprinkaankop

Dactyleotris tentaculatus Smith, 1958: 161, Fig. 17 (Bazaruto); 1961: 570, **No. 944j.** *Hetereleotris tentaculatus*: Akihito & Meguro, 1981: 336.

D VI+I,12; A I,11; P 15; V I,5. Body naked. Head compressed; maxilla reaches to or beyond rear margin of eye.

Brownish with irregular blotches and crossbars on body. Attains 3 cm. Seychelles and Sodwana Bay.

240.52 *Hetereleotris tentaculata:* 2.5 cm holotype (S. Mozambique).

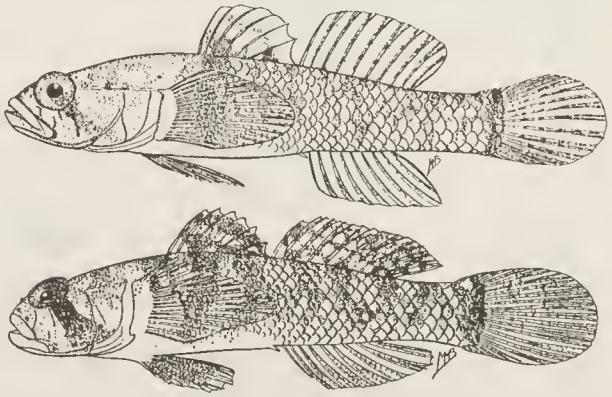
240.53 *Hetereleotris zanzibarensis*
(Smith, 1958)

Goggle goby — Bril-dikkop

Satulinus zanzibarensis Smith, 1958: 160, Fig. 16 (Zanzibar). *Monishia oculata* Smith, 1959: 206, Pl. 9H (Mahé, Seychelles); 1960: 304*; 1961: 570, **No. 911a.**

D VI+I,9-10; A I,8; P 16-18; LS 27-29; TRB 12-13. Tongue tip notched. Tips of upper 3-6 P rays free; V often partly separate.

Body yellowish, with dark bars and spots. Coral tide



240.53 *Hetereleotris zanzibarensis:* top: 2.5 cm holotype (Zanzibar); bottom: 2.5 cm holotype of *Monishia oculata* (Seychelles).

pools. Attains 3 cm. East Africa south to Inhaca, Seychelles, Mauritius and St. Brandon's Shoals.

240.54 *Hetereleotris zonata*
(Fowler, 1934)
PLATE 124

Goggles — Brilletjie

Leioeleotris zonatus Fowler, 1934: 494, Fig. 48 (St. Lucia coast, Natal). *Hetereleotris diadematus* (*non* Rüppell): Smith, **SFSA No. 935*.** *Hetereleotris zonatus*: Smith, 1958: 160* 1961: 570, **No. 935*.**

D VI+I,11-13 (11-12 in our area); A I,9-11 (9-10 in our area); P 16-18; V I,5; LS 41-46; TRB 11-13; PD 0. *H. kenyae* Smith, 1958 from east Africa and Red Sea has 32-36 LS.

Attains 6 cm. Natal to Port Alfred, Pakistan and India.

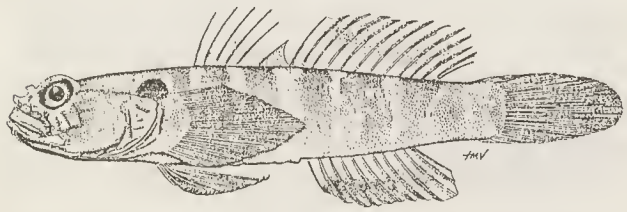
240.55 *Hetereleotris margaretae*
Hoese, 1986

Smoothscale goby — Gladdeskub-dikkop

Hetereleotris margaretae Hoese, 1986: 00, Figs. 2 & 3 (Sodwana Bay).

D VI+I,11; A I,10; P 17; V I,5; LS 28-30.

Dark spot above end of opercle; body with about 6 dark bars; 2 faint dark bars under eye. Attains 3 cm. Known only from Sodwana Bay.



240.55 *Hetereleotris margaretae:* 2.5 cm SL female holotype (Natal).

Genus ***Istigobius*** Whitley, 1932

Mouth small, subinferior; head pores Type A; papillae pattern longitudinal. Scales ctenoid, none on cheek or operculum. V a disc. Gill opening equals P base. D VI+I,10; A I,9; P 17-20; LS 25-28. Vertebrae 26. Easily confused with *Gnatholepis*, which has paired anterior interorbital pores and cheek scales, with extralimital *Exyrias* and *Macrodontogobius*, which have cheek scales and with *Oplopomops*, which has a thickened stiff spine in 2nd D. About 10 species, mostly tropical, found in sandy areas along shore and on coral reefs; 2 species in our area, but a third, *I. ornatus* (Rüppell, 1830), may be found here.

KEY TO SPECIES

1a Upper P rays free, silk-like; no enlarged curved tooth laterally in lower jaw; (mangroves) ..... *I. ornatus*
1b No P rays free; an enlarged tooth laterally in outer row of lower jaw; (reefs) 2
2a Isthmus broad, scaled forward to under eye, scales extending over branchiostegal membrane; dusky blotch under eye; no enlarged spot between 1st 2 D spines ..... *I. spence*
2b Isthmus narrow; scaled forward to behind eye; cheek with 2 or 3 oblique dark lines; usually with a black spot between 1st 2 D spines ..... *I. decoratus*

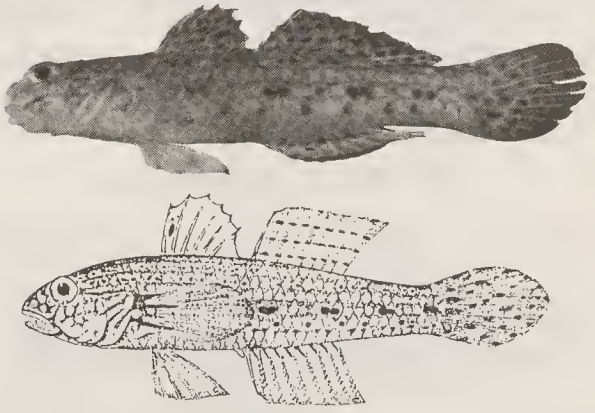
240.56 *Istigobius decoratus*
(Herre, 1927)

Decorated goby — Versierde dikkop

Rhinogobius decoratus Herre, 1927: 181, Pl. 13, Fig. 3 (Philippines). *Acentrogobius ornatus* (*non* Rüppell): Smith, 1959: 202 (in part). *Istigobius* sp.: Hoese & Winterbottom, 1979: 4.

D VI+I,10; A I,9; P 17-19; LS 26-27; TRB 7-8; PD 8-10; GR 2+5.

Body yellowish, with dark lines forming a reticulated network dorsally, 4 or 5 pairs of pupil-sized black spots midlaterally, and similar sized spots in a row below; C with enlarged spots; 3 oblique bars below eye. Often confused with *I. ornatus*. Attains 13 cm. Indo-West Pacific south to Durban.



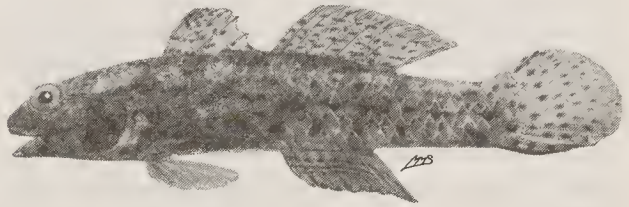
240.56 *Istigobius decoratus*: top: 9 cm (Mauritius; photo by J. E. Randall); bottom: 3.5 cm holotype (after Herre, 1927).

240.57 *Istiogobius ornatus*
(Rüppell, 1830)

Ornate goby — Oorlaide dikkop

Gobius ornatus Rüppell, 1830: 135 (Massaua, Red Sea). *Acentrogobius ornatus*: Smith, 1959: 202* (in part).

D VI+I,10; A I,9; P 17-20; LS 29-32; TRB 8-9; PD 9-12; GR 2+(4-5)



240.57 *Istigobius ornatus*: 7.5 cm (N. Mozambique).

Body yellowish, with 3-4 longitudinal rows of white spots; 2 thin brown longitudinal lines dorsally; midside with about 8 rectangular black longitudinal spots; 7-8 enlarged black spots in a horizontal line ventrally; D and C with black spots; D_1 often with yellow in life. Indo-West Pacific, not yet known from our area, but occurs in Mozambique.

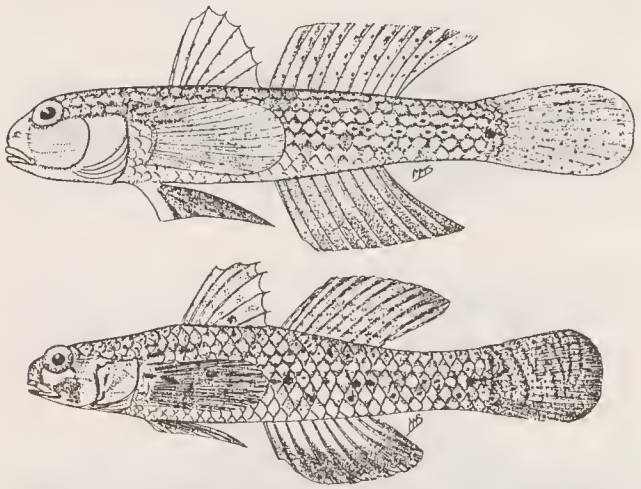
240.58 *Istigobius spence*
(Smith, 1946)

Pearl goby — Pêrel-dikkop

Gobius spence Smith, 1946: 809 (Inhaca); **SFSA No. 921***. *Acentrogobius spence*: Smith, 1959: 203*; 1960: 306; 1961: 570, **No. 921**. *Acentrogobius aestuarius* Smith, 1959: 202, Fig. 18 (Inhambane); 1961: 570, **No. 921f**. *Istigobius spence*: Hoese & Winterbottom, 1979: 4.

D VI+I,10; A I,9; P 18-19; LS 27; TRB 7; PD 7-10; GR 3+5.

Body yellowish, with light longitudinal lines dorsally, pairs of small black spots laterally, and a few scattered black spots dorsally and ventrally; often with a black stripe from eye to above rear of opercle. Attains 5 cm. Indo-West Pacific south to Sodwana Bay.



240.58 *Istigobius spence:* top: 5 cm holotype (Inhaca Id.); bottom: 4.5 holotype of *Acentrogobius aestuarius* (S. Mozambique).

Genus ***Mahidolia*** H. Smith, 1932

Head compressed; maxilla reaching beyond eye in adult male; head pore pattern Type A; no anterior interorbital pore; papillae pattern transverse; gill opening extending to below end of preoperculum. V a disc. Scales ctenoid posteriorly from 2nd D origin, cycloid anteriorly. One tropical species, found in burrows with alphaeid shrimps in coastal silty areas. Easily confused with *Cryptocentrus*, which has an anterior interorbital pore and higher scale counts. One or two species.

240.59 *Mahidolia mystacina*
(Valenciennes, 1837)
PLATE 124

Smiling goby — Glimlag-dikkop

Gobius mystacinus Valenciennes, *in* Cuv. & Val., 1837: 124 (Java). *Mahidolia duque* Smith, 1946: 812 (Delagoa Bay); **SFSA No. 907***. *Waitea duque*: Smith, 1959: 213*; 1961: 570, **No. 907**. *Waitea mystacina*: Smith, 1959: 312.

D VI+I,10; A I,9; P 15-17; LS 33-39. Vertebrae 26. Body scales reaching to above rear of opercle.

Head with small blue or brown spots; body with 5 or 6 dark irregular crossbars. Attains 8 cm. Indo-West Pacific, south to Delagoa Bay.

Genus ***Monishia*** Smith, 1959

Head depressed; gill opening equals P base, head pore pattern Type A; papillae pattern transverse. V a disc. Scales ctenoid. Upper P rays often free near tips. D VI+I,9-11; A I,8-9; P 16-23; LS 26-34. Vertebrae 10+17. Easily confused with *Bathygobius*, which has longitudinal papillae and a small bump under anterior nostril. About 6 species restricted to Red Sea and western Indian Ocean; 2 species in our area.

KEY TO SPECIES

1a P base scaled; pores above operculum on continuous tube from behind eye ..... *M. sordida*
1b P base naked; pores above operculum at ends of small detached tube ..... *M. william*

240.60 *Monishia sordida*
Smith, 1959

Epaulette goby — Epaulet-dikkop

Monishia sordida Smith, 1959: 206, Fig. 25 (Inhaca); 1960: 304*; 1961: 570, **No. 911b**.

D VI+I,11-12; A I,9; P 21-23; LS 32-34; TRB 10-13; PD 0; GR 2+6. Tips of upper 6 P rays free. Prepelvic naked. Belly completely scaled.

Brownish with irregular dark saddles; upper P base with a large dark spot. Attains 5.2 cm. Malindi to Inhaca.

240.60 *Monishia sordida:* 4.5 cm holotype (Inhaca Id.).

240.61 *Monishia william*
(Smith, 1947)
PLATE 124

Kaalpens goby — Kaalpens-dikkop

Bathygobius william Smith, 1947: 341, Fig. 2 (Xora River mouth); SFSA No. 911*. *Monishia william*: Smith, 1959: 207*; 1960: 304; 1961: 570, No. 911.

D VI+I,10-11; A I,9; P 22-23; LS 31-34; TRB 11-14; PD 0; GR 3+(5-6). Tips of upper 7-8 P rays free. Prepelvic and midline of belly naked.

Colour variable, usually dark with darker scale edges; dark crescent at C base. Attains 5 cm. Inhaca to Still Bay.

Genus ***Mugilogobius*** Smitt, 1899

Head depressed; no pores; papillae pattern longitudinal; interorbital broad; anterior nostril just above upper lip; segmented C rays 16. V a disc. Gill opening equals P base. Scales cycloid or ctenoid. D VI+I,7-8; A I,7-9; P 14-17; LS 24-58. Vertebrae 26. Sometimes confused with *Redigobius*, which has a compressed head with pores, and with the extralimital *Pseudogobius*, which has head pores. About 25 species, usually found in burrows among mangroves; 2 species in our area. Names provisional.

KEY TO SPECIES

1a PD 11-14, anteriormost scale between rear of eyes enlarged; P 16-17; 8 segmented D and A rays ..... *M. inhacae*
1b PD 15-18, not reaching eyes, anteriormost scale not enlarged; P 14-16; usually 7 segmented D and A rays ..... *M. durbanensis*

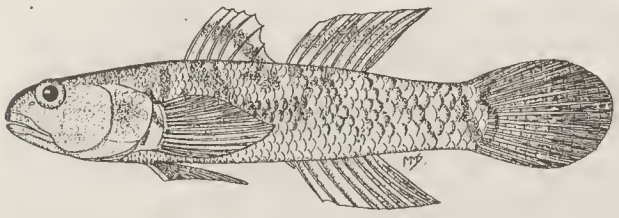
240.62 *Mugilogobius durbanensis*
(Barnard, 1927)

Durban goby — Durban-dikkop

Gobius durbanensis Barnard, 1927: 815 (Durban); Smith, SFSA No. 915*. *Stigmatogobius durbanensis*: Smith, 1960: 306; 1961: 570, No. 915.

D VI+I,7-8; A I,7-8; P 14-16; LS 32-39; TRB 11-12; PD 15-18; GR (1-2)+8. Large triangular naked patch on isthmus behind branchiostegal membranes; operculum with about 6 rows of scales; preopercle naked. Scales ctenoid in wedge from behind P base to middle of 2nd D and A and to C base; anteriorly scales cycloid above and below wedge.

Peduncle with comma-shaped mark dorsally at C base and an oblique spot ventrally; body with diffuse crossbars and often with a series of dashes along midside. Attains 4.5 cm. Freshwater and estuaries; southern Mozambique to Coffee Bay, but probably more widespread.



240.62 *Mugilogobius durbanensis:* 3.5 cm (Natal).

240.63 *Mugilogobius inhacae*
(Smith, 1959)

Meander goby — Slinger-dikkop

Stigmatogobius inhacae Smith, 1959: 198, Pl. 9G (Inhaca); 1961: 570 No. 920a.

D VI+I,8; A I,8; P 16-17; LS 32-37; TRB 10-12; PD 11-14; GR 1+8. Prepelvic almost completely scaled; operculum with about 6 rows of scales; preopercle naked; scales ctenoid in wedge from behind P base to origin of second D and A and to C base; anteriorly scales above and below wedge cycloid.

Body wih diffuse oblique crossbars; C peduncle with a comma-shaped mark dorsally at C base, and an oblique spot ventrally. Attains 4.5 cm. Southern Mozambique to Natal, but probably more widespread.

240.63 *Mugilogobius inhacae:* 3.5 cm holotype (Inhaca Id.).

Genus ***Nemateleotris*** Fowler, 1938

Head strongly compressed, with a low nuchal crest, and Type B head pores; head papillae reduced, rarely visible. V separate, no frenum; gill opening extending to below rear preopercular margin. D VI+I,28-32; A I,27-32; P 19-21; V I,5; LS 110-160. Vertebrae 26. Most easily confused with *Ptereleotris*, which has a low 1st D and V I,4. Three species found on coral reefs; 1 in our area.

240.64 *Nemateleotris magnifica*
Fowler, 1938
PLATE 126

Fire goby — Vuur-dikkop

Nemateleotris magnifica Fowler, 1938: 131 (Celebes); Randall & Allen, 1973: 350*; Smith, 1980: 183.

D VI+I,28-32; A I,27-30; P 19-20; LS 110-130.

A favourite aquarium fish, being both beautiful and graceful. Attains 9 cm. From Sodwana Bay and Comoro Ids. to Marquesas Ids. in Pacific.

Genus ***Oligolepis*** Bleeker, 1874

Head pores Type B; papilla pattern transverse or reduced, resembling longitudinal pattern; 3-4 rows of teeth in

upper jaw; no flaps on shoulder girdle; tongue largely fused to floor of mouth, tip free; lower jaw curved slightly upward in front. V a disc. Gill opening to under mid-operculum. Scales ctenoid. D VI+I,10-11; A I,11-12; P 20-22; LS 24-27. Easily confused with *Oxyurichthys*, which has 1 row of teeth in upper jaw, and typically higher scale and D counts. Few species, tropical, found in muddy estuaries and coastal bays; 2 species in our area.

KEY TO SPECIES

1a No preopercular pores; maxilla reaching to or beyond rear edge of eye in adults; dark brown bar from eye forward and downward to middle of upper jaw; body often with small oblique bars; D VI+I,11 ..... *O. keiensis*

1b Preopercular pores present; maxilla not reaching past eye in adult; dark brown bar from below eye to behind end of jaws; no oblique bars on body; D VI+I,10 ..... *O. acutipennis*

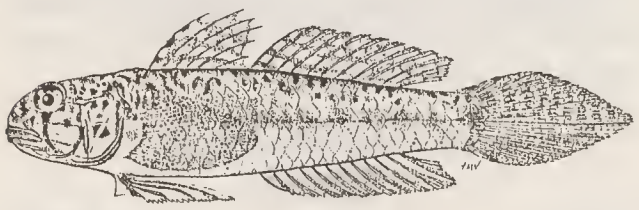
240.65 *Oligolepis acutipennis*
(Valenciennes, 1837)

Sharptail goby — Skerpstert-dikkop

Gobius acutipennis Valenciennes, *in* Cuv. & Val., 1837: 80 (Malabar, India); Smith, **SFSA No. 923.** *Ctenogobius acutipennis*: Smith, 1959: 196 (in part); 1960 (in part); 1961: 570, **No. 923.**

D VI+I,10; A I,11; P 20-21; LS 25-27; TRB 6-7; GR 1+6. D spines 3-5 prolonged and filamentous in male. Predorsal, P base and prepelvic naked; midline of belly scaled.

Body brownish with numerous dark blotches along back; a series of faint blotches, equal to eye, on midside, the last at C base. Fins clear to dusky, often spotted. Attains 13 cm. Indo-West Pacific south to Great Fish River.



240.65 *Oligolepis acutipennis*: 4.5 cm SL (Natal).

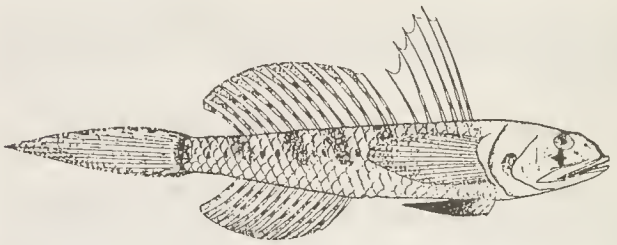
240.66 *Oligolepis keiensis*
(Smith, 1938)
PLATE 124

Kei goby — Kei-dikkop

Gobius keiensis Smith, 1938: 319, Fig. 1 (Kei River mouth); Smith, **SFSA No. 928*.** *Ctenogobius acutipennis*: Smith, 1959: 196* (in part). *Ctenogobius keiensis*: Smith, 1960: 301; 1961: 570, **No. 928.** *Gobionellus keiensis*: Hoese & Winterbottom, 1979: 4.

D VI+I,11; A I,12; P 20-22; LS 26-28; TRB 8-9; GR 3+4. C longer than head in adult. D spines 2-5 prolonged in male. Predorsal, P base, prepelvic and midline of belly naked.

Body grey or brown with dark brown oblique streaks on side; a black spot equal to pupil on upper peduncle at base of C; V blackish in adult. Attains 7 cm. Seychelles, Madagascar and Inhaca to Fish River mouth.



240.66 *Oligolepis keiensis*: 6 cm female holotype (Kei River).

Genus ***Oplopomus*** Valenciennes, 1837

Preopercle with 1-3 flattened spines; 1st spine in each D thickened and stiff. V a disc. Head pores Type A; papillae in multiple longitudinal pattern. Gill opening equals P base. Scales ctenoid. D VI+I,10; A I,10; P 18-19; LS 24-27. Vertebrae 26. Easily confused with *Asterropteryx*, which lacks stiff D spine, and the extralimital *Oplopomops*, which lacks preopercular spines. Few species, found on sand often near coral reefs; one species in our area.

240.67 *Oplopomus oplopomus*
(Valenciennes, 1837)
PLATE 124

Spinecheek goby — Stekelwang-dikkop

Gobius oplopomus Valenciennes, *in* Cuv. & Val. 1837: 66 (Red Sea). *Oplopomus oplopomus* Smith, 1959: 188*; 1961: 570, **No. 925d.**

D VI+I,10; A I,10; P 18-19; LS 24-26; TRB 9. Cheek and opercle naked; predorsal scaled to above rear end of preopercle. D spines 4 and 5 longest; D margin pointed, higher in male.

Attains 8 cm. Indo-West Pacific, south to Inhaca.

Genus ***Oxyurichthys*** Bleeker, 1860

Head pore pattern Type B; papillae pattern transverse; one row of teeth in upper jaw (sometimes 2 rows anteriorly in large specimens); no flaps on shoulder girdle; tongue largely fused to floor of mouth, tip free; lower jaw curved slightly upward. V a disc. Gill opening equals P base. Scales cycloid or weakly ctenoid. Preopercular pores absent. D VI+I,12-13; A I,13-14; P 18-25; LS 32-90 (42-74 in our area). Vertebrae 26. Easily confused with *Oligolepis*, which has 3-4 rows of teeth in upper jaw. Several species found in mangrove areas, or silty sand and mud bottoms on continental shelf; 4 species in our area. This genus is in need of revision and the names used here may be incorrect.

KEY TO SPECIES

1a Distinct elongate tentacle over eye ..... *O. ophthalmonema*
1b No tentacle, but sometimes a bump over eye 2

2a Head large, 3.3-3.8 in SL; LS 42-50; scales mostly ctenoid ..... *O. microlepis*
2b Head shorter, 4.0-5.0 in SL; LS 54-74; scales cycloid anteriorly, ctenoid from 2nd D origin posteriorly 3

3a Eye with a small bump dorsally; maxilla reaching to below middle of eye; breast scaled ..... *O. papuensis*
3b Eye without a bump dorsally; maxilla reaching to below rear edge of eye; breast naked ..... *O. lemayi*

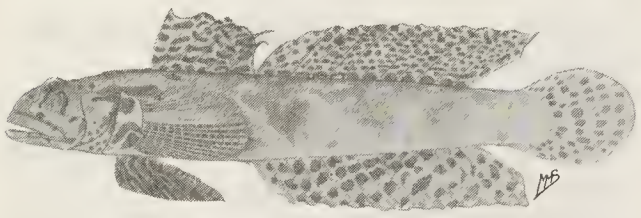
240.68 *Oxyurichthys lemayi*
(Smith, 1947)
PLATE 124

Lace goby — Galon-dikkop

Gobiichthys lemayi Smith, 1947: 811 (Delagoa Bay); **SFSA No. 913*.** *Oxyurichthys lemayi*: Smith, 1959: 204*; 1960: 303; 1961: 570, **No. 913.**

D VI+I,12; A I,13; P 22-23; LS 72-74; TRB 20-21; PD 19-24; GR 3+6. P base naked. Median predorsal with a low naked crest. D spines sometimes elongated, much higher than body. C about 1.5 times head.

Attains 16 cm. Known from weeds in Delagoa Bay.



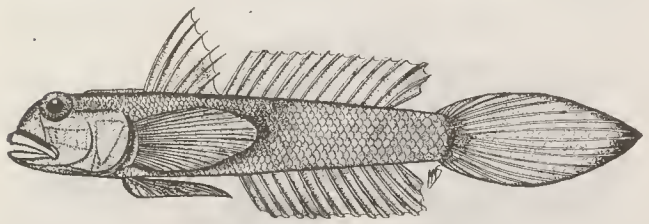
240.68 *Oxyurichthys lemayi:* 15 cm female paratype (Inhaca Id.).

240.69 *Oxyurichthys microlepis*
(Bleeker, 1849)

Maned goby — Maanhaar-dikkop

Gobius microlepis Bleeker, 1849: 35 (Indonesia). *Gobius nuchalis* Barnard, 1927: 824 (Zululand). *Gobius cristatus*: Smith, **SFSA No. 929*.** *Oxyurichthys microlepis*: Smith, 1959: 203*; 1960: 303; 1961: 570, **No. 929.**

D VI+I,12-13; A I,13; P 20-22; LS 42-50; TRB 14-16; PD 15-20; GR 3+6. P base and prepelvic naked. No bump on eye. Midline of predorsal with a low naked crest. No elongate D spines. C about twice head.



240.69 *Oxyurichthys microlepis:* 9 cm (East London).

Body violet; vertical fins pink; 1st D with 2 blue lines; 2nd D with blue spots; P orange with violet spots below; A pink with yellow and violet margin; V orange. Attains 13.5 cm. Widespread in Indo-West Pacific, south to Xora River mouth, Transkei, down to 75 m.

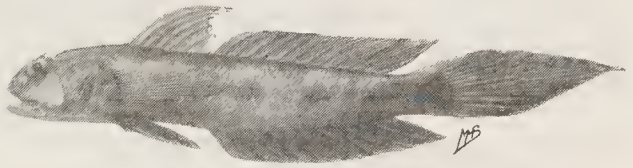
240.70 *Oxyurichthys ophthalmonema*
(Bleeker, 1857)

Eyebrow goby — Wenkbrou-dikkop

Gobius ophthalmonema Bleeker, 1857: 208 (Ternate). *Oxyurichthys tentacularis* (*non* Val.): Smith, **SFSA No. 913b;** 1953: 521; 1959: 203*; 1960: 302; Akihito, 1971: 103*.

D VI+I,12-13; A I,12-13; P 22-23; LS 54-61; TRB 14-16; PD 15-20 at side; GR 3+6. P base and prepelvic with a small patch of scales. Median predorsal crest naked. Anterior scales cycloid, ctenoid behind 1st D. Anterior D spines longest, none greatly prolonged; C about twice head.

Live colour unknown, preserved brownish. Attains 18 cm. Indo-West Pacific, south to Xora River, Transkei.



240.70 *Oxyurichthys ophthalmonema:* 9.5 cm (Zanzibar).

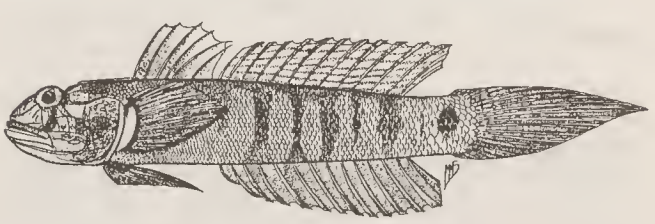
240.71 *Oxyurichthys papuensis*
(Valenciennes, 1837)
PLATE 124

Frogface goby — Paddabek-dikkop

Gobius papuensis Valenciennes, *in* Cuv. & Val., 1837: 106 (New Guinea). *Oxyurichthys papuensis*: Smith, **SFSA No. 913a*;** 1959: 203*; 1960: 303.

D VI+I,12; A I,13; P 21-23; LS 65-75; TRB 18-22; PD 18-25; GR 3+6. P base naked. D spines not elongated.

Body brown with about 7-8 vertical dark brown bars. Attains 18 cm. Indo-West Pacific, south to Delagoa Bay.



240.71 *Oxyurichthys papuensis:* 18 cm (Inhaca Id.).

Genus ***Pandaka*** Herre, 1927

Head rounded; without pores; D VI+6-7; A 6-7 (no spine in 2nd D and A). P 13-16; LS 20-24; TRB 4-6. Vertebrae 25. V a disc. Head papillae reduced. Scales ctenoid. Gill opening equals P base. Most easily confused with juveniles of *Redigobius*, which have a compressed head, narrow interorbital, and 2nd D and A with a spine. About 5 species, found in tropical estuaries and freshwater; 1 species in our area.

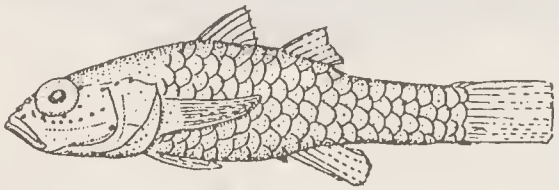
240.72 *Pandaka silvana*
(Barnard, 1943)

Dwarfgoby — Dwergdikkop

Gobius silvana Barnard, 1943: 258 (Knysna Lagoon). *Pandaka minuta* Smith, 1959: 205, Fig. 23 (Wamizi Id., Mozambique). *Pandaka silvana*: Penrith & Penrith, 1972: 106*.

D VI+7; A 7; P 14-16; LS 20-22; TRB 5-6; PD 0-3. Mouth small, reaches to below front of eye. Head, P base and prepelvic naked; predorsal with scales just before D, naked in front.

Body with irregular black spots and oblique bars; 4 black spots along A base and lower part of peduncle; 1st D black anteriorly. Attains 1.6 cm. Northern Mozambique to Knysna.



240.72 *Pandaka silvana:* less than 2 cm SL female lectotype (Knysna; after Penrith & Penrith, 1972).

Genus ***Parachaeturichthyus*** Bleeker, 1874

D VI+I,9-11; A I,9-10; P 19-22; LS 25-31; TRB 7-11. Vertebrae 26. Short barbels on chin; large ctenoid scales on nape and opercle; cheek scaled; head pores Type A, anterior interorbital pore absent; cheek papillae longitudinal. Gill opening to below mid-operculum. Scales ctenoid. Two species, trawled in tropical areas.

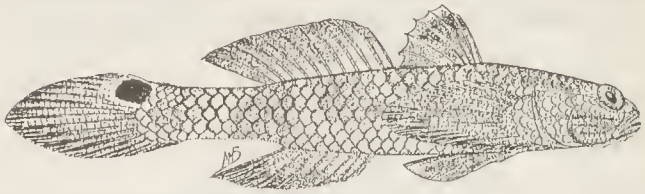
240.73 *Parachaeturichthys polynema*
(Bleeker, 1853)

Taileyed goby — Stertoog-dikkop

Chaeturichthys polynema Bleeker, 1853: 44, Fig. 4 (Japan). *Gobius polynema*: Smith, **SFSA No. 920***. *Parachaeturichthys polynema*: Smith, 1959: 197*; 1960: 302; 1961: 570, **No. 920**.

D VI+I,9-11; A I,9-10; P 20-22; LS 25-30; TRB 7-8; PD 12-14; GR 2+10.

Upper base of C with a large black spot surrounded by yellow; body greenish, fins dark. Attains 15 cm. Indo-West Pacific, south to Natal.



240.73 *Parachaeturichthys polynema:* 7.5 cm (Natal).

Genus ***Paragobiodon*** Bleeker, 1873

Numerous small bumps and flaps on lower surface of head; V a disc, with fleshy frenum; large ctenoid scales on body; head and nape naked. Head pores Type A; cheek papillae reduced. Gill opening equals P base. D VI+I,9; A I,8-9; P 19-23; LS 22-26. Vertebrae 26. Easily confused with *Gobiodon*, which lacks scales. About 7 species; only *P. modestus* known in our area, but 3 others that may occur here are also included. Most species have been confused under the name *P. echinocephalus*. Tropical species living in corals of the genera *Pocillopora, Seriatopora* and *Stylophora*.

KEY TO SPECIES

1a Head and body uniformly tan, green or light brown 2
1b Body black, head distinctly paler 3

2a Fins, except V, black; midline of belly naked; top of head with minute bumps ..... *P. lacunicolus*
2b Fins coloured like body; midline of belly scaled; top of head with elongate flaps in adult ..... *P. xanthosomus*

3a Midline of belly naked; top of head with minute bumps ..... *P. modestus*
3b Midline of belly scaled, at least posteriorly, head with elongate bumps ..... *P. echinocephalus*

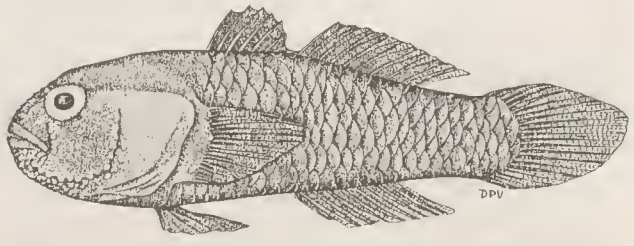
240.74 *Paragobiodon echinocephalus*
(Rüppell, 1830)

Redhead goby — Rooikop-dikkop

Gobius echinocephalus Rüppell, 1830: 136, Pl. 34, Fig. 3 (Massaua, Red Sea). *Paragobiodon echinocephalus:* Smith, 1959: 218 (in part).

D VI+I,9; A I,9; P 19-21; LS 22-23; TRB 8-9.

Head red to reddish orange; body and fins black. Attains 3.5 cm. Associated with *Stylophora* coral. Indo-West Pacific.



240.74 *Paragobiodon echinocephalus:* 1.5 cm SL (N. Mozambique).

240.75 *Paragobiodon lacunicolus*
(Kendall & Goldsborough, 1911)

Blackfin goby — Swartvin-dikkop

Ruppellia lacunicola Kendall & Goldsborough, 1911: 318, Pl. 6, Fig. 1 (Fakarava, Paumotu Ids., Pacific). *Paragobiodon echinocephalus* (*non* Rüppell): Smith, 1959: 218 (in part).

D VI+I,9; A 1,8; P 21; LS 21-23; TRB 8-9.

Head reddish orange to orange; body tan. Attains 3 cm. Indo-Pacific.

240.75 *Paragobiodon lacunicolus*: 2 cm (after Kendall & Goldborough, 1911).

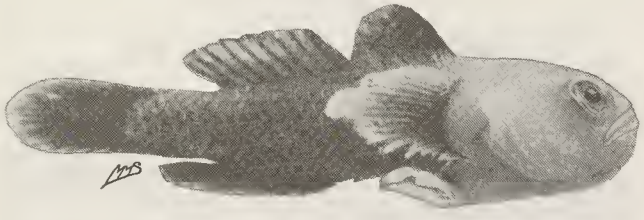
240.76 *Paragobiodon modestus*
(Regan, 1908)
PLATE 124

Warthead goby — Vrat-dikkop

Gobiopterus modestus Regan, 1908: 242 (Chagos Archipelago). *Paragobiodon echinocephalus* (*non* Rüppell): Smith, **SFSA No. 908*;** 1959: 218* (in part), 1960: 313.

D VI+I,9; A 1,9; P 19-23; LS 22-24; TRB 8-9.

Associated with the branching coral *Pocillopora*. Attains 3.5 cm. Indo-West Pacific, south to Inhaca.



240.76 *Paragobiodon modestus*: 2.5 cm (Inhaca Id.).

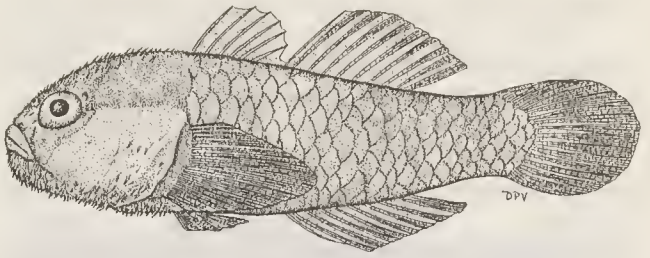
240.77 *Paragobiodon xanthosomus*
(Bleeker, 1852)

Emerald goby — Smarag-dikkop

Gobius xanthosoma Bleeker, 1852: 703 (Wahai, Ceram). *Paragobiodon echinocephalus* (*non* Rüppell): Smith, 1959: 218 (in part).

D VI+I,9; A I,9; P 20-22; LS 22-24; TRB 9.

Head and body green to greenish yellow; C often with a dark margin. Associated with the coral *Seriatopora hystrix*. Attains 4 cm. Indo-West Pacific.



240.77 *Paragobiodon xanthosomus*: 2.5 cm (Kenya).

Genus ***Periophthalmus*** Bloch & Schneider, 1801

Eyes protruding, with lower eyelid; P base elongate; one row of teeth in upper jaw; gill opening less than P base; tongue adnate. V separate, partly or completely united. Head pores absent; cheek papillae reduced. Scales ctenoid or cycloid. Easily confused with the extralimital *Periophthalmodon*, which has 2 rows of teeth in upper jaw. Several species; found in tropical muddy habitats, especially among mangroves, spending considerable time out of water. One or 2 species in our area (separation of species tentative).

KEY TO SPECIES

1a V completely separate, no frenum; 1st D spines 7-15; fin height greater than length of base .. *P. koelreuteri africanus*

1b V partly connected, frenum low; 1st D spines 14-17; fin base longer than height ..... *P. sobrinus*

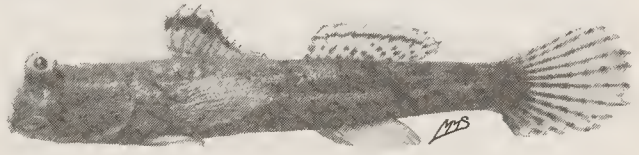
240.78 *Periophthalmus koelreuteri africanus*
Eggert, 1935

African mudhopper — Afrikaanse moddersprinter

Periophthalmus koelreuteri africanus Eggert, 1935: 78, Pl. 5, Fig. 21 (Zanzibar); Smith, 1959: 219*; 1961: 570, **No. 936a.**

D VII-XV+I,10-12; A I,9-10; P 12-13. First D widely separate from second, particularly in juvenile.

Dusky; both D with a white edge and a dark band below. Attains 9.5 cm. Seychelles, Kenya to Transkei.



240.78 *Periophthalmus koelreuteri africanus*: 6.5 cm (N. Mozambique).

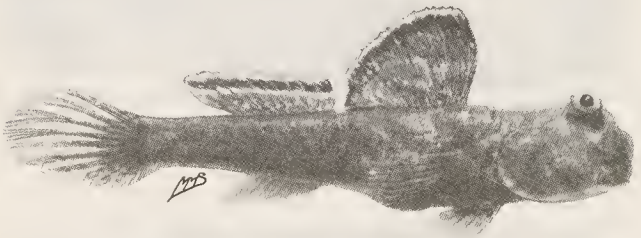
240.79 *Periophthalmus sobrinus*
Eggert, 1935

Bigfin mudhopper — Grootvin-moddersprinter

Periophthalmus sobrinus Eggert, 1935: 95, Pl. 9, Figs. 37, 38 (Red Sea); Smith, 1959: 220*; 1961: 570, **No. 936;** Stebbins & Kalk, 1961: 18. *Periophthalmus cantonensis*: Smith, **SFSA No. 936*.**

D XIV-XVII+I,10; A I,9-10; P 12-13. First D and 2nd D contiguous.

Dusky, both D with white margin and black stripe below. Attains 14 cm. Seychelles, Red Sea to Transkei.



240.79 *Periophthalmus sobrinus*: 14 cm (Seychelles).

Genus ***Pleurosicya*** Weber, 1913

V rays highly branched; V frenum with fleshy lobes at tips of V spines; snout obtusely pointed; head broad; interorbital narrow; head pores Type A; cheek papillae reduced. Gill opening varying from lower end of P base to under eye. Scales ctenoid. Outer row of teeth enlarged in upper jaw; a large pair of symphysial teeth in lower jaw. Second D I,7-9; A I,7-9; P 14-21; LS 18-31. Vertebrae 26. Tropical species normally found on various invertebrate hosts, such as soft corals, sponges and some hard corals. About 15 species, 4 in our area.

KEY TO SPECIES

1a Nape scaled to eye; black spot at base of 1st D, gill opening extends under eye; membranes form free fold across isthmus 3
1b Nape naked; no black spot on 1st D; gill opening restricted to P base or extending to under operculum with membranes attached to sides of isthmus 2

2a P 17-18; LS 22-25; tongue bluntly rounded ..... *P. muscarum*
2b P 14-16; LS 24-31; tongue pointed ..... *P.* sp. 1

3a Body depth at anus 6.5-7.0 in SL; P 17-19; TRB 7; (coral reefs) ..... *P. mossambica*
3b Body depth at anus 4.6-5.7 in SL; P 19-20; TRB 9; (trawled 14-70 m) ..... *P. annandalei*

240.80 *Pleurosicya annandalei*
Hornell & Fowler, 1922

Scalynape goby — Skubkop-dikkop

Pleurosicya annandalei Hornell & Fowler, 1922: 924 (Tuticorin, India); Larson & Hoese, 1980: 36*.

240.80 *Pleurosicya annandalei*: 2.5 cm male (after Larson & Hoese, 1980).

D VI+I,8-9; A I,8-9; P 19-20; LS 23; TRB 9; PD 9-10; GR 2+5. Lower ⅓ of 1st gill arch bound to gill cover by membrane. Tongue blunt to concave.

Attains 3 cm. Known only from dredges from 14 - 70 m. Found on gorgonians. Sodwana Bay, northern Indian Ocean and New Guinea.

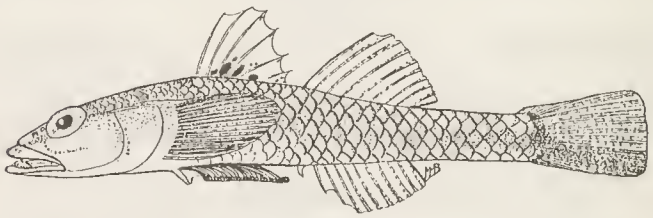
240.81 *Pleurosicya mossambica*
Smith, 1959

Toothy goby — Getande-dikkop

Pleurosicya mossambica Smith, 1959: 218, Fig. 37 (Pinda); Hoese & Winterbottom: 1979: 4.

D VI+1,8; A I,8; P 17-19; LS 23-24; TRB 6-8; GR 2+7 (rudimentary). Lower ¼ or less of 1st gill arch bound to gill cover by membrane. Tongue blunt to rounded. Gill opening extending to below rear ½ of eye. Predorsal scaled.

Found on soft corals, sponges, *Tridacna* and broad-bladed plants. Attains 3 cm. Sodwana Bay, Mozambique, Seychelles and tropical Indo-West Pacific.



240.81 *Pleurosicya mossambica*: 2.5 cm holotype (N. Mozambique).

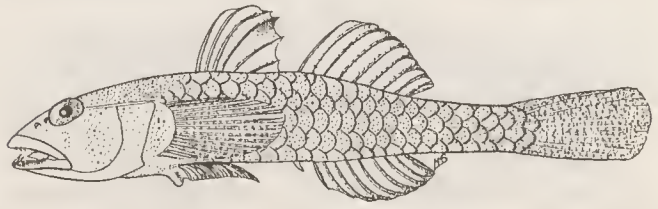
240.82 *Pleurosicya muscarum*
(Jordan & Seale, 1906)

Ghost goby — Spook-dikkop

Rhinogobius muscarum Jordan & Seale, 1906: 401, Fig. 90 (Samoa). *Pleurosicyops timidus* Smith, 1959: 217, Fig. 35 (Pinda). *Pleurosicya timidus*: Hoese & Winterbottom, 1979: 4.

D VI+I,7-8; A I,7-9, P 17-18; LS 22-25; TRB 6-7; GR 2+(3-6) (very rudimentary). Lower ¼ to ⅓ of 1st gill arch bound to gill cover by membrane. Predorsal naked.

Found on soft corals. Attains 2.2 cm. Mozambique, Seychelles, Chagos Archipelago and tropical Pacific.



240.82 *Pleurosicya muscarum*: 2 cm holotype of *P. timidus* (N. Mozambique).

240.83 *Pleurosicya* sp. 1

D VI+I,8 (rarely 7); A I,8; P 14-16; LS 24-31; TRB 7-9; GR 2+4 (rudimentary). Lower ¼ of 1st gill arch bound to gill cover by membrane. Gill opening restricted to P base. Predorsal naked.

Found on *Acropora*. Attains 2.2 cm. Sodwana Bay, Seychelles, Chagos Archipelago, tropical Indian Ocean and western tropical Pacific.

Genus ***Priolepis*** Ehrenberg, 1837

Gill opening extending to below rear preopercular margin; head broad; outer teeth of upper jaw widely spaced; lower jaw truncate when viewed from below; V united; V frenum rarely present; head pores absent; sensory papillae reduced to a transverse pattern; scales ctenoid, large. Second D I,9-11; A I,7-9; P 16-21; LS 23-32. Vertebrae 26. Easily confused with *Trimma*, which has a broader gill opening and the extralimital *Lubricogobius*, which has few or no scales. A tropical and subtropical genus found on coral or rocky reefs. About 15 species, 3 in our area.

KEY TO SPECIES

1a Predorsal and operculum naked; transverse bands on head connected by horizontal stripe above preoperculum and operculum; D VI+I,8 ..... *P.* sp.
1b Predorsal scaled to eyes; operculum usually scaled dorsally; transverse bands on head not connected by horizontal stripe; D VI+I,10-11 2

2a Body with 7 dark bars; P 17-19; size to 6 cm ..... *P. cincta*
2b Body without bars or at most 1 or 2 anteriorly; P 15-17; size to 4 cm ..... *P. inhaca*

240.84 *Priolepis cincta*
(Regan, 1908)
PLATE 124

Convict goby — Bandiet-dikkop

Gobiomorphus cinctus Regan, 1908: 240 (Chagos Archipelago). *Hetereleotris eugenius* (*non* Jordan & Evermann): Smith, **SFSA No. 935a*.** *Quisquilius eugenius* (*non* Jordan & Evermann): Smith, 1959: 210*; 1960: 305; 1961: 570, **No. 935a.** *Quisquilius cinctus*: Hoese & Winterbottom, 1979: 4.

D VI+I,11; A I,9; P 17-19; LS 29-33; TRB 12-14; PD 15-20; GR 3+(11-13). V frenum absent.

Attains 6 cm. Indo-West Pacific, south to Natal.

240.85 *Priolepis inhaca*
(Smith, 1949)
PLATE 125

Brick goby — Baksteen-dikkop

Gobius inhaca Smith, 1949: 103 (Inhaca); **SFSA No. 923a*.** *Quisquilius inhaca*: Smith, 1959: 210*; 1960: 305; 1961: 570, **No. 923a.**

D VI+I,9-10; A I,8; P 15-17; LS 25-28; TRB 9-11; PD 13-18; GR 2+(9-10). V frenum absent.

Scale pockets edged in dark, forming network pattern. Attains 4 cm. Indo-West Pacific, south to Inhaca.

240.86 *Priolepis* sp.
Sodwana goby — Sodwana-dikkop

Priolepis semidoliatus (*non* Valenciennes): Hoese & Winterbottom, 1979: 5.

D VI+I,8; A I,7; P 18-19; LS 22; TRB 6. V frenum absent.

Attains 2.5 cm. Indo-West Pacific, south to Sodwana Bay.

Genus ***Psammogobius*** Smith, 1936

Broad head; tongue tip notched; gill opening extends to below eye, with a free fold across isthmus; head pores Type A; papillae pattern longitudinal; V a disc; scales ctenoid. Easily confused with *Favonigobius*, which has a narrow gill opening and truncate tongue tip, and *Glossogobius*, which has a longer snout and mouth. One species, known only from South Africa.

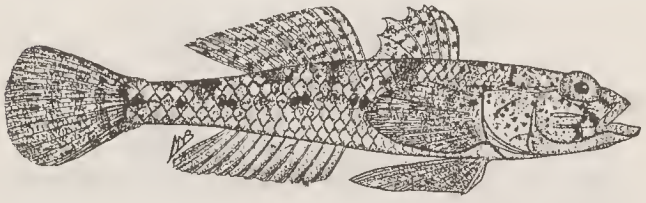
240.87 *Psammogobius knysnaensis*
Smith, 1936
PLATE 125

Knysna sandgoby — Knysna-sanddikkop

Psammogobius knysnaensis Smith, 1936: 215 (Knysna); **SFSA No. 906*;** 1960: 311*; Smith & Smith, 1966: 105*; Hoese & Winterbottom, 1979: 5.

D VI+I,9-10; A I,9-11; P 17-18; LS 27-30; TRB 7-8. Vertebrae 11+17. Head, P base and midline of belly naked; a few prepelvic scales; predorsal scaled to above rear of preopercle.

Body grey to brown, often with scattered white and brown spots on back; often with several thin vertical white bars on side; midside with 3-6 elongate dark brown spots. Males with a black spot on rear of 1st D and often black branchiostegal membranes. Colour pattern matches sand in estuaries where it lives in fringe of water and seeks escape by short zigzag dashes, finally burying itself in the sand. Attains 7 cm. Known from Port Nolloth to Natal.



240.87 *Psammogobius knysnaensis:* 5.5 cm (Knysna).

Genus ***Ptereleotris*** Gill, 1863

Head strongly compressed; scales minute; V separate I,4; head pore pattern Type B; papillae pattern reduced, often not visible; chin with longitudinal fold, sometimes with barbel; gill opening extends to below rear preopercular margin; scales cycloid; 2nd D I,24-37; A I,23-36; P 20-24; V I,4; LS about 100-150. Vertebrae 26. Easily confused with *Nemateleotris*, which has ctenoid scales posteriorly, V I,5 and a higher 1st D. Tropical and subtropical species normally found around coral or rocky reefs, sometimes trawled. About 15 species, 3 in our area.

KEY TO SPECIES

1a Chin with enlarged barbel: D VI+I,37 ..... *P. lineopinnis*
1b Chin without barbels; D VI+I,23-29 2

2a Body pale; C black centrally ..... *P. heteroptera*
2b Rear part of body darker than front part and head; C clear centrally; juveniles uniformly coloured, but with black spot ventrally on C peduncle ..... *P. evides*

240.88 *Ptereleotris evides*
(Jordan & Hubbs, 1925)
PLATE 125

Scissortail — Skêrstert

Encaeura evides Jordan & Hubbs, 1925: 303, Pl. 11, Fig. 2 (Japan). *Ptereleotris tricolor* Smith, 1956: 817, Fig. 1 (Waimizi Id., Mozambique); 1958: 155*.

D VI+I,23-25; A I,23-25; P 22-23; GR (6-7)+(19-21).

Attains 12 cm. Adults generally swim together in pairs about coral heads. Red Sea and tropical Indo-West Pacific, south to Natal.

240.89 *Ptereleotris heteroptera*
(Bleeker, 1855)
PLATE 126

Blacktail goby — Swartstert-dikkop

Eleotris heteropterus Bleeker, 1855: 422 (Bandjermasin); Smith, 1980: 183.

D VI+I,27-32; A I,24-30; P 20-26.

Attains 14 cm. Indo-Pacific, south to Natal.

240.90 *Ptereleotris lineopinnis*
(Fowler, 1935)
PLATE 125

Sad glider — Treurige swerwer

Laccoeleotris lineopinnis Fowler, 1935: 403, Fig. 35 (Umzumbi, Natal); Smith, **SFSA No. 944*;** 1958: 154*.

D VI+I,37; A I,36; P 21; GR 5+15.

Known only from the 11.5 cm holotype taken from the stomach of a flounder caught at 90 m.

Genus ***Redigobius*** Herre, 1927

Head compressed; head pore pattern Type B; anterior nasal pore absent; head papillae pattern longitudinal; large ctenoid scales; gill opening extends to below mid-operculum; V form disc. Males often with very large mouth. D VI+I,6-8; A I,4-7; P 16-19; LS 20-30. Vertebrae (11-12)+(14-15)=26. Juveniles easily confused with *Pandaka*, which lacks 2nd D and A spines and has a broader interorbital. Sometimes confused with *Mugilogobius*, which lacks pores, has a broad interorbital and depressed head. Can also be confused with the extralimital *Pseudogobius*, which has a small inferior or subinferior mouth. Tropical and subtropical species found in freshwater, mangroves and sea grass beds. Numerous species, 3 in our area.

KEY TO SPECIES

1a One distinct bar below 1st D; dark band from eye to lower part of operculum; tip of 1st D black ..... *R. balteatops*
1b One or more vertical bars or none on body; no oblique band from rear of eye; black spot basally on 1st D 2

2a Black blotch on each side of urogenital papilla; PD 6-8; cycloid on midline, anteriormost scale distinctly enlarged ..... *R. bikolanus*
2b No black blotch at sides of urogenital papilla; PD 9-11; usually ctenoid on midline, becoming cycloid in large males, anteriormost scale not distinctly enlarged ..... *R. dewaali*

240.91 *Redigobius balteatops*
(Smith, 1959)

Bull goby — Bul-dikkop

Acentrogobius balteatops Smith, 1959: 200, Pl. 9D (Inhaca); 1960: 306; 1961: 570, **No. 921h.** *Redigobius balteatops*: Hoese & Winterbottom, 1979: 5.

D VI+I,7; A I,6; P 18-19; LS 22-23; TRB 10; PD 10-11; GR (2-3)+(6-8). PD ctenoid; P base and prepelvic scales cycloid.

Four dark spots along A base and lower peduncle; 2 dark spots at C base. Estuarine. Possibly identical with *R. balteatus* (Herre) from Pacific. Attains 3.8 cm: Inhaca.

240.91 *Redigobius balteatops:* 4 cm male holotype (Inhaca Id.).

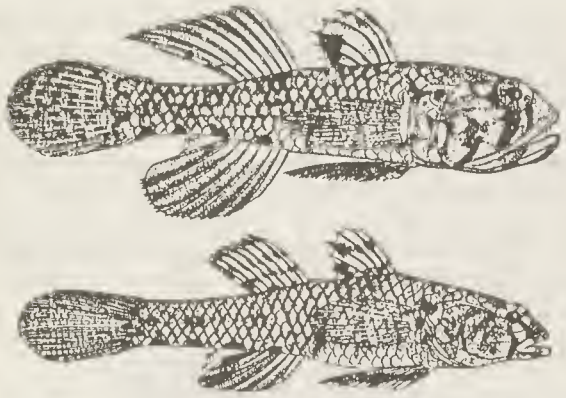
240.92 *Redigobius bikolanus*
(Herre, 1927)

Bigmouth goby — Grootbek-dikkop

Vaimosa bikolana Herre, 1927: 151, Pl. 11, Fig. 2 (Luzon, Philippines). *Stigmatogobius versicolor* Smith, 1959: 197, Fig. 12 (Mahé, Seychelles). *Redigobius bikolanus*: Akihito & Meguro, 1975: 49*.

D VI+I,7; A I,6; P 15-17; LS 21-23; TRB 7-8; PD 6-8; GR (1-2)+(4-6). P base and prepelvic scales cycloid. Males with mouth reaching well behind eye, females with mouth to under mid-eye.

Two or 3 dark spots at C base. Freshwater and estuarine. Attains 3 cm. Indo-Pacific, south to Coffee Bay.



240.92 *Redigobius bikolanus*. top: 3 cm male holotype; bottom: 2 cm female paratype of *Stigmatogobius versicolor* (both Seychelles).

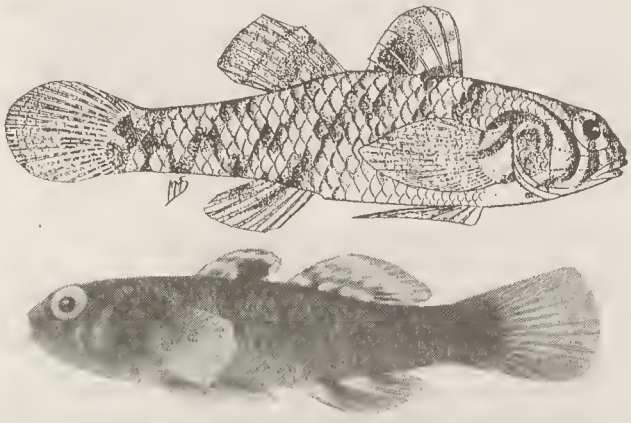
240.93 *Redigobius dewaali*
(Weber, 1897)

Checked goby — Blokkies-dikkop

Gobius dewaali Weber, 1897: 145 (Natal); Smith, **SFSA No. 918.** *Gobius maxillaris* Davies, 1949: 375, Fig. (Knysna); Smith, **SFSA No. 915a*.** *Stigmatogobius dewaali*: Smith, 1960: 305; 1961: 570, **No. 915a.** *Mugilogobius pongolensis* Kok & Blaber, 1977: 163, Figs. 1 & 2 (Pongola floodplain, Zululand); Bruton, 1980: 233*. *Redigobius dewaali* Hoese & Winterbottom, 1979: 5.

D VI+I,7-8; A I,5-7; P 16-18; LS 25-29; TRB 9-10; PD 9-11; GR (1-2)+(5-6). Maxilla reaches to mid-eye in female; and to beyond eye in male; P base and prepelvic scales cycloid.

Body olive with oblique dark bars in front and diffuse spots in rear; 3 or 4 dark spots along A base and peduncle; 2 dark pupil-sized spots at C base. Freshwater and estuarine. Attains 4.2 cm. Southern Mozambique to Knysna.



240.93 *Redigobius dewaali:* top: 3.5 cm (Knysna); bottom: 3 cm (Zululand).

Genus ***Silhouettea*** Smith, 1959

Eyes dorsal; snout short; head pores Type A; head papillae in longitudinal pattern; gill opening to between rear preopercular margin and mid-operculum; fewer D than A rays; opercular membrane covers most of P base; mouth reaching to below rear half of eye; V forming expanded disc; scales ctenoid. D VI+I,10-11; A I,11-13; P 13-16; LS 23-28. Vertebrae 26. Most likely to be confused with *Favonigobius*, which has a smaller mouth, equal number of D and A rays and less expanded opercular membrane. Tropical species, capable of burying in sand. About 5 species, 2 in our area.

KEY TO SPECIES

1a Prepelvic scaled; 1st D height less than body depth; no subvertical lines on body ..... *S. insinuans*
1b Prepelvic naked; 1st D slightly higher than body depth in female, about twice body depth in male, D spines 2-4 filamentous in males; 3-5 subvertical lines of small spots on side of body ..... *S. sibayi*

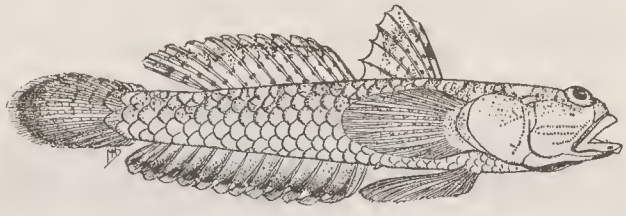
240.94 *Silhouettea insinuans*
Smith, 1959
PLATE 125

Phantom goby — Droom-dikkop

Silhouettea insinuans Smith, 1959: 214, Fig. 23, Pl. 11E (Silhouette Id., Seychelles).

D VI+I,11; A I,13; P 14-15; LS 23-24; TRB 7-8; GR 2+(9-10). P base naked; midline of belly naked behind pelvic disc; predorsal midline naked.

Body yellowish, with white saddles and faint brown spots dorsally; A often dusky near tip; chin and branchiostegal membranes often black. Lives in sand. Attains 4.5 cm. Western Indian Ocean south to Bazaruto.



240.94 *Silhouettea insinuans:* 4.5 cm holotype (Seychelles).

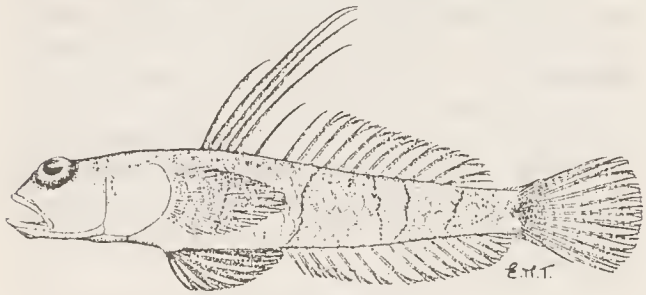
240.95 *Silhouettea sibayi*
Farquharson, 1970

Barebreast goby — Kaalbors-dikkop

Silhouettea sibayi Farquharson, 1970: 85, Fig. 1 (Lake Sibayi); Bruton, 1980: 234.

D VI+I,11; A 1,13; P 14-15; LS 24-25; TRB 6-7; GR 3+9. P base and midline of belly naked.

Body pale with flecks of red and brown; a series of small black spots along midside; 1st D dusky in front; V and A margins often black. Attains 4 cm. Known only from Lake Sibayi and Kosi Bay.



240.95 *Silhouettea sibayi*: 3.5 cm SL (Natal).

Genus ***Stenogobius*** Bleeker, 1874

Small finger-like flaps on shoulder girdle; tongue tip free; head compressed, with Type B pore pattern and transverse papillae pattern. V a disc. Gill opening equals P base. Scales ctenoid. D VI+I,10-11; A I,10-11; P 15-16; LS 45-55. Vertebrae 26. Most easily confused with *Awaous*, which has a broad head. A few tropical freshwater species, one in our area. Genus is in need of revision and the species name used here is provisional.

240.96 *Stenogobius kenyae*
Smith, 1959

Africa rivergoby — Afrika rivierdikkop

Stenogobius kenyae Smith, 1959: 190, Pl. 9, Fig. 1 (Sabaki River, Kenya); Smith, 1980: 183.

D VI+I,10; A I,10-11; P 16; LS 46-50; TRB 12; PD 12-14, reaching almost to eye. GR rudimentary, not visible. Cheek and opercle usually naked, sometimes with a few scales dorsally on operculum. P base naked; prepelvic with few scales. D spines 3-5, elongated in male.

Male with light stripe near 1st D base. Attains 12 cm. Sabaki River to Maputaland.

240.96 *Stenogobius kenyae*: 10.5 cm male holotype (Kenya).

Genus ***Sufflogobius*** Smith, 1960

Head compressed with Type A pores and transverse papillae pattern; 2 barbels on chin; V a disc. Gill opening equals P base. Scales largely ctenoid. Easily confused with *Caffrogobius*, which lacks barbels and the extralimital *Nematogobius* from Angola, which has a depressed head. One species.

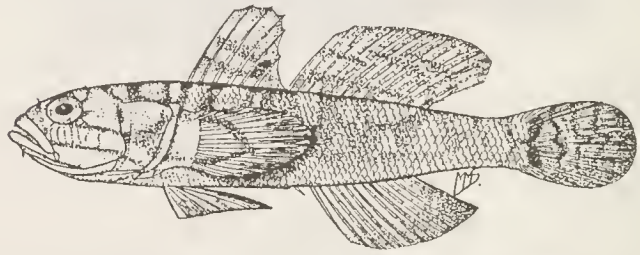
240.97 *Sufflogobius bibarbatus*
(von Bonde, 1923)

Pelagic goby — Pelagiese dikkop

Gobius bibarbatus von Bonde, 1923: 28, Pl. I & 6 (NW of Lambert's Bay, W. Cape Province, 50 fms.); Smith, **SFSA No. 934***. *Sufflogobius bibarbatus* Smith, 1956: 714; 1960: 308; 1961: 570, **No. 934.**

D VI+I,12-13; A I,12-13; P 21-23; LS 48-54; TRB 19-23; PD 18-25; GR (2-3)+(10-11). Vertebrae 27. Maxilla reaches to below front of eye. Anterior nostril with elongate flap. Predorsal scales reach to above rear of preopercle; cheek and opercle naked; P base and prepelvic scaled.

Fins dusky to black. Attains 13 cm. Occurs in shoals between Port Nolloth and Saldanha Bay; from shore to 90 m.



240.97 *Sufflogobius bibarbatus*: 7.5 cm (Cape west coast).

Genus ***Taenioides*** Lacepède, 1798

Body elongate, naked or with few scales; eyes minute, rudimentary; D single, united with C; tongue fused to floor of mouth; skin flabby, flexible; short tentacles on head; mouth very oblique; V a disc. Gill opening equals P base. D V-VI,27-51; A 0-I,30-52; P 13-19. Vertebrae 26-29. Easily confused with *Odontamblyopus,* which has symphysial canines in lower jaw, and long P. Tropical species found in burrows in estuaries or on muddy marine areas. Numerous species, 2 in our area. Genus needs revising and names given here are provisional.

KEY TO SPECIES

1a Mouth slightly oblique, forming an angle of less than 45° with body axis; numerous small short flaps on head, dense around eye and on operculum; no distinct vertical papillae rows on cheek; teeth only slightly enlarged; A rays 30 ..... *T. jacksoni*

1b Mouth almost vertical; barbel-like flaps confined to ventral surface of head; transverse papillae on cheek distinct; teeth conspicuously large; A rays 48 ..... *T. esquivel*

240.98 *Taenioides esquivel*
Smith, 1946
PLATE 125

Bulldog eelgoby — Bulhond-palingdikkop

Taenioides esquivel Smith, 1946: 814 (Delagoa Bay); **SFSA No. 904*;** 1959: 221*.

D VI+48-50; A 48-50; P 16-17; GR 1+10; vertebrae 10+19. Jaws with 8-10 enlarged compressed teeth in outer row.

Attains 29 cm. Known from mud burrows from Delagoa Bay to Transkei.

240.99 *Taenioides jacksoni*
Smith, 1943
PLATE 125

Bearded eelgoby — Bebaarde palingdikkop

Taenioides jacksoni Smith, 1943: 70, Fig. 2 (St. Lucia Estuary, Natal); **SFSA No. 903*;** 1959: 221*.

D VI,27-28; A 30; P 17; GR 0+7; vertebrae 10+16-17. Jaws with 20 conical teeth in outer row.

Flesh semi-transparent. Mangroves. Attains 12 cm. Estuaries of Natal, but probably more widespread.

Genus ***Trimma*** Jordan & Seale, 1906

Gill opening extending to below rear edge of preopercle or to below eye; head compressed; wide-set teeth in outer row of upper jaw; lower jaw truncate when viewed from below; no head pores; sensory papillae reduced; V united or separate; frenum rarely present. Scales ctenoid. D VI+I,7-10; A I,7-10; P 13-20; LS 20-28. Vertebrae 26. Easily confused with *Priolepis*, which has a narrower gill opening and broader head. Found on coral reefs. About 50 species, 2 in our area.

KEY TO SPECIES

1a Gill opening to just in front of rear preopercular margin; distinct groove between and behind eyes; series of small dark spots or crossbars just below D; 1 or 2 faint brown transverse bars under eye ..... *T. corallina*

1b Gill opening to below eye; no groove between or behind eye; series of light circular spots below D; pale round spots below eye ..... *T. macrophthalma*

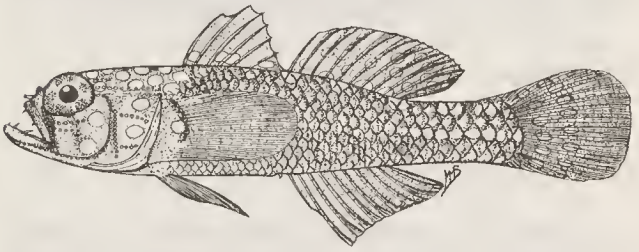
240.100 *Trimma corallina*
(Smith, 1959)

Polkadot goby — Kolletjies-dikkop

Zonogobius corallinus Smith, 1959: 209, Fig. 29 (Pinda). *Trimma corallinus*: Hoese & Winterbottom, 1979: 5.

D VI+I,9-10; A I,8-10; P 19-20; LS 23-25; TRB 11; GR (3-4)+13. V united, but membrane often torn; D spine 2 longest, often filamentous. Lower 11 P rays unbranched. P base, prepelvic, predorsal, cheek and opercle naked. Closely related to *T. townsendi* (Boulenger) from the Persian Gulf.

Body red, with 2 silvery areas below 1st D and 3 silver areas below 2nd D; head and C peduncle with orange spots; P base with orange spot or sometimes 2 small dusky spots. Attains 2.5 cm. Pinda to Sodwana Bay.



240.100 *Trimma corallina*: 2.5 cm holotype (N. Mozambique).

240.101 *Trimma macrophthalma*
(Tomiyama, 1936)
PLATE 125

Flame goby — Vlam-dikkop

Eviota macrophthalma Tomiyama, 1936: 47, Fig. 6 (Japan). *Zonogobius flammeus* Smith, 1959: 209, Pl. 10G (Pinda); 1961: 570, **No. 922b.** *Trimma flammeus*: Hoese & Winterbottom, 1979: 5.

D VI+I,9-10; A I,8-9; P 17-19; LS 21-23; TRB 10; GR 3+(12-13). D spines 2 and 3 longest, often filamentous; V connected for ½ to ⅔ their length. Prepelvic and P base scaled; predorsal, cheek and opercle naked.

Attains 2.5 cm. Indo-West Pacific south to Sodwana Bay.

Genus ***Trypauchen*** Valenciennes, 1837

Head strongly compressed with a bony median crest; eyes rudimentary; D single, united with C; scales small, cycloid; V completely or partly connected; pit opening into cavity above operculum. Gill opening extending to below mid-operculum. No head pores; sensory papillae reduced. D VI,40-51; A 40-52; P 15-18; LS 45-115. Vertebrae 34-38. Tropical species of muddy bottoms in burrows, often at mouths of estuaries. Numerous species, 1 in our area; genus in need of revision and the species name used here is provisional.

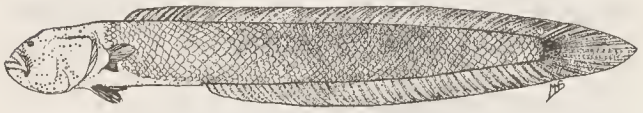
240.102 *Trypauchen microcephalus*
Bleeker, 1860

Comb goby — Kam-dikkop

Trypauchen microcephalus Bleeker, 1860: 62 (Borneo); Smith, **SFSA No. 937*.** *Ctenotrypauchen microcephalus*: Smith, 1959: 220*; 1961: 570, **No. 937.** *Ctenotrypauchen barnardi* Hora, 1926: 221, Figs. 1 & 2 (off Tugela River, Natal).

D VI+48-51; A 45-47; P 16-17; LS 52-65; TRB 13-14. Vertebrae 37 or 38. GR rudimentary. Head, nape and belly naked. V connected basally, ends free; frenum low.

Pink. Attains 18 cm. Indo-West Pacific, south to Natal.



240.102 *Trypauchen microcephalus* 13 cm (off Natal).

Genus ***Valenciennea*** Bleeker, 1868

V separate; minute ctenoid scales on body; snout elongate; GR poorly developed; elongate flap on upper limb of 1st gill arch; one row of teeth in upper jaw. Gill opening equals P base. Type A head pores. Longitudinal cheek papillae pattern. D VI+I,11-19; A I,11-19; P 18-24; LS 67-146. Vertebrae 26. Sometimes confused with *Amblygobius*, which has united V and transverse head papillae. Tropical and subtropical species living in burrows on sand around coral reefs and harbours. Fifteen species, 3 in our area.

KEY TO SPECIES

1a D VI+I,17-19; some D spines filamentous; elongate horizontal bar on cheek; body uniformly coloured; no black spot on 1st D ..... *V. strigata*

1b D VI+1,11-12; no filamentous D spines; head with oblong or round blue spots or 2 longitudinal stripes; body with 1 or 2 stripes, sometimes faint; black spot on 1st D 2

2a D VI+I,11; 2 dark stripes on head and body, extending onto C ..... *V. helsdingenii*

2b D VI+I,12; head with small round or oblong blue spots; body with 1 or 2 faint stripes, not extending onto C ..... *V. sexguttata*

240.103 *Valenciennea helsdingenii*
(Bleeker, 1858)
PLATE 125

Railway glider — Spoorweg-swerwer

Eleotriodes helsdingenii Bleeker, 1858: 212 (Goram, Indonesia); Smith, 1958: 151*; 1961: 570, **No. 943.** *Calleleotris helsdingenii*: Smith, **SFSA No. 943*.** *Valenciennea helsdingenii*: Hoese & Winterbottom, 1979: 5.

D VI+I,11; A I,11; P 21-23; LS 100-120; TRB 38-48. Third and 4th D spines subequal; C with 2 elongate filaments.

Coral reefs and harbours in depths of 1 - 30 m. Attains 16 cm. Widespread in tropical Indo-Pacific, south to Delagoa Bay.

240.104 *Valenciennea sexguttata*
(Valenciennes, 1837)
PLATE 125

Ladder glider — Leer-swerwer

Eleotris sexguttatus Valenciennes, *in* Cuv. & Val., 1837: 254 (Trincomalee, Ceylon). *Eleotriodes sexguttatus*: Smith, 1958: 150*; 1961: 570, **No. 943a.** *Valenciennea sexguttatus*: Hoese & Winterbottom, 1979: 5.

D VI+1,12; A I,12; P 19-21; LS 68-80; TRB 22-28. Third D spine longest.

Sandy areas on coral reefs. Attains 13 cm. Tropical Indo-Pacific, south to Bazaruto.

240.105 *Valenciennea strigata*
(Broussonet, 1787)
PLATE 126

Pennant glider — Vlag-swerwer

Gobius strigatus Broussonet, 1787: 1, Pl. I (near Tahiti). *Eleotriodes strigatus*: Smith, 1958: 151*.

D VI+I,17-19; A I,16-19; P 21-23; LS 103-120; TRB 31-40; GR (1-2)+(6-8).

Immediately recognised by curved dark bar below eye to opercle. Found around rubble on coral reefs in depths of 1 - 20 m. Attains 18 cm. Widespread in Indo-Pacific, south to Sodwana Bay.

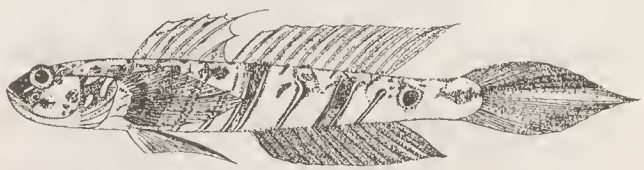
Genus ***Vanderhorstia*** Smith, 1949

Head compressed; gill opening from rear preopercular margin to below eye; cheek papillae pattern longitudinal; head pores Type A. Scales cycloid or ctenoid. V a disc. D VI+I,12-16; A I,12-17; P 17-19; LS 47-67. Vertebrae 26. Tropical and subtropical species, living in burrows with alphaeid shrimps on sandy bottoms, often near coral reefs. Most easily confused with *Amblyeleotris* and *Cryptocentrus*, which have a transverse cheek papillae pattern. About 8 species, 1 in our area.

240.106 *Vanderhorstia delagoae*
(Barnard, 1937)
PLATE 125

Candystick goby — Suikerstok-dikkop

Gobius delagoae Barnard, 1937: 62, Fig. 3 (Delagoa Bay); Smith, **SFSA No. 930*.** *Vanderhorstia delagoae*: Smith, 1959: 192, Fig. 4; 1960: 303; 1961: 570, **No. 930.**



240.106 *Vanderhorstia delagoae:* 7 cm holotype (Inhaca Id.).

D VI+I,13-14; A I,13-14; P 18-20; LS 45-55; TRB 14-18; GR (1-3)+9. Scales cycloid; midline of nape naked, sides scaled to above operculum; fifth D spine longest.

Attains 7.5 cm. Red Sea to Inhaca.

Genus ***Yongeichthys*** Whitley, 1932

Scales large, ctenoid; head naked, with longitudinal papillae pattern; gill opening equals P base; V united. D VI+I,8-9; A I,9; P 18-19; LS 26-30. Vertebrae 26. Tropical species found on muddy bottoms in mangroves or continental shelf muds. Most easily confused with the extralimital *Acentrogobius*, which has head scales, and *Amoya*, which is more slender bodied and has a slightly different head papillae pattern. About 3 species, 1 in our area.

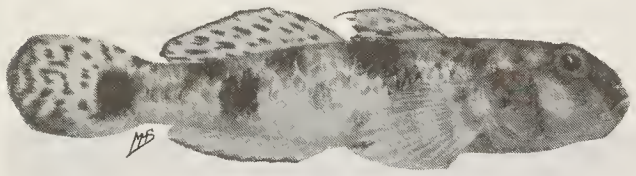
240.107 *Yongeichthys nebulosus*
(Forsskål, 1775)
PLATE 126

Shadow goby — Skaduwee-dikkop

Gobius nebulosus Forsskål, 1775: 24 (Jiddah, Saudi Arabia); Smith, SFSA No. **917***. *Ctenogobius nebulosus*: Smith, 1959: 197*; 1960: 301; 1961: 570, No. **917***. *Yongeichthys nebulosus*: Hoese & Winterbottom, 1979: 5.

D VI+I,9; A I,9; P 18-19; LS 26-30; TRB 10-12; GR 3+6. Midline of nape naked; outwardly-curved enlarged tooth at each side of lower jaw.

Margins of median fins often black. Mangroves or trawled from mud bottoms. Attains 18 cm. Widespread in western tropical Pacific and Indian oceans, extending south to Durban in quiet shallow waters.



240.107 *Yongeichthys nebulosus*: 13 cm (Inhaca Id.).

Family No. 241: ELEOTRIDAE

by D.F. Hoese

Sleepers — **Slapers**

Small fishes, most species less than 20 cm, although *Oxyeleotris* from the Pacific may reach 60 cm; branchiostegal rays 6; pelvic fins I,5 widely separated, not connected by membranes; first dorsal fin with 6-10 flexible "spines", second usually short based, base much less than caudal peduncle length (except in *Xenisthmus*); rays I,6-15; anal fin begins just behind dorsal origin, rays I,6-12; last ray of second dorsal and anal fins split to base; segmented caudal rays 15 or 17; pectoral rays 14-25; body and most of head generally scaled; scales cycloid or ctenoid; no lateral line on body, canals and pores usually present on head; teeth generally small and conical in several rows in jaws.

Mostly benthic fishes, but some free-swimming forms, found mainly in freshwater and estuarine areas, but some species on coral reefs (*Calumia* and *Xenisthmus* in our area). Worldwide with about 40 genera and 300 species; about 30 genera and 250 species in the Indo-Pacific area. Seven genera and 9 species from our area. Few studies have been made recently of Indo-Pacific representatives and no thorough work has been done on western Indian Ocean species. Consequently, the names used here are provisional.

Scale counts: LS (longitudinal scale series) = number of scales from upper pectoral base to caudal base, excluding small scales on base of caudal fin. TRB (transverse series) = number of scales from anal spine obliquely upward and backward to second dorsal fin base. PD (predorsal scales) = number of scales along midnape before first dorsal fin.

Head pores: see Family Gobiidae. Sensory papillae (small bumps in distinct rows on head): the arrangements of papillae in rows are important taxonomic characters but are only given for *Eleotris*, since the papillae are often difficult to see and examination requires microscopic study.

KEY TO GENERA

1a Preopercle with a ventrally directed spine (covered by skin); predorsal scales 35-53; (freshwater and estuarine) ..... *Eleotris*
1b Preopercle without spines; predorsal scales in fewer than 30 rows 2

2a Soft D I,11-12; its base much longer than C peduncle; LS about 60; (size less than 4 cm; coral reefs) ..... *Xenisthmus*
2b Soft D I,6-9; its base not longer than C peduncle; LS fewer than 40 3

3a Bony ridge above eye; P 18-22; (estuarine) 4
3b No ridge above eye; P 12-17 5

4a Jaws and snout elongate; snout flat, about twice eye diameter; lower jaw projecting; head flat ..... *Butis*
4b Jaws and snout short; snout rounded, subequal to eye; lower jaw not projecting; head more or less rounded ..... *Prionobutis*

5a Predorsal scale rows 18-26; LS 33-37; attains 34 cm; (freshwater and estuarine) ..... *Ophiocara*
5b Predorsal scale rows 7-15; LS 21-28; (size less than 6 cm) 6

6a Soft D & A I,6-7; head broad; (coral reefs) ..... *Calumia*
6b Soft D & A I,8-9; head compressed; (freshwater and estuarine) ..... *Hypseleotris*

Genus ***Butis*** Bleeker, 1856

Head depressed, with bony serrations above each eye. Top of head, cheeks and opercles scaled; no enlarged interorbital scales. Anterior nostril short. Gill opening ex-

tending to below eye. Head pores present above eyes, preoperculum and operculum. P rays branched. Segmented C rays 17; D VI+I,8; A I,8-9; P 17-21; LS 25-30; vertebrae 26.

A tropical genus found in estuaries and lower reaches of rivers. About 5 species, 2 in our area.

KEY TO SPECIES

1a Body depth 4.5-5.0 in SL; C uniformly dark ..... *B. melanostigma*
1b Body depth 5.0-6.0 in SL; upper margin of C clear, rest of fin dark ..... *B. butis*

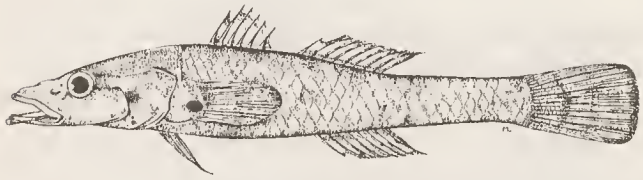
241.1 *Butis butis*
(Hamilton-Buchanan, 1822)

Duckbill sleeper — Eendbek-slaper

Cheilodipterus butis Hamilton-Buchanan, 1822: 57, 367 (India). *Butis butis:* Smith, SFSA **No. 940;** 1958: 143*.

D VI+I,8; A I,8-9; P 18-20; LS 28-30; TRB 9-10; PD 20-25; GR 3+8. Maxilla ends under front edge of eye. Interorbital with ctenoid scales extending between eye and orbital crest. Adults with small auxiliary scales between larger body scales. Upper GR pointed.

Body dark with several dark longitudinal lines; C black with a light margin dorsally; P base with 1 or 2 black spots. Attains 14 cm. Tropical Indo-West Pacific, south to Mgeni Beachwood estuary, Natal.



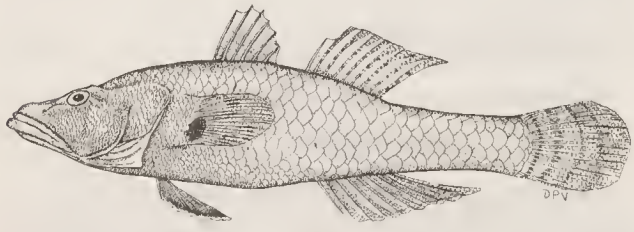
241.1 *Butis butis:* 4 cm SL (Natal).

241.2 *Butis melanostigma*
(Bleeker, 1849)

Blackspot sleeper — Swartkol-slaper

Eleotris melanostigma Bleeker, 1849: 23 (Indonesia).

D VI+I,8; A 1,8; P 18-20; LS 25-30; TRB 9-10; PD 25-30; GR 0+7. Maxilla ends under front to middle of eye. Interorbital with ctenoid scales between eye and orbital crest. Adults with small auxiliary scales on larger body scales. Upper GR developed as clusters of spines.



241.2 *Butis melanostigma:* 9 cm SL (Transkei).

Body dark with several thin longitudinal dark lines, and often with irregular dark spots; P base with large black spot; C black. Attains 18 cm. Port St. Johns; otherwise known from tropical western Pacific.

Genus ***Calumia*** Smith, 1958

Head depressed; top of head, cheeks and opercles with large scales, enlarged scale between eyes. Anterior nostril elongate. Gill opening extending to below preopercle or eye. No head pores. P rays unbranched. Segmented C rays 15. P 14-17; LS 21-25; vertebrae 25. Two species, known only from coral reefs; 1 in our area.

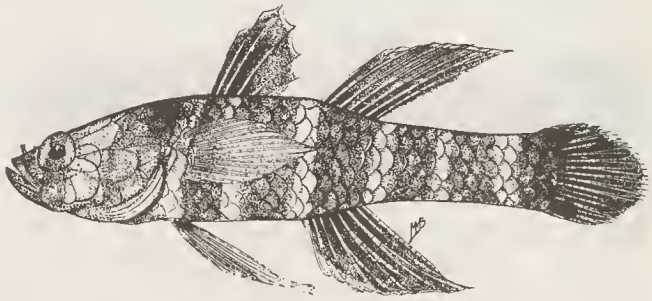
241.3 *Calumia godeffroyi*
(Günther, 1877)
PLATE 127

Tailface sleeper — Stertgesig-slaper

Eleotris godeffroyi Günther, 1877: 188, Pl. 122, Fig. B (Raiatea, Tahiti). *Calumia biocellata* Smith, 1958: 148, Pl. 1I, K and Fig. 8 (Zanzibar); 1961: 570, **No. 941a.** *Calumia godeffroyi:* Larson & Hoese, 1980: 18*.

D VI+I,6-7; A I,6-7; P 16-17; LS 21-23; TRB 7-8; PD 7-9; lower GR 6, short and stubby. Maxilla reaching to below front edge of eye. Gill opening extends to below rear preopercle margin. V rays branched.

Body with 5 dark vertical bars; C base with 2 dark spots. Attains 36 mm. Bazaruto to Shimoni, Philippines, Australia and Tahiti.



241.3 *Calumia godeffroyi:* 3.5 cm holotype of *C. biocellata* (Zanzibar).

Genus ***Eleotris*** Schneider, 1801

Head depressed; top of head, cheeks and opercles scaled; interorbital scales minute. Anterior nostril a short tube. Gill opening extending to below end of preopercle. P rays mostly branched. No head pores. Vertebrae 10+15. Segmented C rays 15; soft D I,7-8; P 15-20; LS 41-76; PD 33-64; vertebrae 26. A worldwide tropical genus found in fresh and estuarine waters. About 10-15 species, 3 in our area.

KEY TO SPECIES

1a Front ½ of lower limb of 1st gill arch attached by membrane to operculum; lower GR 5-7; oblique row of papillae dorsally on operculum not reaching lower oblique row ..... *E. mauritianus*

1b Lower limb of 1st gill arch attached to operculum only near anterior tip; lower GR 8-10; upper papillae row on operculum curves downward to lower row at rear end of operculum 2

2a LS 46-56; anterior 3 vertical papillae rows below eye extend below longitudinal row on mid-cheek; 7-9 transverse papillae rows along lower margin of preopercle from preopercular spine to rear end of jaws ..... *E. melanosoma*

2b LS 57-65; anteriormost and 3rd papillae row under eye extend below longitudinal row; 8-12 transverse papillae rows along lower margin of preopercle ..... *E. fusca*

241.4 *Eleotris fusca*
(Schneider, 1801)

Dusky sleeper — Donker slaper

Poecilia fusca Schneider, in Bloch & Schneider, 1801: 453 (*"Oriadeae insulae rivulis"* =Pacific islands). *Eleotris fusca:* Smith, **SFSA No. 938*** (in part); 1958: 149 (in part); Akihito, 1967, 154*.

D VI+I,8; A I,8; P 17-19; GR(2-3)+(8-10); LS 57-65; TRB 16-20; PD 38-50. Maxilla reaches to below middle of eye; cheek scaled to under eye; numerous short papillae rows between main vertical cheek rows developing with increased size.

Head, body and fins dark brown to black; numerous horizontal dark (or light) lines on body; fins spotted in young. Several species have been confused with *E. fusca*. Attains 26 cm. Tropical Indo-West Pacific, south to Coffee Bay, Transkei.

241.4 *Eleotris fusca:* 18 cm (Natal).

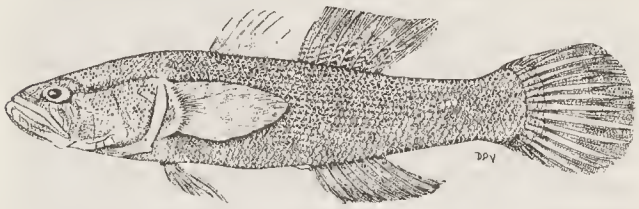
241.5 *Eleotris mauritianus*
Bennett, 1831

Widehead sleeper — Wyekop-slaper

Eleotris mauritianus Bennett, 1831: 166 (Mauritius); Akihito, 1967: 154. *Eleotris fusca* (*non* Bloch): Smith, **SFSA No. 938** (in part); 1958: 149 (in part). *Eleotris melanosoma* (*non* Bleeker): Smith, **SFSA No. 938a;** 1958: 150*.

D VI+I,8; A I,8; P 15-18; GR (2-3)+(5-7); LS 56-65; TRB 14-19; PD 35-49. Maxilla reaches to below front ½ of eye; cheek scaled to below middle of eye. Often confused with *Eleotris fusca* and *E. melanosoma*. *Eleotris acanthopoma* Bleeker from the Pacific may prove identical.

Head and body dark brown to black, often with numerous light longitudinal lines and irregular mottling on body; fins dark. Attains 15 cm. Umtata River to Mozambique, Seychelles, Madagascar and Mauritius.



241.5 *Eleotris mauritianus:* 11 cm SL (Natal).

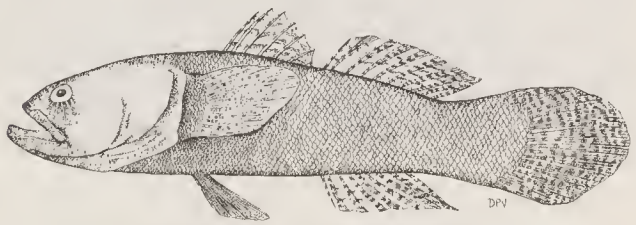
241.6 *Eleotris melanosoma*
Bleeker, 1852

Broadhead sleeper — Breëkop-slaper

Eleotris melanosoma Bleeker, 1852: 705 (Sumatra); Akihito, 1967: 151*. *Eleotris fusca* (*non* Bloch): Smith, **SFSA No. 938** (in part); 1958: 149 (in part).

D VI+I,8; A I,8; P 17-20 (usually 17-18 in our area); GR (2-3)+(8-9); LS 46-56; TRB 17-20; PD 37-53. Maxilla reaches to below rear ½ of eye. Preopercle scaled dorsally, scales not reaching to below eyes. Possibly 2 Indo-Pacific species are being confused under this name.

Body dark brown to black, sometimes with pale longitudinal lines; fins spotted in young, becoming black in large individuals. Attains 17 cm. Tropical Indo-West Pacific, south to Qora River, Transkei.



241.6 *Eleotris melanosoma:* 10 cm SL (Natal).

Genus ***Hypseleotris*** Gill, 1863

Head compressed; top of head, cheeks and opercles usually (always in our area) scaled. No enlarged scales between eyes. Anterior nostril a short tube. Gill opening extends to below rear margin of preopercle. Most P rays branched. Head pores absent or reduced to 2-4 preopercular pores and 2 or 3 pores above each eye. Mouth very oblique, reaching below front of eye. P base narrow, with free fold of skin dorsally. Segmented C rays 15. D VI-VIII+I,8-12; A I,10-13; P 12-17; LS 24-43; vertebrae 25-32. A tropical and warm-temperate genus typically in freshwater, sometimes in estuaries. About 15 species, 1 in our area.

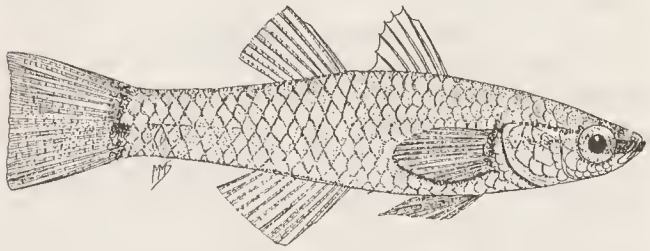
241.7 *Hypseleotris dayi*
Smith, 1950

Golden sleeper — Goue slaper

Hypseleotris dayi Smith, 1950: 707, Fig. 2 (St. Lucia, Zululand).

D VI+1,8; A 1,9; P 12-14; LS 24-25; TRB 8; PD 12-14; GR (1-3)+(9-11). Cheek and operculum scaled; scales on top of head reaching tip of snout. Possibly identical with *H. cyprinoides* Valenciennes, 1836 from Réunion or *H. tohizonae* Steindachner, 1880 from Madagascar.

Head and body grey to brown; a dark spot on C base ventrally; dark stripe from snout tip through eye; narrow dark bar across P base. Attains 37 mm. Fresh and brackish water. St. Lucia and Empangeni, Natal, but probably more widespread.



241.7 *Hypseleotris dayi*: 3.5 cm holotype (Natal).

Genus ***Ophiocara*** Gill, 1863

Head width about equal to head depth; top of head flat. Top of head, interorbital, cheeks and opercles scaled. Anterior nostril a short tube. Lower end of gill opening from rear margin of preopercle to below eye. P rays branched. Head pores above eyes and from eye to above end of operculum. Preopercle with 4-5 pores. Maxilla reaches to below middle of eye. Segmented C rays 17. Vertebrae 26. One species found in tropical estuaries and freshwater.

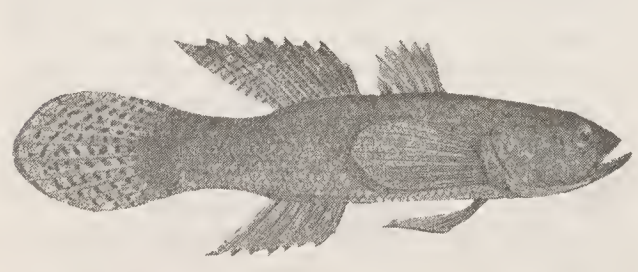
241.8 *Ophiocara porocephala*
(Valenciennes, 1837)
PLATE 127

Flathead sleeper — Platkop-slaper

Eleotris porocephala Valenciennes, *in* Cuv. & Val., 1837: 237 (New Ireland); Smith, 1958: 148*; Akihito & Meguro, 1974: 75. *Eleotris limosus* Smith, 1936: 52, Pl. 4 (Isipingo Lagoon, Natal). *Ophiocara limosus:* Smith, **SFSA No. 941***. *Ophiocara aporos:* Smith, **SFSA No. 942.**

D VI+1,8-9; A I,7; P 14-15; LS 33-37; TRB 12-14; PD 18-26; GR (3-5)+(12-16). Tongue tip with shallow notch.

Head and body dark; second D and C spotted; juveniles with irregular crossbars. Attains 34 cm. From Durban to Shimoni and most of western Indian Ocean to western tropical Pacific.



241.8 *Ophiocara porocephala*: 27 cm holotype of *Eleotris limosus* (Natal).

Genus ***Prionobutis*** Bleeker, 1874

Head rounded to depressed; bony serrations above each eye; top of head, cheeks and opercles scaled. No enlarged interorbital scale. Anterior nostril a short tube. Gill opening reaches to between mid operculum to under eye. P rays branched. Head pores above eye and operculum and along rear preopercle margin. Jaws subequal; snout short; segmented C rays 17; D VI+I,8; A I,7-8; P 19-22; LS 25-33; vertebrae 26. A tropical estuarine genus. About 4 species, 1 in our area.

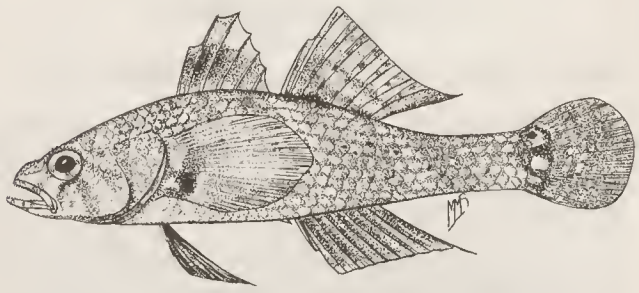
241.9 *Prionobutis koilomatodon*
(Bleeker, 1849)
PLATE 127

Mud sleeper — Modder-slaper

Eleotris koilomatodon Bleeker, 1849: 21 (Indonesia). *Eleotris delagoensis* Barnard, 1927: 811 (Delagoa Bay). *Butis caperatus:* Smith, **SFSA No. 939***. *Prionobutis koilomatodon:* Smith, 1958: 142*; 1961: 570, **No. 939***.

D VI+I,8; A 1,8; P 21-22; LS 25-28; TRB 9-10; PD 11-15; GR (4-5)+(6-8). Mouth oblique, reaching to below front of eye. Membrane connects anterior ½ of 1st gill arch to operculum; GR moderately long.

Head and body dark brown; body with 4 or 5 broad oblique bands; scales edged in dark brown. First D dark anteriorly; 2nd D and C with alternating dark brown and white spots; A and V dusky to black; P clear. Bands more distinct and fins lighter in female. Attains 75 mm. Common in Delagoa Bay; throughout Indian Ocean to China.



241.9 *Prionobutis koilomatodon*: 5.5 cm (Delagoa Bay).

Genus ***Xenisthmus*** Snyder, 1908

Head depressed; top of head, cheek and operculum scaled or naked. Anterior nostril a short tube. Gill opening reaching to between eye and rear margin of preopercle. Projecting lower jaw thickened anteriorly; lower edge of lower lip free from chin. P rays branched. Head pores developed above eye, from eye to above end of operculum, and along rear preopercle margin. Body covered with numerous small scales. Known only from coral reefs. Segmented C rays 17; 2nd D I,11-12; A I,10-11; P 14-17; LS 50-60; vertebrae 26. About 10 species, 1 in our area.

241.10 *Xenisthmus africanus*
Smith, 1958
PLATE 127

Flathead wriggler — Platkop-wikkelaar

Xenisthmus africanus Smith, 1958: 153, Fig. 10 (Pinda, Mozambique); Smith 1961: 570, **No. 944b.**

D VI+I,12; A I,11; P 15-17; LS 57-60; TRB 20-21; PD 18-20; GR 4+12. Tongue emarginate to bilobed. Body scales ctenoid behind A origin, cycloid anteriorly. Cheek and operculum with cycloid scales; predorsal scaled to just behind eye.

Dark stripe from snout through eye across operculum, onto P base and continued on body to lower C base; 6-8 dark vertical bars extending upward from lateral stripe to 2nd D base. Attains 38 mm. Known only from Indian Ocean, Bazaruto, Zanzibar, Pemba, Mafia, Aldabra, Chagos Archipelago and Cocos-Keeling Id.

Family No. 242: KRAEMERIIDAE

by D.F. Hoese

Sand darts — **Sandspiese**

Small fishes, less than 4 cm; scaleless; single dorsal fin with 4-5 flexible spines and 13-17 segmented rays; anal fin with 1 spine and 11-14 segmented rays; caudal fin with 11 segmented rays; pectoral fins small with 3-9 rays; pelvic fins separate or connected, but not forming disc; vertebrae (10-14)+(16-17) = 26-30; chin with a prominent forward projection; head with small flaps along lower edge of preopercle and often lower operculum; operculum expanded, covering pectoral base; eyes minute.

Benthic tropical fishes living buried in sand on shallow coral reefs at mouths of creeks and in estuaries. Two genera and about 8 species, one in our area.

Genus ***Kraemeria*** Steindachner, 1906

About 7 species, 1 in our area.

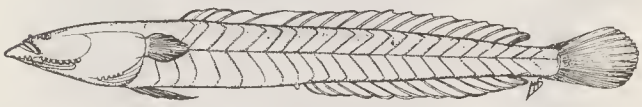
242.1 *Kraemeria samoensis*
Steindachner, 1906

Sand dart — Sandspies

Kraemeria samoensis Steindachner, 1906: 41 (Samoa); Smith, 1959: 221*; Winterbottom, 1976: 67.

D V,14; A I,13; P 7-9; V I,5; GR 0+9; vertebrae 11+16. Gill opening extends to below preopercle. Lower edge of preopercle with 6-7 small flaps. Lower edge of operculum with 5-6 flaps. Tongue bilobed. Indian Ocean specimens have fewer opercular flaps than Pacific material and may prove to be identical with *K. nudum* (Regan, 1908) from the Seychelles, which is recorded as lacking opercular and preopercular flaps.

Attains 35 mm. Indo-Pacific, south to Inhaca.



242.1 *Kraemeria samoensis:* 3 cm (Seychelles).

Family No. 243: ACANTHURIDAE

by J.E. Randall

Surgeonfishes, unicornfishes — **Doktervisse, eenhoringvisse**

This family is divisible into 3 subfamilies: the Acanthurinae, characterised chiefly by a single sharp spine folding into a groove on the side of the caudal peduncle; the Nasinae, which have 1 or 2 bony plates (which bear sharp keels in adults) on a notably thinner peduncle; and the Prionurinae, which have 3 to 10 bony peduncular plates. The Prionurinae are not represented by any species in southern Africa.

Subfamily ACANTHURINAE

Surgeonfishes — **Doktervisse**

Body ovate to oblong, and compressed. Side of caudal peduncle with a single, scalpel-like spine which folds into a groove. Dorsal and anal fins continuous and unnotched, the dorsal with 4 to 9 spines and 19 to 33 rays; anal fin with 3 spines and 18 to 28 rays; pelvic fins with 1 spine and 3 or 5 rays. Scales very small, ctenoid. Mouth small, terminal; teeth in a single row in jaws, close-set, either spatulate with denticulate edges or slender and numerous with expanded incurved tips; no teeth on palate.

Four genera with a total of 50 species; 19 species in our area. Widely distributed in tropical and subtropical seas. The largest genus, *Acanthurus,* is represented by 5 species in the Atlantic; all remaining acanthurines are Indo-Pacific

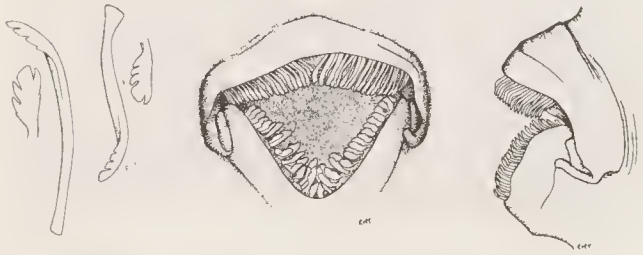
in distribution. Most surgeonfishes occur in shallow tropical waters; a few species penetrate depths to about 100 m. The species of *Ctenochaetus,* with their distinctive comb-like teeth, are detritus feeders. *Paracanthurus hepatus* and 3 species of *Acanthurus* feed mainly on zooplankton. The remaining surgeonfishes graze on benthic algae. The species of one group of *Acanthurus* (including *nigricauda, tennenti, dussumieri, mata* and *xanthopterus*) often ingest sand and have thick-walled, gizzard-like stomachs. The late postlarval stage, termed the acronurus, is transparent with silvery abdomen, orbicular, and has fine vertical grooves on the body. The caudal concavity used in diagnoses below is the difference between the lengths of the longest and shortest caudal fin rays.

KEY TO GENERA

1a D spines 4 or 5; snout strongly produced; D and A elevated ..... *Zebrasoma*
1b D spines 6-9; snout not strongly produced; D and A not elevated 2

2a V I,3; body bright blue and black, C and peduncle yellow with black edges ..... *Paracanthurus*
2b V I,5; colour not as in 2a 3

3a Teeth in jaws fixed, spatulate with denticulate edges, 8-28 in each jaw; D spines usually 9 ..... *Acanthurus*
3b Teeth in jaws flexible, slender with incurved tips which are denticulate on lateral edge, more than 30 in each jaw of adults; D spines 8 ..... *Ctenochaetus*



Teeth of *Ctenochaetus strigosus*.

Genus ***Acanthurus*** Forsskål, 1775

Thirty-seven species, 12 in our area; 4 extralimital species, *A. polyzona* (Bleeker, 1868), *A.* sp., *A. guttatus* Bloch & Schneider, 1801 and *A. melanosternon* Smith, 1955 are included in the key, as they may be found in our area. *A.* sp. is a close relative of the Pacific *A. pyroferus* Kittlitz, 1834.

KEY TO SPECIES

1a Body pale with vertical black bars; C truncate or slightly emarginate (C concavity contained more than 15 times in SL); caudal spine very small 2
1b Body not pale with black bars; C emarginate to lunate (C concavity less than 15 in SL, except *A. guttatus*); caudal spine not very small 3

2a Six black bars on head and body; A rays 19-22 ..... *A. triostegus*
2b Head and body with 12 black bars that are much broader dorsally; A rays 21-23 ..... *A. polyzona* (Mauritius, Réunion and Madagascar)

3a Snout length 6.6-8.2 in SL; 22-28 teeth in lower jaw of adults 4
3b Snout length 3.9-5.3 in SL; 22 or fewer teeth in lower jaw of adults 6

4a Body depth 1.8-2.1 in SL; D spines 6-9 ..... *A. nubilis*
4b Body depth 2.1-2.5 in SL; D spines 9 5

5a Snout 6.6-7.1 in SL; least depth of C peduncle 2.7-3.0 in head; lengthwise blue lines on head and body; reaches at least 40 cm ..... *A. mata*
5b Snout 7.9-8.2 in SL; least depth of C peduncle 2.2-2.5 in head; no blue lines on head and body; maximum length 27 cm ..... *A. thompsoni*

6a D spines 8; snout somewhat produced ..... *A. sp.* (Indonesia to Maldives and Seychelles)
6b D spines 9 (first short, embedded in skin); snout not produced 7

7a Body depth 1.5-1.6 in SL; C slightly emarginate; 3 white bars on head and body; body and D and A posterior to 2nd white bar with numerous small white spots ..... *A. guttatus* (Hawaii and Tahiti to Mauritius)
7b Body depth 1.7-2.5 in SL; C of adults emarginate to lunate; colour not as in 7a 8

8a Caudal spine length 1.9-2.0 in head; dorsal three-fourths of head and body with light blue stripes, broadly edged in black, alternating with yellow stripes ..... *A. lineatus*
8b Caudal spine length 2.1-8.0 in head; colour not as in 8a 9

9a D rays 28-30; body depth 1.7-1.9 in SL; C emarginate; body blue, the chest crossed by a broad white band; head black; D and C peduncle yellow; C black and white ..... *A. leucosternon*
9b D rays 23-28; body depth 1.8-2.3 in SL; C of adults lunate; colour not as in 9a 10

10a Prominent black spot at end of D base and a smaller one at end of A base; head and chest with numerous orange dots; body depth 2.0-2.3 in SL; maximum length 20 cm ..... *A. nigrofuscus*
10b No black spot at end of D and A bases; no orange dots on head and chest; body depth 1.8-2.3 in SL; maximum length greater than 35 cm 11

11a A horizontal black band on body extending posteriorly from upper end of gill opening (band length 4.5-7.0 in SL); adults with a black line extending anteriorly from caudal spine, gradually narrowing to a point at the front ..... *A. nigricauda*
11b Colour not as in 11a 12

12a A semicircular black mark on shoulder region, or (at a SL greater than about 10 cm) 2 elongate black bands; a white crescent posteriorly in C ..... *A. tennenti*
12b Colour not as in 12a 13

13a Throat and chest black with a transverse whitish band; rear margin of C black ..... *A. melanosternon* (Zanzibar to Mozambique and Seychelles to Aldabra)
13b Colour not as in 13a 14

14a C with numerous small black spots; sheath of caudal spine white; yellow band crossing or nearly crossing interorbital space; body with numerous, slightly wavy, pale bluish lengthwise lines; D and A of adults mainly yellow without dark bands (or with only a few narrow faint ones in outer part of fins) ... *A. dussumieri*

14b C without black spots; sheath of caudal spine brown; no yellow band crossing interorbital space (a yellowish area may extend anterior to eye but not as a distinct band); body without pale bluish lengthwise lines; D and A with alternating blue and brownish yellow lengthwise bands 15

15a P dark brown basally, outer ⅓ yellowish in specimens > 12 cm SL; D with 4 blue bands alternating with brownish yellow; caudal spine length 4.5-5.5 in head; GR 16-22 ..... *A. xanthopterus*

15b P uniform brown; D with 8 blue bands alternating with brownish yellow; caudal spine 3.0-4.4 in head; GR 20-25 ..... *A. blochii*

243.1 *Acanthurus blochii*
Valenciennes, 1835
PLATE 129

Tailring surgeon — Stertring-doktervis

Acanthurus Blochii Valenciennes, *in* Cuv. & Val., 1835: 209 (Mauritius). *Acanthurus mata* (*non* Cuvier): Randall, 1956: 218*.

D IX,25-27; A III,23-25; P 17; GR 20-25. Body depth 1.9- 2.1 in SL; eye diameter 4.2-5.0, caudal spine 3.0-4.4 in head; 16 teeth in both jaws at 84 mm SL, and 20 teeth in both jaws at 247 mm SL; C emarginate in young, lunate in adults: C concavity 6.2 in SL at 292 mm and 10 at 151 mm SL. Body dark olive to dark bluish brown (underwater usually appears almost black), with a colour phase of tiny pale spots following scale rows (this phase can be abruptly assumed and just as quickly "turned off"); head below eye with horizontal, slightly wavy, alternating lines of deep blue and dull yellow; yellowish spot nearly as large as eye behind and adjacent to lower part of eye (usually lost in preservative); a black area around caudal spine about twice as high as greatest spine width; D dull yellow with 8 or 9 longitudinal blue lines except basally in soft portion where fin becomes yellowish brown and blue bands follow rays; blue line at base of fin; A similar but with 5 or 6 blue bands; C deep blue, often with a whitish to white bar across base.

Attains at least 42 cm. Indo-Pacific, south to Durban. Closely tied to coral reefs for shelter, but often feeds on algal film on sand.

243.2 *Acanthurus dussumieri*
Valenciennes, 1835
PLATE 129

Pencilled surgeon — Potlood-doktervis

Acanthurus dussumieri Valenciennes, *in* Cuv. & Val., 1835: 201 (Mauritius). *Acanthurus bariene* (*non* Lesson): Smith, **SFSA No. 613*.** *Acanthurus dussumieri:* Randall, 1956: 213*.

D IX,25-27; A III,24-26; P 16-17; GR 22-26. Body depth 1.9-2.1 in SL (decreasing with size); eye diameter 3.4-4.7 in head; caudal spine 3-5 in head (relatively longer in larger fish); 16 upper and 18 lower jaw teeth at 94 mm SL, and 20 upper and 22 lower teeth at 325 mm SL. C lunate in adult. Brown with numerous longitudinal, slightly wavy blue lines on body; a yellow band extending anteriorly from eye, often crossing interorbital space, and a yellow area behind eye; socket of caudal spine edged in black, the spine sheath whitish; D and A yellow, sometimes becoming blue posteriorly, with a blue margin and blue band at base (2 or 3 longitudinal blue lines may be present in outer posterior part of these fins, but these are absent in large adults); C blue with numerous small black spots.

Attains 54 cm. Algoa Bay to western Pacific and Hawaiian Ids.; common on Natal coast.

243.2 *Acanthurus dussumieri:* 44 cm (Seychelles).

243.3 *Acanthurus leucosternon*
Bennett, 1832
PLATES 127 & 130

Powder-blue surgeonfish — Poeierblou-doktervis

Acanthurus leucosternon Bennett, 1832: 183 (Ceylon); Smith, 1953: 518, **No. 609a;** Randall, 1956: 198*; van der Elst, 1981: 97*.

D IX,28-30; A III,23-26; P 15-16. Body depth 1.7-1.9 in SL; 10 upper and 11 lower jaw teeth at 89 mm SL, and 11 upper and 12 lower teeth at 173 mm SL; C concavity 10-16 in SL. Body mainly blue with white chest.

Attains 23 cm. Sodwana Bay to Indonesia. A showy inshore species sometimes seen in large aggregations.

243.4 *Acanthurus lineatus*
(Linnaeus, 1758)
PLATE 129

Bluebanded surgeon — Blouband-doktervis

Chaetodon lineatus Linnaeus, 1758: 274 (Indies). *Acanthurus lineatus:* Smith, **SFSA No. 610*;** Randall, 1956: 193*; Smith, 1962: 509.

D IX,27-29; A III,25-28; P 16. Body depth of adults about 2.2 in SL; caudal spine very long, 1.9-2.0 in head; C lunate, concavity 3.3-4.5 in SL. Body with alternating black-edged blue and yellow stripes.

Attains 38 cm. Indo-Pacific; south to Durban. Replaced in the Red Sea by the related *A. sohal* (Forsskål, 1775). The strikingly coloured *A. lineatus* lives at the outer edge of reefs exposed to wave action; it is generally seen at depths of only 1 - 3 m. Territorial and very aggressive. The caudal spine is venomous.

243.5 *Acanthurus mata*

Cuvier, 1829
PLATES 127 & 130

Elongate surgeon — Lang doktervis

Chaetodon meta Cuvier, 1829: 224 (after Russell, error for *mata*). *Acanthurus mata* Valenciennes, *in* Cuv. & Val., 1835: 202. *Acanthurus lineolatus* (*non* Valenciennes): Smith, **SFSA No. 609***. *Acanthurus bleekeri*: Randall, 1956: 180*.

D IX,24-26; A III,23-24; P 16-17. Body depth 2.1-2.5 (decreasing with size), snout 6.6-6.9 in SL; mouth width 4.7-5.0 in head. Up to 24 teeth in upper jaw and 26 in lower jaw of large adults. C of adults lunate. Dark brown with lengthwise blue lines on head and body; a yellow area behind eye and 2 yellow bands extending anteriorly from eye; capable of a colour change to overall pale bluish.

Attains 50 cm. Indo-Pacific, south to Durban. Appears to feed mainly if not entirely on zooplankton. More inclined than most other surgeonfishes to enter turbid water.

243.5 *Acanthurus mata*: 22.5 cm (Seychelles).

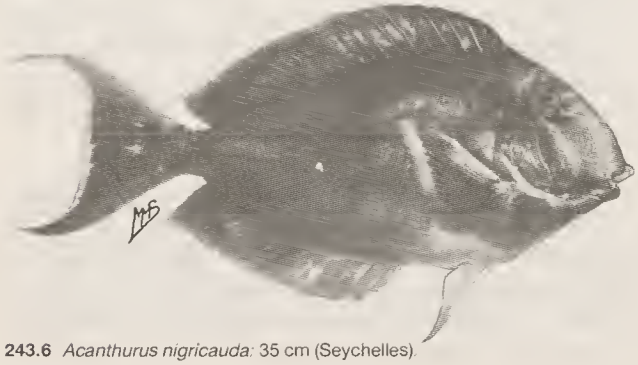
243.6 *Acanthurus nigricauda*

Duncker & Mohr, 1929
PLATE 129

Epaulette surgeon — Epaulet-doktervis

Acanthurus gahm nigricauda Duncker & Mohr, 1929 (St. Matthias Group). *Acanthurus nigricans* (*non* Linnaeus): Smith, **SFSA No. 612***. *Acanthurus gahhm* (*non* Forsskål): Randall, 1956: 207*.

D IX,25-28; A III,23-26; P 17. Body depth 1.9-2.2 in SL (smaller individuals relatively deeper bodied); caudal spine 4.5-7.5 in head; 16 teeth in both jaws at 74 mm SL, and 19 upper and 22 lower teeth at 226 mm SL. C of adults strongly lunate, C concavity 3.6 in SL at 237 mm and 6.5 at 76 mm SL. Brown (one colour phase is purplish grey) without lines on body or spots on head; a horizontal black band passing posteriorly from upper end of gill opening (band length 4.5-7.0 in SL, first appearing at 6 cm SL); a horizontal black line, progressively narrower anteriorly, extending forward from caudal spine up to half distance to P base (this line first appearing at a SL of 10 cm); an elongate purple mark may be present in front of D origin; C brown (often with a white bar across base) with a whitish posterior margin (fin of young entirely pale); P brown, outer third pale (inner half of pale zone yellow in life); remaining fins brown.



243.6 *Acanthurus nigricauda*: 35 cm (Seychelles).

Attains 40 cm. Indo-Pacific, south to Durban. Not known from the Red Sea; has been confused with a large Red Sea endemic species, *A. nigricans* Linnaeus, 1758 (*A. gahhm* Forsskål, 1775 is a synonym) which also has a black band in the shoulder region. Generally found in protected waters such as lagoons or bays, around isolated coral heads or rocks on sandy bottoms.

243.7 *Acanthurus nigrofuscus*

(Forsskål, 1775)
PLATE 129

Brown surgeon — Bruin doktervis

Chaetodon nigro-fuscus Forsskål, 1775: 64 (Red Sea). *Acanthurus nigrofuscus*: Randall, 1956: 190*; Winterbottom, 1976: 68; Smith, 1980: 179.

D IX,24-27; A III,22-24; P 16-17. Body depth 2.0-2.3 in SL; 10 upper and 12 lower jaw teeth at 55 mm SL, and 14 upper and 16 lower teeth at 148 mm SL; C lunate, concavity 4.5-6.0 in SL. Brown to lavender-brown, with or without fine bluish grey longitudinal lines on body; lips blackish; prominent black spot larger than ½ eye diameter at rear end of D base and a smaller black spot at end of A base; head and chest with numerous small orange spots (which may or may not persist as pale spots in preservative); a distinct narrow whitish border posteriorly on C; a narrow blackish edge around caudal spine socket.

A small reef species; attains about 20 cm. Indo-Pacific, to Coffee Bay, Transkei; common off Natal.

243.7 *Acanthurus nigrofuscus*: 7 cm (Natal).

243.8 *Acanthurus nubilus*

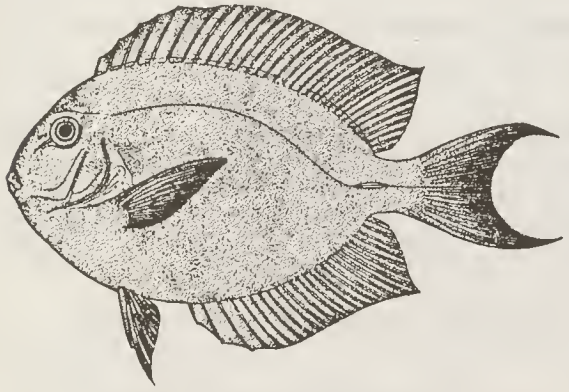
(Fowler & Bean, 1929)
PLATE 129

Bluelined surgeon — Bloulyn-doktervis

Hepatus (Harpurina) nubilus Fowler & Bean, 1929: 253, Fig. 15 (Celebes). *Acanthurus nubilus*: Randall, 1956: 179*.

D VI-IX,25-27; A III,23-24; P 16-17. Body depth 1.8-2.1, snout 6.8-7.0 in SL; mouth width about 3.8 in head; 24 upper and 28 lower jaw teeth at 153 mm SL; C concavity 6.7-9.5 in SL. Body dark yellowish brown with numerous lengthwise blue lines; a broad brownish yellow area around caudal spine; head and chest blue with numerous, close-set, round, dark yellowish brown spots (about ⅓ pupil diameter); D and A bluish grey basally, greenish brown distally, with numerous dark brown bands; C dark grey (white in life).

Largest specimen, 26 cm. Described from Celebes (Sulawesi); otherwise recorded only from the Society Ids., New Caledonia and 1 specimen, 95 mm SL, from the Mozambique Channel at 25°S from 50 fathoms. This specimen differs from the Pacific ones in having D IX,25 instead of the usual VII,27. Although this appears to be a major difference, the number of dorsal elements are the same, and the fish has the characters of *A. nubilus* in other respects. Its identification is however provisional. The Bishop Museum has specimens heretofore unreported from the Solomon Ids., Cook Ids. and Austral Ids. This species has been observed only at depths greater than about 25 m. It is usually seen well off the bottom and appears to feed on zooplankton.



243.8 *Acanthurus nubilus*: 24.5 cm holotype (after Fowler & Bean, 1929).

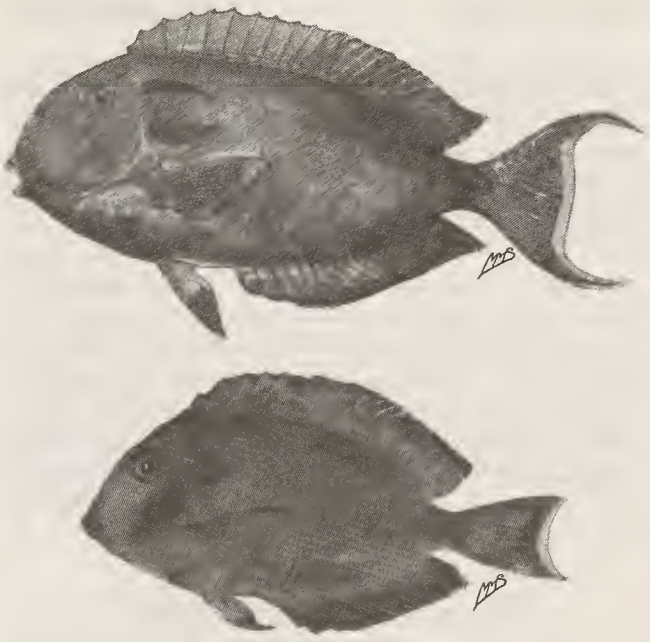
243.9 *Acanthurus tennenti*
Günther, 1861

Lieutenant surgeonfish — Luitenant-doktervis

Acanthurus tennenti Günther, 1861: 337 (Ceylon); Randall, 1956: 205*; Smith, 1980: 179. *Acanthurus bicommatus* Smith, 1955: 694, Pl. 18, Figs. C & D (Shimoni, Kenya).

D IX,23-24; A III,22-23; P 16. Body depth 1.9-2.2 (body more elongate with growth); 15 upper and 16 lower jaw teeth at 105 mm SL, and 20 upper and 22 lower at 214 mm SL; C concavity 5 in SL at 214 mm and 10 at 105 mm SL. Brown with a horseshoe-shaped black mark (open end forward) on shoulder region in fish up to 12 cm SL; above this size the mark breaks into 2 horizontal, slightly curved bands which are pointed posteriorly; caudal spine enclosed in a black area surrounded by bluish white (black area progressively larger and white margin smaller with growth); C with a white posterior border which narrows as it passes onto pointed lobes of fin (larger individuals show some white on outer edges of lobes as well).

Attains 31 cm. Western Indian Ocean from Natal to Sri Lanka. Closely related to the Pacific *A. olivaceus* Bloch & Schneider, 1801.



243.9 *Acanthurus tennenti*: top: 24.5 cm holotype (Kenya); bottom: 11 cm paratype of *A. bicommatus* (Seychelles).

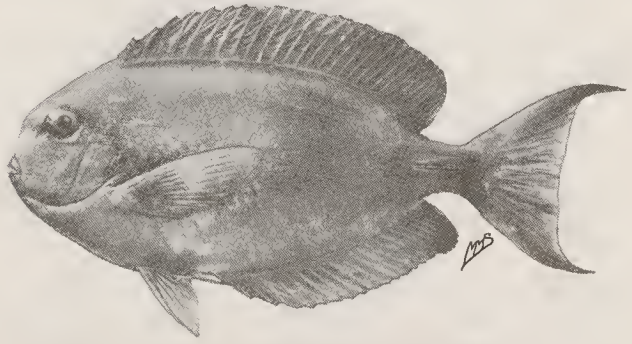
243.10 *Acanthurus thompsoni*
(Fowler, 1923)
PLATE 129

Chocolate surgeon — Sjokolade-doktervis

Hepatus thompsoni Fowler, 1923: 386 (Honolulu). *Acanthurus philippinus*: Smith, 1955: 692. *Acanthurus thompsoni*: Randall, 1956: 182*; Smith, 1980: 179.

D IX,23-26; A III,23-26; P 17. Body depth about 2.3, snout 7.9-8.2 in SL; mouth width about 4 in head; adults with 20-21 upper and 24 lower jaw teeth; C lunate, concavity about 5 in SL. Uniform brown to dark brown; a darker brown spot below and adjacent to P axil (difficult to see on dark specimens); individuals from the Pacific have white C.

Attains 27 cm. Indo-Pacific, south to Sodwana Bay. Feeds on zooplankton.



243.10 *Acanthurus thompsoni*: 20 cm (N. Mozambique).

243.11 *Acanthurus triostegus*
(Linnaeus, 1758)
PLATE 127

Convict surgeon — Bandiet-doktervis

Chaetodon triostegus Linnaeus, 1758: 274 (Indies). *Acanthurus triostegus:* Smith, SFSA No. 608*; Randall, 1956: 172*: van der Elst, 1981: 98*.

D IX,22-24; A III,19-22; P 14-16. Body depth 1.8-1.9 in SL; 12 upper and 14 lower jaw teeth at 54 mm SL, and 16 upper and 18 lower teeth at 158 mm SL. Caudal spine small; C truncate to slightly emarginate. Olivaceous grey, shading to white ventrally, with 6 narrow black bars on head and body.

Attains 27 cm, but rarely exceeds 20 cm. A common inshore species throughout the Indo-Pacific (except Red Sea and Persian Gulf); also in eastern Pacific; south to the Bashee River with postlarvae drifting as far as Algoa Bay; young abundant in tide-pools. Adults sometimes occur in large aggregations feeding on benthic algae; in such schools they overwhelm the territorial herbivorous fishes such as the damselfishes (Pomacentridae). Randall (1961) has studied the biology of the Hawaiian subspecies.

243.12 *Acanthurus xanthopterus*
Valenciennes, 1835
PLATE 129

Yellowfin surgeon — Geelvin-doktervis

Acanthurus xanthopterus Valenciennes, *in* Cuv. & Val., 1835: 215 (Seychelles); Randall, 1956: 215*. *Acanthurus fuliginosus* (*non* Lesson): Smith, SFSA No. 611*.

D IX,25-27; A III,23-25; P 16 or 17; GR 16-22. Body depth 1.8-2.25 in SL; eye diameter 4.1-5.6 in head. Caudal spine 4.5-5.5 in head; 15 upper and 16 lower jaw teeth at 97 mm SL, and 18 upper and 21 lower teeth at 320 mm SL; C concavity 4.6 in SL at 320 mm and 7 at 127 mm SL. Uniform purplish grey (can be altered quickly to a pattern of light blue-grey with highly irregular dark grey lines); a dull yellow area in front of eye, and a lesser extension of yellow posterior to lower part of eye; D and A yellowish grey basally, shading outwardly to dull yellow, with 4 longitudinal, broad, blue bands and a narrow bluish grey band at base; C purplish grey, the base often dull white; P brown basally, yellow on outer third (except extreme distal part which is hyaline).

Probably the largest of the surgeonfishes; recorded to 62.5 cm. Durban to eastern Pacific. Prefers protected deeper waters of bays and lagoons; may range over sand flats far from the shelter of reefs or rock outcrops.

243.12 *Acanthurus xanthopterus:* 30 cm (Inhaca Id.).

Genus ***Ctenochaetus*** Gill, 1885

D spines 8, the 1st small and easily overlooked. Six species, 3 in our area.

KEY TO SPECIES

1a No prominent black spot at rear end of D and A bases (young *striatus* may have a small black spot basal at rear of D only) 2
1b Prominent black spot at rear end of D and A bases ..... *C. binotatus*

2a C lunate; C concavity 3.7-6.0 in SL; D rays 27-31; A rays 24-28; body brown with longitudinal blue lines ..... *C. striatus*
2b C emarginate, the C concavity 13-20 in SL; D rays 25-27; A rays 22-25; body brown with blue dots ..... *C. strigosus*

243.13 *Ctenochaetus binotatus*
Randall, 1955
PLATE 130

Twospot bristletooth — Tweekol-borseltand

Ctenochaetus binotatus Randall, 1955: 164 (Luzon, Philippines).

D VIII,24-27; A III,22-25; P 15-16. Body depth 1.9-2.15 in SL; upper teeth with 6 denticulations (including tip) on lateral edge of distal expanded ends; lower teeth with 3 lateral denticulations (including tip); adults with as many as 42 upper and 45 lower jaw teeth; C lunate, concavity 4.5-6.4 in SL. Body orangish brown with longitudinal blue lines; blue dots on head and thorax; a prominent black spot (nearly as large as pupil) at rear end of D and A bases; D and A with faint longitudinal banding in outer part; P rays light brownish except upper 2 rays which are dark brown, the membranes clear; iris mainly blue.

Attains 22 cm. Indo-Pacific, south to Natal.

243.14 *Ctenochaetus striatus*
(Quoy & Gaimard, 1825)

Striped bristletooth — Gestreepte borseltand

Acanthurus striatus Quoy & Gaimard, 1825: 373, Pl. 63, Fig. 3 (Guam). *Ctenochaetus strigosus* (*non* Bennett): Smith, SFSA No. 614*. *Ctenochaetus striatus:* Randall, 1955: 155.

243.14 *Ctenochaetus striatus:* 24 cm (Seychelles).

D VIII,27-31; A III,24-28; P 16-17. Body depth 1.9-2.3 in SL; upper teeth with 5-7 denticulations (including tip) on lateral edge of distal expanded ends; lower teeth with 4 lateral denticulations; adults with as many as 45 upper and 53 lower jaw teeth; C lunate, concavity 3.7-6.0 in SL. Body dark brown with numerous blue longitudinal lines; small orange spots on head; soft portion of D and A with about 5 narrow lengthwise dark bluish bands.

Attains about 26 cm. Indo-Pacific, south to Natal. One of the most abundant reef fishes. Feeds on fine detrital and soft algal material by a combination of whisking with its flexible comb-like teeth and suction.

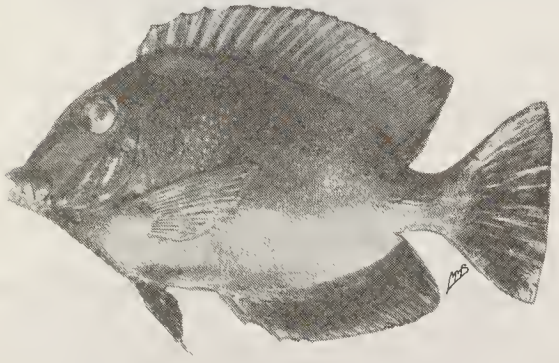
243.15 *Ctenochaetus strigosus*
(Bennett, 1828)
PLATE 130

Spotted bristletooth — Gespikkelde borseltand

Acanthurus strigosus Bennett, 1828: 41 (Hawaiian Ids.). *Ctenochaetus strigosus:* Randall, 1955: 159*. *Ctenochaetus striatus* (*non* Quoy & Gaimard): Smith, 1961: 518, **No. 614a** (in part).

D VIII,25-27; A III,22-25; P 15-16. Body depth 1.7-2.0 in SL; upper teeth with 5 denticulations (including tip) on lateral edge of distal expanded ends; lower teeth with 3 lateral denticulations (including tip); adults with as many as 47 upper and 60 lower teeth; C emarginate, concavity 13-20 in SL. Body dark brown with numerous blue dots.

Largest specimen, 18 cm. Indo-Pacific, south to Natal. Not common except in Hawaii (where *C. striatus* is absent). Population differences are evident within the range of this species. In Pacific fish the C is more emarginate (concavity 5.7-10 in SL) and the body has blue longitudinal lines similar to *C. striatus;* in Hawaiian fish, there is a conspicuous yellow ring around the eye; in fish from French Polynesia, the ring is less evident and C is white. The caudal spine once reported as venomous.



243.15 *Ctenochaetus strigosus*. 12.5 cm (N. Mozambique).

Genus ***Paracanthurus*** Bleeker, 1863

Monotypic.

243.16 *Paracanthurus hepatus*
(Linnaeus, 1766)
PLATE 130

Palette surgeon — Palet-doktervis

Teuthis hepatus Linnaeus, 1766: 507 (in part; sea of the Indies). *Acanthurus theuthis* Lacepède, 1802: 547, 549. *Paracanthurus theuthis:* Smith, **SFSA No. 607***. *Paracanthurus hepatus:* Randall, 1955: 408*.

D IX,19-20; A III,18-19; P 16; V I,3 (I,5 for other Acanthurinae). Body depth of adults about 2.3 in SL; caudal spine about 4 in head; 12 upper and 14 lower jaw teeth at 140 mm SL, and 14 upper and 17 lower teeth at 204 mm SL. C of juveniles slightly rounded, of adults truncate, lobe tips slightly projecting. Colour bright blue, yellow and black; pattern distinctive, see illustration.

Attains about 26 cm. Natal to central Pacific. In the Pacific, the body is blue ventrally instead of yellowish. Poorly represented in museum collections. Feeds on zooplankton. Generally found on reefs in clear water with moderate to strong current; the young hide among branches of live coral.

Genus ***Zebrasoma*** Swainson, 1839

Six species, 3 in our area.

KEY TO SPECIES

1a Longest D ray 2.1-2.5 in SL; body with alternating dark and light bars ..... *Z. veliferum*
1b Longest D ray 2.7-4.0 in SL; body without dark and light bars 2

2a D V (rarely IV), 23-25; A III,19-21; yellowish brown anteriorly, shading to dark brown posteriorly (including C), with wavy, light blue, longitudinal lines on body and light blue dots on nape, chest and head ..... *Z. scopas*
2b D IV,27-29; A III,24-25; dark brown with pale blue dots on head, body, and D and A; C yellow or yellowish brown ..... *Z. gemmatum*

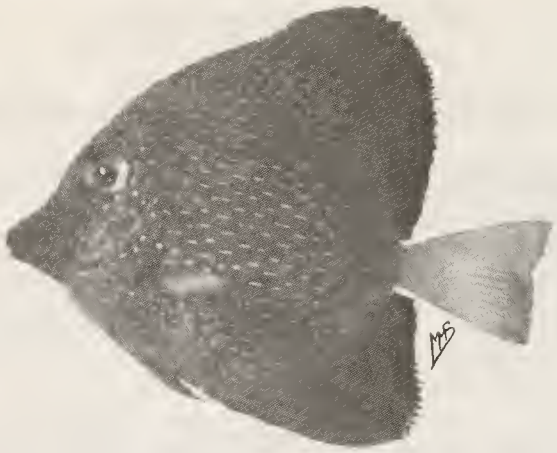
243.17 *Zebrasoma gemmatum*
(Valenciennes, 1835)

Spotted tang — Gespikkelde tang

Acanthurus gemmatus Valenciennes, *in* Cuv. and Val., 1835: 255 (Mauritius). *Zebrasoma gemmatum:* Randall, 1955: 401*; Smith, 1965: 30*; 1966: 5, Pl. 2, Fig. A only (in part; description and illustration of Mauritius specimen from a painting by Nicholas Pike is of *Z. scopas*).

D IV,27-28; A III,24-25; P 16-17. Body depth 1.7-1.9, longest D ray 3.0-3.1 in SL; no patch of setae on side of body anterior to caudal spine; 15 upper and 17 lower teeth at 121 mm SL, and 18 upper and 20 lower teeth at 179 mm SL. C truncate.

Largest specimen examined, 22 cm. Mauritius, Madagascar, Sodwana Bay and 3 specimens from Durban. A rare species; usually encountered at depths greater than 25 m.



243.17 *Zebrasoma gemmatum:* 6 cm (Natal).

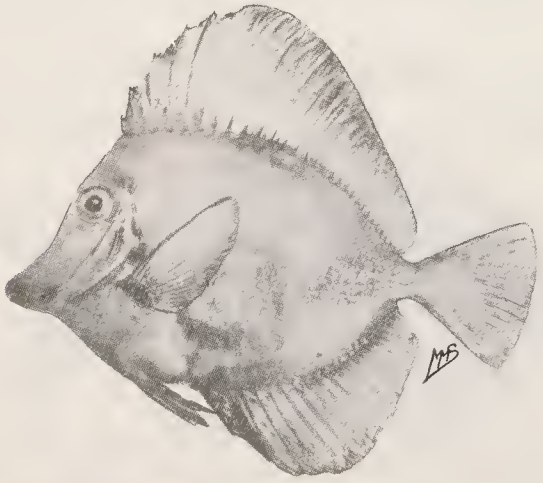
243.18 *Zebrasoma scopas*
(Cuvier, 1829)
PLATE 130

Twotone tang — Tweekleur-tang

Acanthurus scopas Cuvier, 1829: 224 (after Renard; Neira, Province of Banda). *Zebrasoma scopas:* Randall, 1955: 405*; Smith, 1980: 179. *Zebrasoma flavescens* (*non* Bennett): Smith, 1961: 568, **No. 607b.** *Zebrasoma gemmatum* (*non* Valenciennes): Smith, 1966: 7, Pl. 2, Fig. B (in part; see synonymy of *Z. gemmatum* above).

D IV-V,23-25; A III,19-21; P 14-16. Body depth 1.5-1.7 in SL; an oval, brush-like patch of setae on side of body anterior to caudal spine at sizes greater than 7 cm SL (this patch larger and the setae longer in males); longest D ray 2.7-4.0 in SL; 14 upper and 16 lower teeth at 74 mm SL, and 18 upper and 22 lower teeth at 145 mm SL. Fins dark brown except P which are clear with dusky orange rays and a narrow black upper margin. Juveniles have vertical pale lines on body instead of horizontal lines.

Attains 20 cm. A common reef species found throughout most of the Indo-Pacific region south to Natal. Occurs more on protected than exposed reefs. A number of authors have placed this species in the synonymy of the bright yellow *Zebrasoma flavescens* (Bennett), believing the two to be colour forms of a single species. They are, however, valid species, differing by an average of one D and A ray and in visceral anatomy.



243.18 *Zebrasoma scopas:* 17.5 cm (Mozambique).

243.19 *Zebrasoma veliferum*
(Bloch, 1797)
PLATE 130

Sailfin tang — Seilvin-tang

Acanthurus velifer Bloch, 1797: 106, Pl. 427, Fig. 1 (East Indies). *Acanthurus Desjardinii* Bennett, 1835: 207 (Mauritius). *Zebrasoma veliferum:* Randall, 1955: 398*; Smith, 1969: 297*. *Zebrasoma desjardins:* Smith, 1980: 179.

D IV,27-31; A III,22-24; P 15-17. Body depth 1.8-2.0 in SL; no patch of setae on side of body; D elevated, the longest ray 2.1-2.5 in SL. Dark olive brown to almost black with narrow dull yellow bars on body which may break into spots ventrally and small dull yellow spots on head and a dark brown bar through eye; D and A with broadly curving alternating bands of dark brown and dull yellow; C dark brown with small dull yellow spots. Juveniles barred with bright yellow and black.

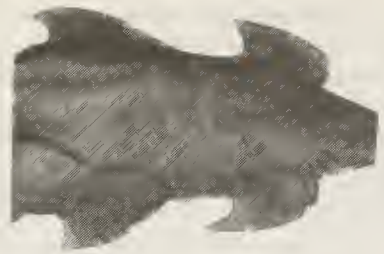
Attains 40 cm. Indo-Pacific, south to Natal. More often seen on sheltered than exposed reefs. In Pacific fish the D and A soft-ray counts of this species are higher, though overlapping those of Indian Ocean specimens, and the life colour is slightly different. Some authors have preferred to regard the Indian Ocean population as a distinct species, *Z. desjardinii.*

243.19 *Zebrasoma veliferum:* 8 cm juvenile (N. Mozambique).

Subfamily NASINAE

Unicornfishes — **Eenhoringvisse**

Body oblong or ovoid and compressed, more elongate with age. C peduncle narrow, with 1 or 2 bony plates that bear sharp lateral keels in adults. D and A continuous and unnotched, D with 4-6 spines and 24-31 rays and A with 2 spines (not counting the rudimentary nubbin under the skin at the base of the 1st visible spine) and 23-31 rays; 1st D spine strongest and usually longest; V I,3. C varying



Fixed spines of Nasinae.

from slightly rounded to deeply emarginate, the adults of some species (for at least one, only the males) developing a long posterior filament from each corner of the fin. Skin thick, almost leathery, with small thick, close-set, non-overlapping scales which are ciliate on the top. Mouth small, terminal; teeth in a single row in jaws, small, lanceolate with edges finely serrate (incisiform in one species as adult); no teeth on palate. With age many of these fishes develop a prominent convexity on the forehead or a forward-projecting rostral horn (in *Naso brachycentron,* only the male develops this horn).

One Indo-Pacific genus, *Naso* (though some authors recognise 3 genera). The subfamily is in need of revision. The present account is taken largely from the review by Smith (1966). These fishes are generally found in shallow water on coral reefs or along rocky shores, though a few penetrate depths of 100 m or more. They feed on benthic algae, especially leafy types such as *Sargassum,* or on zooplankton. Occasionally they occur in aggregations. Most species are wary, hence not easily approached by divers. The distinctive late postlarval stage of *Naso* was described as a separate genus, *Keris;* this name is still used in reference to postlarvae which resemble the acronurus stage of the Acanthurinae. Juveniles and subadults of many species are difficult to identify. The basic length measurement for species of *Naso* is FL or fork length (from front of upper jaw to end of mid C rays).

Genus ***Naso*** Lacepède, 1802

About 15 species, 12 probably in our area.

KEY TO SPECIES (AS ADULTS)

1a Two bony plates (sharply keeled in adults) on each side of C peduncle 2
1b A single bony plate on each side of C peduncle 11

2a Teeth of adults incisiform with rounded tips, smooth-edged, 30-35 or fewer in jaws; peduncular plates and keels bright orange (pale in preservative); forehead without any protuberance or horn; a curved yellow line from behind corner of mouth to below eye; D mainly yellow ..... *N. lituratus*
2b Teeth of adults lanceolate, the edges finely serrate, more than 35 in jaws; forehead with or without a protuberance or horn; colour not as in 2a 3

3a No protuberance or horn developing on forehead of adults 4
3b Prominent bump or distinct rostral projection (horn) developing on forehead of adults 5

4a Depth 2.7-3.2 in FL; tongue black ..... *N. hexacanthus*
4b Depth 3.4 in FL; tongue not black ..... *N. thorpei*

5a Forehead with a distinct bony rostral projection (horn) directed anteriorly 6
5b Forehead without a horn, the snout with a strongly convex protuberance 9

6a Prominent hump developing (at about 20 cm FL) on back below anterior soft D rays; dorsal profile of snout straight and strongly sloping (about 45°); large males with a long horn in front of upper edge of eye, the adult females with a bump at the same site ..... *N. brachycentron*
6b No hump on back beneath front of soft portion of D; dorsal profile of snout not straight and strongly sloping (except *unicornis*, both sexes of which develop a horn which does not extend anterior to mouth) 7

7a Horn not extending anterior to mouth; body depth of large adults less than 3.0 in FL; peduncular plates blue in life (blackish in preservative) ..... *N. unicornis*
7b Horn extending well anterior to mouth when fully developed; body depth of large adults greater than 3.0 in FL; peduncular plates not blue 8

8a D spines 5; angle of snout to base of horn about 60°; no dark lines or spots on head or body; large adults with a filament from each corner of C ..... *N. annulatus*
8b D spines 6; profile of snout to base of horn nearly vertical; head and body with dark lines and/or spots; no filaments on C ..... *N. brevirostris*

9a A rays 23-25; D V,24-26; bump on snout develops below level of eye, becoming somewhat acute in large adults ..... *N. fageni*
9b A rays 26-29; D V-VI,26-29; centre of bump on snout at level of lower edge of eye, this protuberance always broadly rounded 10

10a D VI,26-27; A II,27-29; profile of back smoothly convex; C truncate to rounded, large adults with a long filament from each corner; D relatively high, 1st spine 1.5-1.7 in head; vertical dark lines on side of body ..... *N. vlamingii*
10b D V,27-29; A II,26-27; a hump on back developing below anterior soft D rays; C emarginate, without filaments; D low, the first spine about 2 in head; no vertical dark lines on body (body profusely covered with small dark spots) ..... *N. tuberosus*

11a D spines 4; keel of peduncular plate rounded at all sizes; head 4.5-4.8 in FL; eye diameter 3.2-3.9 in head ..... *N. thynnoides*
11b D spines 5; keel of peduncular plate with a forward-projecting point; head in FL; eye diameter 2.9 in head ... *N. minor*

243.20 *Naso annulatus*
(Quoy & Gaimard, 1825)

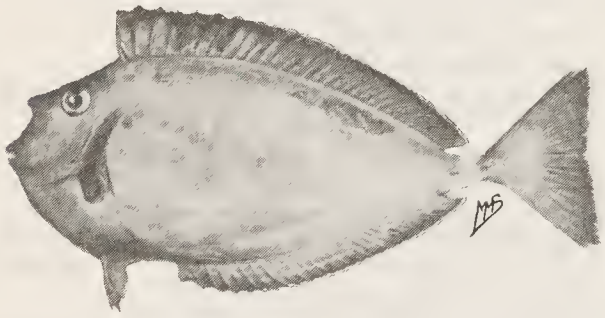
Whitemargin unicorn — Witrand-eenhoringvis

Priodon annulatus Quoy & Gaimard, 1825: 377 (Timor). *Naso annulatus:* Smith, 1961: 568, **No. 615a;** 1966: 649*. *Naso herrei* Smith, 1966:

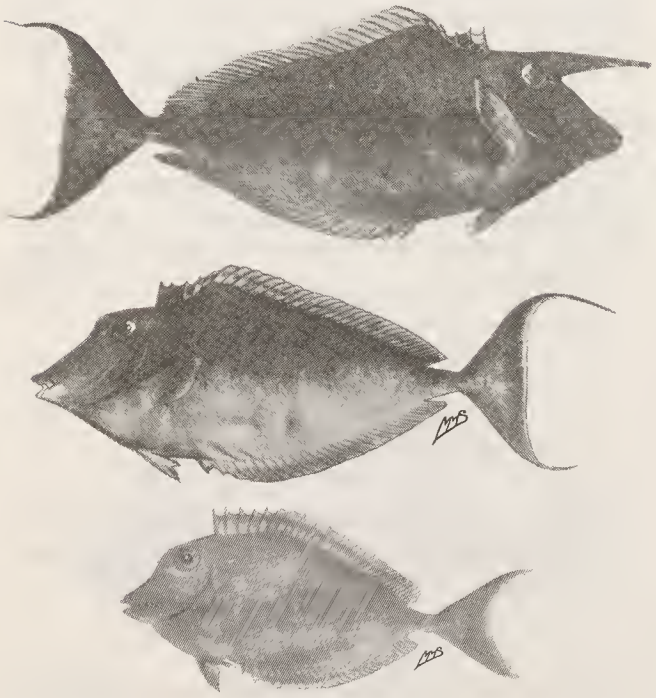
647, Figs. 12A, B (on *Naso brachycentron* (*non* Valenciennes): Herre, 1927: 448, Pl. 5, Fig. 2 (Bennett Id., Philippines)).

D V,28-29; A II,27-28; P 17-19. Body depth 2.8-3.3 in FL. Adults with a long tapering bony horn anterior to eye which can project as much as a head length anterior to mouth (precursor of horn indicated by the bump anterior to eye of the 235 mm specimen illustrated); dorsal profile of snout to base of horn about 60°; 2 peduncular plates, each developing a knife-like keel in adults; C truncate in subadults, scalloped with a long trailing filament from each corner in large adults. Olivaceous to brown, paler ventrally, without dark markings on head or body; subadult's C with a distinct white, submarginally black, hind edge; adults with C rays black, narrow membranes and C filaments white; P with a white distal margin. Juveniles reported to have a whitish ring around C peduncle.

A large species; attains at least 100 cm. Indo-Pacific, south to Natal. Although juveniles and subadults may be seen in shallow water, the large adults are rarely encountered in less than 25 m.



243.20 *Naso annulatus:* 29 cm (N. Mozambique).



243.21 *Naso brachycentron:* top: 67 cm male holotype; middle: 68 cm female paratype; bottom: 22 cm juvenile paratype of *N. rigoletto* (all N. Mozambique).

243.21 *Naso brachycentron*
(Valenciennes, 1835)

Humpback unicorn — Boggel-eenhoringvis

Naseus brachycentron Valenciennes, *in* Cuv. & Val., 1835: 275 (Caroline Ids.). *Naso rigoletto* Smith, 1951: 1128, Fig. 1 (Pinda, Mozambique). *Naso brachycentron:* Smith, 1966: 653*; Smith, 1980: 179.

D IV-V,28-30; A II,27-28; P 17. Body depth 2.6-2.9 in FL. A hump develops (at about 20 cm in length) on back below origin of soft portion of D; profile of back beneath spinous portion of D distinctly concave; males develop a long tapering horn anterior to eye which extends as much as half a head length in front of mouth; females have only a prominent bump in front of eye; dorsal profile of snout to base of horn or bump straight, forming an angle of about 45°; 2 peduncular plates, those of adults sharp, with keel ending in forward-projecting point; C emarginate, with a filament from each corner in adults (apparently longer in males). Olive-grey, shading to pale yellowish ventrally, without dark markings; rear border of C and margins of D and A white.

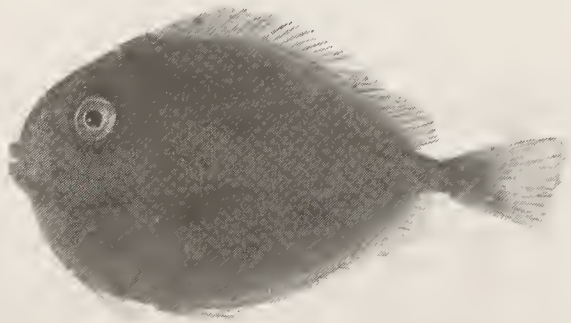
Attains at least 60 cm (reported to 90 cm). Indo-Pacific; ranges south to Natal.

243.22 *Naso brevirostris*
(Valenciennes, 1835)
PLATE 128

Spotted unicorn — Gespikkelde eenhoringvis

Naseus brevirostris Valenciennes, *in* Cul. & Val., 1835: 277, Pl. 291 (Mauritius, Moluccas and New Guinea). *Naso brevirostris:* Smith, **SFSA No. 615***; Smith, 1966: 650*. *Cyphomycter coryphaenoides* Smith, 1955: 173, Pl. 1, Fig. 2 (Bazaruto, Mozambique); 1961: 568, **No. 617d.**

D VI,27-29; A II,27-29; P 16-17. Body depth 2.5-3.0 in FL. A prominent, broad-based, tapering horn on forehead extending more than ½ a head length in front of mouth (horn first appearing as a bump on individuals about 10 cm TL); profile of snout between upper lip and base of horn very short and nearly vertical; 2 peduncular plates, the keels only moderately developed; C truncate to slightly rounded, without filaments. Ground colour varying from bluish grey to olivaceous brown; subadults with small dark spots on head and body; adults with diagonal dark lines on horn, short irregular lines on side of body (spots persisting dorsally, ventrally, and on chest); edges of lips blue; C pale, particularly distally. Often exhibits a broad pale zone on front part of body and on cheek and throat; this zone may become more intensely pale during intraspecific encounters. Another temporary colour phase is pale blue-grey without dark markings.



243.22 *Naso brevirostris:* 5 cm juvenile (Seychelles).

Reported to attain 60 cm, but 50 cm is large for the species. Indo-Pacific, south to Durban, with young drifting to Algoa Bay. Feeds on benthic algae when young, shifting principally to zooplankton as adults. The change in food habits may be associated with the development of the long horn which would impede grazing on algae (the author once saw an adult feed on algae at the tip of a pointed rock, the horn then not encumbering).

243.23 *Naso fageni*
Morrow, 1954

Horseface unicorn — Perdgesig-eenhoringvis

Naso fageni Morrow, 1954: 799 (Philippines); Smith, 1966: 655*. *Cyphomycter cavallo* Smith, 1955: 173, Pl. 1, Fig. 3 (Pinda Reef, Mozambique). *Rhinodactylus baixopindae* Smith, 1956: 686, Fig. 1 (Mozambique). *Cyphomycter fageni:* Smith, 1961: 568, **No. 617c.**

D V,24-26; A II,23-25; P 17. Body depth 2.4-3.5 in FL. Large adults with a short protuberance on snout just above upper lip, extending slightly anterior to mouth (first appearing as a small convexity at about 50 cm TL); 2 peduncular plates, each with a large curved keel and forward-projecting point in adults; C deeply emarginate, with filamentous lobes in large adults. Olivaceous grey; adults with small dusky spots.

Attains at least 80 cm. Known only from Philippines, Kenya south to Bazaruto Id., Aldabra and Seychelles.

243.23 *Naso fageni:* top: 18 cm (Aldabra); middle: 53 cm holotype of *N. cavallo* (N. Mozambique); bottom: 80 cm holotype of *Rhinodactylus baixopindae* (N. Mozambique).

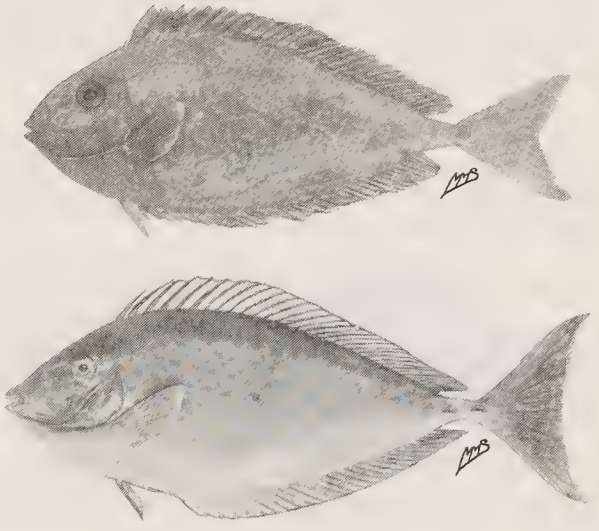
243.24 *Naso hexacanthus*
(Bleeker, 1855)

Blacktongue unicorn — Swarttong-eenhoringvis

Priodon hexacanthus Bleeker, 1855: 393, 421 (Ambon). *Naso hexacanthus:* Smith, 1966: 666*.

D VI,26-29; A II,27-30; P 17-18; upper jaw of large adults with 100 or more teeth and lower jaw with 85 or more. Body depth 2.7-3.2 in FL. Dorsal profile of head smoothly convex; 2 peduncular plates, those of full-grown adults with large, sharp, curved keel; C emarginate in young, truncate in adults. Brown to bluish grey dorsally and on sides, shading ventrally to yellowish; no dark markings; occasionally one sees a fish change its colour overall to pale blue; edges of opercle and preopercle often dark; the tongue is black at lengths of 25 cm or more. During courtship males develop a large pale blue area on upper head and dorsoanteriorly on body and some pale blue vertical lines and spots anteriorly on side of body; this pattern is rapidly assumed and just as quickly lost.

Attains about 75 cm. Indo-Pacific; south to Bazaruto, Mozambique. Often seen in shoals in mid-water near reefs. Appears to feed on zooplankton, at least as adults. Sleeps on reefs at night.



243.24 *Naso hexacanthus:* top: 30 cm (N. Mozambique); bottom: 40 cm (Pemba Id.).

243.25 *Naso lituratus*
(Schneider, 1801)
PLATE 127

Orange-spine unicorn — Oranje stekel-eenhoringvis

Acanthurus lituratus Schneider *in* Bloch & Schneider, 1801: 216 (no locality). *Naso lituratus:* Smith, **SFSA No. 617*.** *Callicanthus lituratus:* Smith, 1966: 641*.

D VI,27-30; A II,28-30; P 16 or 17; teeth of adults incisiform with rounded ends, smooth-edged, 30-35 in jaws; body depth 2.2-2.7 in FL. Dorsal profile of head forming an angle of about 45° and nearly straight; 2 peduncular plates, each with a well-developed, sharp, curved, forward-pointing keel; C emarginate, the fin of males with filamentous lobes. Olivaceous to yellowish brown, the caudal plates and keels brilliant orange (hence an example of warning coloration); narrow curved yellow

band from behind corner of mouth to below eye; diffuse yellow area behind eye; edges of lips orange-yellow; D orange-yellow with broad black band at base, a blue line below, a white outer margin and black submarginal line; C brown with rear margin white, the upper and lower margins black, joined by a black band in outer ⅓ of fin.

Attains about 45 cm total length. Indo-Pacific; south to Durban. In the Pacific the coloration is somewhat different; the yellow is absent from the D, and the C lacks the posterior white and black bands, having instead a submarginal one of pale yellow. Feeds on benthic algae. Some authors prefer to classify this species in its own genus, *Callicanthus,* largely because of the difference from other *Naso* in dentition of adults.

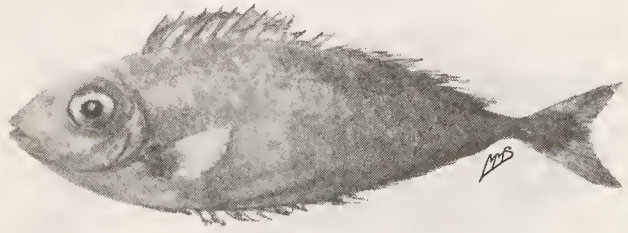
243.26 *Naso minor*
(Smith, 1966)

Slender unicorn — Slank eenhoringvis

Axinurus minor Smith, 1966: 640, Fig. 1A (Pinda Reef, Mozambique).

D V,28; A II,28; P 17; about 60 teeth in each jaw. Body elongate, the depth 3.6 in FL; dorsal profile of head with a slight convexity to snout; a single peduncular plate on each side with a well-developed, sharp, forward-projecting, lateral keel; C deeply emarginate. Colour in preservative uniform grey; P pale, other fins dark.

Described from a 186 mm FL specimen, from 45 - 55 m off northern Mozambique. The Bishop Museum has a 203 mm TL specimen from the Philippines; when fresh it had a yellow C and blackish peduncular plate.



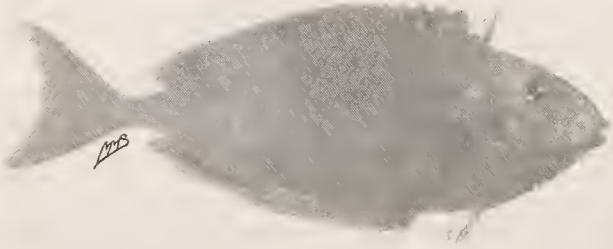
243.26 *Naso minor:* 19.5 cm holotype (Pemba Id.).

243.27 *Naso thorpei*
Smith, 1966

Nohorn unicorn — Geenhoringvis

Naso (Atulonotus) thorpei Smith, 1966: 670, Fig. 9B (Durban).

D VI,27; A II,27; P 16-17; GR 5+12 (other species with (3-4)+(8-11); teeth small, about 100-105 in upper jaw. Body depth 3.4 in FL; dorsal profile of head smoothly and moderately convex; 2 peduncular plates, each with a well-developed subquadrangular keel with short forward-projecting point; C emarginate. Colour in preservative nearly uniform brown, tongue not black.



243.27 *Naso thorpei:* 37.5 cm holotype (Natal).

Known from a 353 mm FL specimen from Durban. Distinguished from *N. hexacanthus* by having a slightly more elongate body and in lacking a dark tongue.

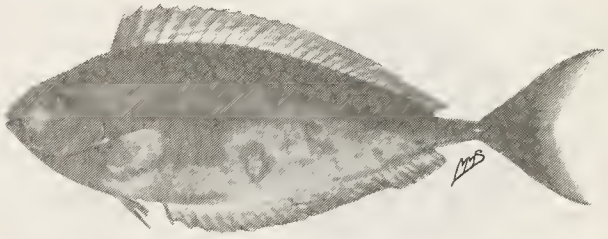
243.28 *Naso thynnoides*
(Valenciennes, 1835)

Oneknife unicorn — Eenmes-eenhoringvis

Axinurus thynnoides Valenciennes, *in* Cuv. & Val., 1835: 299, Pl. 293 (New Guinea); Smith, 1961: 568, **No. 616d;** 1966: 639*.

D IV,28-30; A II,27-29; P 17-18; about 80-90 upper and 70-80 lower teeth. Body depth 3.2-3.4 in FL; dorsal profile of head strongly sloping without a horn or bump on forehead (a slightly greater convexity to snout); a single plate on each side of C peduncle with a lateral keel that is not well developed even on fish of 30 cm FL (rounded and lacking a forward-projecting point); C emarginate. Olive brown to purplish slaty, some specimens with narrow black stripes across middle of body; rear edge of P and C yellowish; young with oblique olive-yellow lines in D and A.

Reported to 40 cm but averages no more than 25 cm. Western Pacific to east Africa, south to Bazaruto, Mozambique.



243.28 *Naso thynnoides:* 30 cm (Seychelles).

243.29 *Naso tuberosus:* top: 25 cm (Mauritius); bottom: 60 cm (N. Mozambique).

243.29 *Naso tuberosus*
Lacepède, 1802

Humpnose unicorn — Hompneus-eenhoringvis

Naso tuberosus Lacepède, 1802: 105, 111, Pl. 7, Fig. 3 (Mauritius); Smith, 1966: 657*. *Cyphomycter tuberosus:* Smith, 1961: 568, **No. 617b.**

D V,27-29; A II,26-27; P 16-18. Body depth of adults 2.6- 2.7 in FL; a hump on back at 1st D soft-ray; adults with a large broadly-rounded protuberance on snout extending in front of mouth; 2 peduncular plates nearly as large as eye diameter, each with a strong lateral keel bearing a forward-projecting point; C emarginate, without filaments. Grey with numerous small black spots on head, body, D, C and V.

Reaches at least 60 cm. Natal to Gilbert Ids.; a shallow-water reef fish.

243.30 *Naso unicornis*
(Forsskål, 1775)
PLATE 128

Bluespine unicorn — Bloustekel-eenhoringvis

Chaetodon unicornis Forsskål, 1775: 13, 63 (Red Sea). *Naso unicornis:* Smith, **SFSA No. 616*;** 1966: 645*; van der Elst, 1981: 99*.

D VI,27-30; A II,27-30; P 17-18. Body depth of adults less than 3.0 in FL; adults with a tapering rostral projection in front of eye which does not extend anterior to mouth (first sign of rostral projection is a bump before the eye at lengths of about 12 cm); dorsal profile of snout to base of horn straight, forming an angle of about 45°; C peduncle with 2 pairs of bony plates, each with a well-developed lateral keel having a forward-projecting point; C slightly emarginate in young, becoming truncate with produced lobes in adults. Light olive, the peduncular plates and keels blue (blackish in preservative); lips bluish; D and A yellowish with longitudinal narrow blue bands. At any one size, adult males are reported to have a longer horn, better developed peduncular spines, and longer C filaments than females.

Reaches 70 cm. Indo-Pacific, south to Natal. A species of coral reefs and rocky shores; enters surprisingly shallow water for such a large fish; feeds on benthic algae.

243.31 *Naso vlamingii*
(Valenciennes, 1835)
PLATE 128

Bignose unicorn — Grootneus-eenhoringvis

Naseus Vlamingii Valenciennes, *in* Cuv. & Val., 1835: 293 (Moluccas). *Cyphomycter vlamingi:* Smith, 1961: 568, **No. 617a.** *Naso vlamingii:* Smith, 1966: 660*.

D VI,26-27; A II,27-29; P 17-19. Body depth 2.6-2.9 in FL. Adults develop a prominent convexity on forehead at level of lower edge of eye; 2 bony plates on C peduncle, those of adults bearing a sharp lateral keel with forward-projecting point; D elevated, the 1st spine 1.5-1.7 in head; soft-rays almost as long as head; C truncate to slightly rounded, the fin of adults with a long filament from each corner. Young with scattered small dark spots; adults with vertical deep violet lines on side of body and small spots above and below; a broad irregular deep violet band extending anteriorly from eye; lips deep violet. In life, the fish may change these dark markings to brilliant blue.

Attains about 60 cm TL. Indo-Pacific, south to Natal. Typically found off reef fronts where it appears to feed in midwater on zooplankton; retires to the reef at night to sleep.

Family No. 244: ZANCLIDAE

by P.C. Heemstra & M.M. Smith

Moorish idol — **Moorse afgod**

Body strongly compressed, discoid, with minute rough scales. No spine on caudal peduncle. Snout produced; mouth small; teeth long, slender, bristle-like, mostly covered by the wide lips. Pelvic fins well developed. Dorsal fin spines elongated into a whip-like filament. A short spine develops in front of each eye in adults.

A single species of the tropical Indo-Pacific; possibly related to the surgeonfishes (Acanthuridae). Some eastern people treat these fishes with great respect. If one is caught, they bow to it and carefully return it to the water, hence the common name.

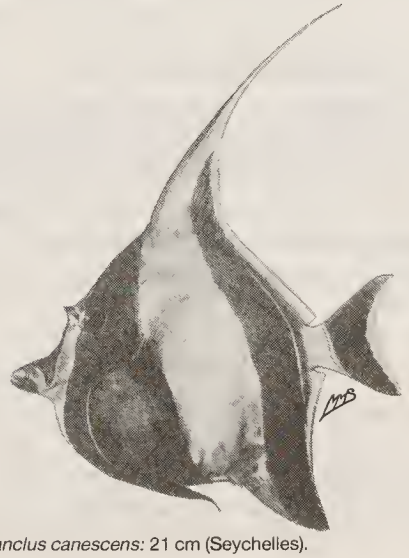
244.1 *Zanclus canescens*
(Linnaeus, 1758)
PLATE 127

Moorish idol — Moorse afgod

Chaetodon canescens Linnaeus, 1758: 272 (East Indies). *Chaetodon cornutus* Linnaeus, 1758: 273 (East Indies). *Zanclus cornutus:* Smith, **SFSA No. 618*.** *Zanclus canescens:* Smith, **SFSA No. 619.**

D VI-VII,39-42; A III,31-37; P 18-19; GR 1+10, short. First 2 D and A spines much shorter than 3rd spine.

Attains 22 cm. Usually seen in groups of 4-6 individuals swimming sedately over the reef. A coral-reef species extending from Africa to Mexico, but not in the Red Sea. Its



244.1 *Zanclus canescens:* 21 cm (Seychelles).

wide distribution is probably due to its long planktonic larval/postlarval stage. Juveniles have been found as far as Mossel Bay on our south coast.

Family No. 245: SIGANIDAE

by D.J. Woodland

Rabbitfishes **Konynvisse**

Body compressed, ovate, covered with very small scales. Pelvic fins with an inner and outer spine separated by 3 soft-rays, a character unique to the family. Dorsal fin almost invariably with 13 spines and 10 soft-rays and preceded by an embedded, procumbent spine. Anal spines 7, soft-rays 9. Jaws with a row of small, close-set, incisiform teeth.

As implied by the name, rabbitfishes feed mainly on sea weeds and grasses, but will readily take a small animal bait. Schooling species often abundant around estuarine flats, rock and coral reefs; adults of pairing species restricted to coral reefs though juveniles may occur in estuarine areas. Rabbitfishes constitute up to 60 percent of the standing crop of marketable-sized fishes of shallow reef flats. Some species used in aquaculture; flesh excellent to slightly weedy. Spines venomous; stab wounds very painful, but pain seldom lasts more than half an hour. Venom can be destroyed by immersing wound in hot (55 °C) water. Live fish are easy to identify because of characteristic, complex colour patterns. Dying, dead and preserved specimens can be difficult to identify, since many species have similar proportions and counts, and distinct species, when threatened, can adopt similar obliterating colour patterns of irregular brown blotching. Tropical Indo-Pacific, ranging from Tuamotus to east Africa. A single genus, *Siganus,* divided into 2 subgenera, *Lo* (5 spp.) and *Siganus* (22 spp.); *Lo,* characterised by a tubular snout, is not found in our area.

Genus *Siganus* Forsskål, 1775

Only 2 species definitely occurring in our area. *S. luridus* (Rüppell, 1829) may occur south of Beira, and is included in the key. *S. rivulatus* Forsskål, 1775 has been reported from our area, but the records are unconfirmed and apparently based on misidentifications of *S. sutor.* Another extra-limital species, *S. canaliculatus* (Park, 1797), is also included in the key.

KEY TO SPECIES

1a C deeply forked (except in juveniles < 10 cm); body depth about ½ SL; head, sides and C covered with a regular pattern of dark spots, equal to or larger than interspaces ..... *S. stellatus*

1b C moderately forked to truncate; body depth less than ½ SL; sides without a regular pattern of dark spots 2

2a C truncate or barely emarginate; snout blunt, equal to or shorter than eye diameter; front nostril with a long flap extending past rear nostril; sides dark brown to olive, either plain or marked with paler vermiculations; complete bars on C ..... *S. luridus* (Not known south of Beira)

2b C emarginate in juveniles to forked in adults; snout longer than eye diameter; front nostril flap reaching at most to rear nostril; only outer rays of C noticeably barred 3

3a Body depth 2.7-3.4 in SL; horizontal golden lines on lower sides, fading at death ..... *S. rivulatus* (Known only from Red Sea and Mediterranean)

3b Body depth 2.2-2.8 in SL; pearly spots on sides, often fading at death 4

4a Scale rows between LL and base of 3rd D spine 21-27; a few hundred small pearly spots, often elongated, on body ..... *S. canaliculatus* (Not known west of Arabian Sea)

4b Scale rows between LL and base of 3rd D spine 24-32; about 30-50 large round pearly spots on body ..... *S. sutor*

245.1 *Siganus stellatus*

Forsskål, 1775

PLATE 128

Starspotted rabbitfish **Sterspikkel-konynvis**

Siganus stellatus Forsskål, 1775: 26 (Jeddah, Red Sea); Smith, **SFSA No. 902a*;** Blaber, 1978: 41.

Depth 2.0-2.3; 23-28 scale rows between LL and base of 3rd D spine; P 17. Cheeks covered with strong scales. Lobes of C usually broadly rounded at tips, but upper lobe occasionally acutely pointed.

Body greyish green with small brown spots. In Red Sea specimens, the spots decrease in size towards the nape, producing an oval green patch about procumbent spine. Diffuse, eye-sized, dark blotch at LL origin, very prominent in juveniles. Attains 40 cm. Adults in pairs about coral reefs; juveniles in schools, entering estuaries in weedy areas. Kosi Bay northwards. Found on coral reefs throughout Red Sea, west and central Indian Ocean, and Andaman Sea.

245.2 *Siganus sutor*

(Valenciennes, 1835)

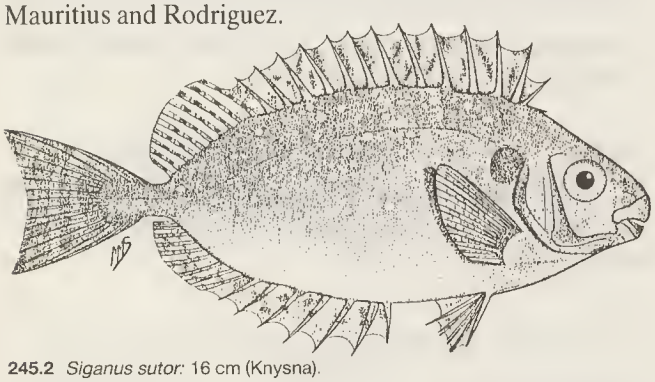
PLATE 128

Whitespotted rabbitfish **Witspikkel-konynvis**

Amphacanthus sutor Valenciennes, *in* Cuv. & Val., 1835: 148 (Seychelles; Réunion; ?Malabar, specimens from Malabar probably the closely related *S. canaliculatus*). *Siganus oramin* (*non* Bloch & Schneider): Barnard, 1927: 785 (figure, copied from Day, is not *S. sutor*); Smith, **SFSA No. 901*;** 1964: 297. *Siganus rivulatus:* Smith, **SFSA No. 902***(?) (colour pattern in figure vaguely resembles "fright" pattern of this species). *Siganus canaliculatus* (*non* Mungo Park): Smith, 1975: 65.

Depth 2.2-2.6; P 16-18. Last A spine 1.3-1.5 times in longest A spine. Cheeks with few to many fine scattered scales.

Colour in life variable, depending on mood of fish and colour of substrate; cream or pearly spots or ocelli evenly spaced over sides, largest spots bigger than pupil. Frightened, injured and dead fish marbled light and dark brown, obscuring large spots; marbling often takes the form of 6 irregular, dark diagonal zones alternating with paler; belly usually dappled with small light and dark brown spots. Dark blotch, slightly smaller than eye, sometimes present at LL origin. Attains 45 cm. Lives in schools around weedy areas of sandy flats and rock and coral reefs. Abundant from Delagoa Bay northwards, stragglers as far south as Knysna. Restricted to western Indian Ocean: South Africa to Kenya, Seychelles, Comores, Madagascar, Réunion, Mauritius and Rodriguez.



245.2 *Siganus sutor:* 16 cm (Knysna).

Family No. 246: SCOMBROLABRACIDAE

by I. Nakamura

Black mackerel **Swartmakriel**

Body moderately elongate and compressed. Upper jaws slightly protractile; 2 or 3 large fangs at front of upper jaw; strong lateral teeth of upper jaw more numerous and smaller than those of lower jaw; small teeth on vomer and palatines. Two nostrils on each side of snout. Four or 5 well-developed, denticulate gill-rakers on lower limb; about 10 clusters of minute spines on upper limb, and a large denticulate raker at corner of first arch. Base of first dorsal fin twice longer than base of second dorsal fin. No keels on caudal peduncle. Lateral line single, running close to dorsal contour. Scales irregular in size and shape, very deciduous. Vertebrae 13+17 = 30; 5th-12th vertebrae of adult with large lateral swellings into which fit evaginations of the gas-bladder (Bond & Uyeno, 1981).

A single species; placed in the Gempylidae by some authors (e.g. Grey, 1960; Gosline, 1968).

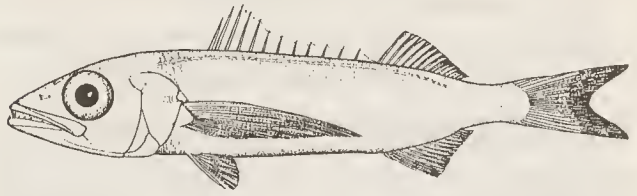
246.1 *Scombrolabrax heterolepis*
Roule, 1922

Black mackerel Swartmakriel

Scombrolabrax heterolepis Roule, 1922: 1, Figs. 1-4 (Madeira); Higgins, Mori & Uyeno, 1970: 51*; Potthoff, Richards & Ueyanagi, 1980: 331*.

D XII/15-16; A II-III,16-18; P 17-19; V I,5; LL 44-49. Depth about 3.7; head length about 3 in SL. Eye diameter about 3.4 in head.

Body uniformly dark brown. Attains about 30 cm TL. Tropical and subtropical waters of all oceans, in depths of 150 - 900 m. Larvae from Mozambique Channel, but adults not yet reported in our area.



246.1 *Scombrolabrax heterolepis* 21.5 cm SL (drawn after Nakamura).

Family No. 247: GEMPYLIDAE

by I. Nakamura

Snake mackerels **Slangmakriele**

Body elongate, compressed or somewhat fusiform (*Lepidocybium* and *Ruvettus*). Mouth large, not protractile; strong teeth in jaws, those at front of upper jaw often fang-like. Two nostrils on each side of snout. Gill-rakers reduced to small spiny tubercles, except for a large raker at angle of first arch. Two dorsal fins; base of spinous dorsal longer than that of soft-rayed fin (excluding finlets). Anal fin similar to second dorsal fin; in some species, separate finlets are present behind dorsal and anal fins. Pectorals shorter than head. Pelvics small, rudimentary or absent in adults of some species. Caudal fin forked, the rays attached only to distal edge of hypurals. No keels on caudal peduncle (except in *Lepidocybium*). Lateral line single or double. Scales small to minute (variously modified in *Lepidocybium* and *Ruvettus*). Vertebrae about 35 (more than 45 in *Gempylus, Diplospinus* and *Paradiplospinus*).

Large, swift predators found in all oceans, usually in depths of 200 - 500 m, but often migrating to the surface at night. Most species attain more than 1 m. About 15 genera and 16 species, 9 in our area; 3 extralimital species (known from tropical western Indian Ocean and/or Gulf of Guinea) are included in the key, as they are likely to be found in our area.

KEY TO GENERA AND SPECIES

1a Total D spines + rays 65-72; distance from anus to A origin more than eye diameter 2
1b Total D spines + rays 30-51; distance from anus to A about equal to eye diameter 3

2a D_1 30-36; D_2 35-42; A II,28-34; anus slightly behind middle of body; distance from anus to A equal to head length ..... *Diplospinus*
2b D_1 36-39; D_2 28-33; A II,25-31; anus well behind middle of body; distance from anus to A equal to snout length ..... *Paradiplospinus*

3a C peduncle with a prominent lateral keel and 2 small supplemental keels above and below; D_2 8-11; LL single, markedly sinuous ..... *Lepidocybium*

3b No prominent keels on C peduncle, D_1 more than 12; LL simple, single or bifurcated, but not markedly sinuous 4

4a Skin very rough; scales interspersed with spinous bony tubercles; midventral keel on belly; LL obscure ..... *Ruvettus*

4b Body smooth; scales small, cycloid; no spiny tubercles; no keel on belly; LL single or double and well developed 5

5a V rudimentary (I,0-4) or absent 6

5b V well developed (I,5) 9

6a LL single 7

6b LL double 8

7a A dagger-shaped spine followed by a minute free spine almost embedded in front of A; LL fairly straight ..... *Nealotus tripes* Johnson, 1865 (Worldwide species known from off Kenya)

7b No free spines in front of A; LL curved abruptly downward anteriorly ..... *Promethichthys prometheus* (Cuvier, 1831) (Worldwide species known from Comores)

8a Body about 5.5 times longer than head; D_1 26-32; D & A finlets 5-7; both LLs begin at upper edge of opercle ..... *Gempylus*

8b Body about 3.5 times longer than head; D_1 17-18, D & A finlets 2; lower LL branches off under 4-6th D spines ..... *Rexea*

9a LL double 10

9b LL single 11

10a D_1 17-19; dermal flaps on jaws; lower LL runs along middle of body; mouth and gill cavities not black ..... *Thyrsitoides*

10b D_1 16; no dermal flaps on jaws; lower LL runs near ventral contour; mouth and gill cavities black ..... *Neoepinnula*

11a Dermal flaps on tip of jaws; LL fairly straight; D_2 (20-21)+(2-3); A II,(16-20)+(2-3); P 13 ..... *Nesiarchus nasutus* Johnson, 1862 (Worldwide species known from Gulf of Guinea)

11b No dermal flap on tip of jaws; LL abruptly bent below posterior D spines; D_2 (10-12)+(5-7); A II-III,(8-11)+(5-7); P 14-15 ..... *Thyrsites*

Genus ***Diplospinus*** Maul, 1948

Karrer (1975) put *Paradiplospinus gracilis* in this genus, otherwise 1 species.

247.1 *Diplospinus multistriatus* Maul, 1948

Diplospinus multistriatus Maul, 1948: 42, Fig. 17 (Madeira); Karrer, 1975: 74; Mikhaylin, 1976: 321; 1983: 13-19.

D XXX-XXXVI/35-42; A II,28-34; P 11-13. Vertebrae 57-61. Head 5.3-6.0 in SL. Body very elongate and compressed; depth 13-18 in SL. LL single (or double ?) but easily removed. Anterior part of A very low. V reduced to a minute spine in adults. Soft D base about ½ that of spinous D.

Attains 25 cm SL. Reported from 3 major oceans; in our area known only off Namibia.

Genus ***Gempylus*** Cuvier, 1829

Acinacea Bory de Saint-Vincent, 1804 was mistakenly substituted for this genus by Whitley (1951), but it is a *nomen oblitum*. One species.

247.2 *Gempylus serpens* Cuvier, 1829

Snake mackerel — Slangmakriel

Gempylus serpens Cuvier, 1829: 20 (Jamaica); Smith, **SFSA No. 864***; Parin & Bekker, 1972: 151*.

D XXVI-XXXII/I-II, 10-13 + 5-7 finlets; A II,I, 10-12 + 5-7 finlets; P 12-15; V I,3-4. Body very elongate and compressed; depth about 15 in SL. LL bifurcated; both branches originating below 1st D spine; upper LL running near D to last spine; lower branch along midside to C. V minute.

Attains 1 m. Worldwide in tropical and subtropical waters; sometimes in temperate latitudes.

Genus ***Lepidocybium*** Gill, 1863

Xenogramma Waite, 1904 is a junior synonym. One species.

247.1 *Diplospinus multistriatus:* 34 cm SL (drawn after Nakamura).

247.2 *Gempylus serpens:* 100 cm (west Africa).

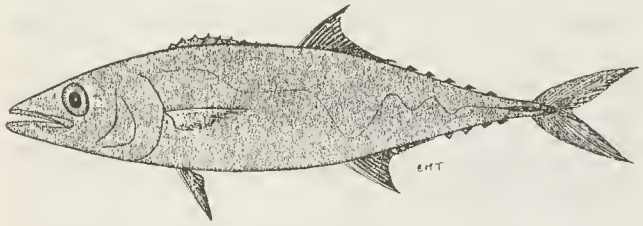
247.3 *Lepidocybium flavobrunneum*
(Smith, 1843)

Escolar Skolier

Cybium flavo-brunneum Smith, 1843: Pl. 20 (Cape of Good Hope). *Lepidocybium flavobrunneum:* Smith, **SFSA No. 862*;** Parin & Bekker, 1973: 458.

D VIII-XI/16-18 + 4-6 finlets; A 13-15 + 4-5 finlets; P 15-17; V I,5. Depth about 4.5. Scales small, each surrounded by a network of tubules bearing pores. Body uniformly dark brown, becoming almost black with age.

Attains almost 2 m. Flesh very oily, with purgative properties. Previously thought to be rare, but recently found to be sporadically distributed in tropical and subtropical waters of all oceans.



247.3 *Lepidocybium flavobrunneum:* 55 cm SL (drawn after Nakamura).

Genus ***Neoepinnula*** Matsubara & Iwai, 1952

Grey (1953) proposed 3 subspecies: *Epinnula orientalis orientalis* Gilchrist & von Bonde, *Epinnula orientalis americana* Grey, and *Epinnula orientalis pacifica* Grey; they are, however, not generally recognised as distinct.

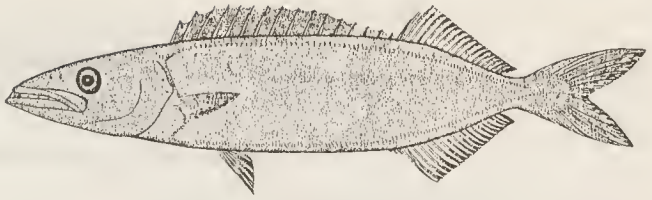
247.4 *Neoepinnula orientalis*
(Gilchrist & von Bonde, 1924)

Sackfish Sakvis

Epinnula orientalis Gilchrist & von Bonde, 1924: 15, Pl. 4, Fig. 1 (South Africa); Barnard, 1927: 790; Smith, **SFSA No. 865*.** *Neoepinnula orientalis:* Matsubara & Iwai, 1952, 196*; Parin & Bekker, 1972: 118*; Nishikawa & Nakamura, 1978: 78*.

D XVI/I,17-20; A III,19; P 13-15; V I,5. Body compressed. Depth about 4.2, head about 3.3 in SL. Upper LL with about 85 scales, lower with 30 scales from shoulder to chest and about 115 scales from chest to C base.

Attains about 30 cm. Found in all oceans near edge of continental shelf and islands.



247.4 *Neoepinnula orientalis:* 17.5 cm SL (drawn after Nakamura).

Genus ***Paradiplospinus*** Andriashev, 1960

Karrer (1975) synonymised this genus with *Diplospinus*. One species.

247.5 *Paradiplospinus gracilis*
(Brauer, 1906)

Lepidopus gracilis Brauer, 1906: 291, Pl. 12, Fig. 1 (off Walvis Bay). *Paradiplospinus antarcticus* Andriashev, 1960: 244, Figs. 1-2 (Antarctic). *Paradiplospinus gracilis:* Bussing, 1965: 215*; Parin & Bekker, 1972: 163*; Mikhaylin, 1976: 321. *Diplospinus gracilis:* Karrer, 1973: 73.

D XXXVI-XXXIX/28-33; A II,25-31; P 12-14. Vertebrae 63-67. Head 4.5-6.9 in SL. Body extremely elongate and compressed; depth 15-20 in SL. LL single, conspicuous, and not usually lost. Front of A fairly high. V reduced to a minute spine in adults. Soft D base less than ½ that of spinous D.

Attains 52 cm SL. Distribution probably circumantarctic; known from off Namibia.

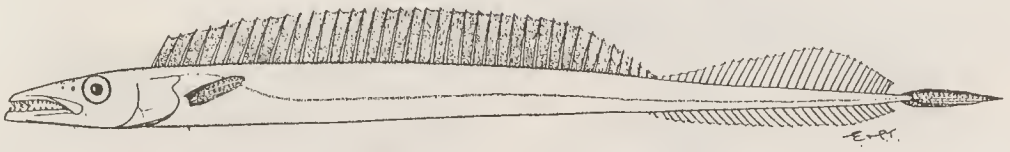
Genus ***Rexea*** Waite, 1911

Two species; *Rexea solandri* (Cuvier, 1831) known from Australia and New Zealand; it has small but distinct V, with 1 spine and 2 or 3 soft-rays, and the lower LL branches off from the upper LL at 6th or 7th D spine (at 5th D spine in *R. prometheoides*).

247.6 *Rexea prometheoides*
(Bleeker, 1856)

Thyrsites prometheoides Bleeker, 1856: 42 (Ambon). *Rexea prometheoides:* Parin & Bekker, 1972: 124*. *Rexea solandri* (*non* Cuvier): Matsubara & Iwai 1952: 204; Smith, 1968: 13*.

D XVI-XVIII/I-II,14-16 + 2; A I,13-16 + 2; P 13-14. Body compressed; depth 4 to 7, increasing with growth. LL as shown in illustration. V represented by a rudimentary spine, absent in fish more than 20 cm SL.



247.5 *Paradiplospinus gracilis:* 22 cm SL (drawn after Nakamura).

247.6 *Rexea prometheoides:* 17.5 cm (S. Mozambique).

Body blue dorsally, silvery below. Attains about 40 cm. Japan, Indonesia, and northern Australia; in our area, a specimen caught in 450 - 550 m off Bazaruto Id., Mozambique (Smith, 1968) and another taken in a bottom trawl off Maputo (Parin & Bekker, 1972); common in 200 - 500 m off Kenya.

Genus ***Ruvettus*** Cocco, 1829

One species.

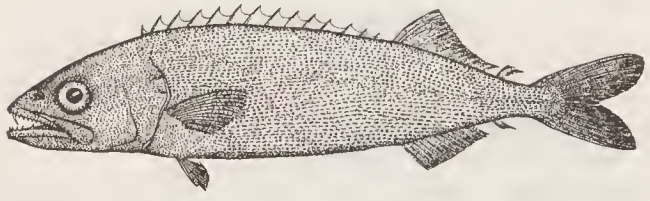
247.7 *Ruvettus pretiosus*
Cocco, 1829

Oilfish — Olievis

Ruvettus pretiosus Cocco, 1829: 21 (Messina); Smith, **SFSA No. 861*;** 1968: 13*; Parin & Bekker, 1973: 460. *Ruvettus delagoensis* Gilchrist & von Bonde, 1924: 16 (off Delagoa Bay, Mozambique); Winterbottom, 1974: 7.

D XIII-XV/15-18 + 2; A 15-18 + 1; P 13-15; V I,5. Depth about 6 in adult and 4 in juveniles. Belly keeled between V and anus. LL single, obscure. Scales minute, cycloid, interspersed with rows of sharp bony tubercles.

Attains 2 m. The oily flesh may cause diarrhoea unless it is grilled to remove the oil. Tropical and temperate parts of all oceans, in 200 - 500 m.



247.7 *Ruvettus pretiosus:* 25 cm SL (S. Mozambique).

Genus ***Thyrsites*** Lesson, 1831

Whitley (1951) mistakenly substituted *Leionura* Bleeker, 1860 as the valid generic name of *T. atun.*

247.8 *Thyrsites atun*
(Euphrasen, 1791)
PLATE 128

Snoek — Snoek

Scomber atun Euphrasen, 1791: 315 (Cape of Good Hope). *Thyrsites atun:* Smith, **SFSA No. 863*;** Parin & Bekker, 1972: 143*; Haigh, 1972: 55*; van der Elst, 1981: 172*.

D XVIII-XXI/10-12 + 5-7; A II-III,8-11 + 5-7; P 14-15; V I,5. Body compressed. Depth about 8 in SL.

Attains 2 m. Mesopelagic in cold waters of the southern hemisphere to depths of 200 m or more; often migrating to surface water at night. Feeds on wide variety of pelagic fishes, crustaceans (chiefly euphausiids) and cephalopods. Flesh tasty, eaten fresh or smoked and salted. An important commercial fish in southern Australia, New Zealand, southern South America and especially in South Africa.

Genus ***Thyrsitoides*** Fowler, 1929

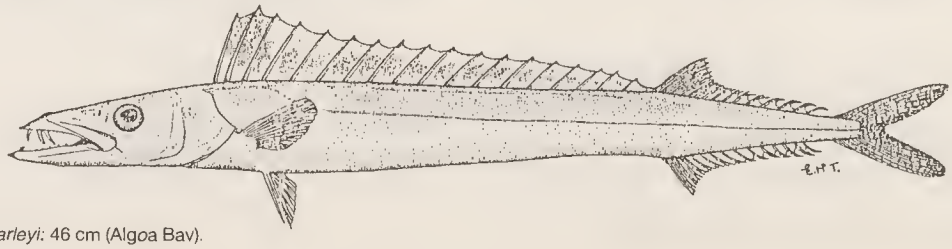
Mimasea Kamohara, 1936 is a junior synonym. One species.

247.9 *Thyrsitoides marleyi*
Fowler, 1929

Black snoek — Swart snoek

Thyrsitoides marleyi Fowler, 1929: 256, Fig. 2 (Natal, South Africa); Smith, 1937: 189; **SFSA No. 866*;** Forster, Badcock, Longbottom, Merrett & Thomson, 1970: 295*.

D XVII-XIX/I,12-13 + 4-6; A II,11-12 + 4-6; P 13-15; V I,5. Body compressed; depth about 9 in SL. A cartilaginous projection at tip of each jaw. About 195 scales in upper branch of LL and about 315 in lower branch.



247.9 *Thyrsitoides marleyi:* 46 cm (Algoa Bav).

Adults blackish brown; juveniles silvery, with black blotch at front of D. Attains 200 cm. Indo-West Pacific, south to Algoa Bay and north to Japan.

Family No. 248: TRICHIURIDAE

by I. Nakamura

Frostfishes **Kalkvisse**

Body extremely elongate and compressed, ribbon-like. Mouth large, not protractile; strong canine teeth in jaws, those at front of upper jaw fang-like; minute teeth on palatines, none on vomer. Single nostril on each side of head. Small spinescent gill-rakers present. Dorsal fin low and long, beginning shortly behind eye, anterior part with spines and posterior part with soft-rays, spinous part shorter than soft part. Pelvic fins reduced to a scale-like spine (with a rudimentary ray in *Benthodesmus*) or completely absent (*Trichiurus*). Anal fin low, or reduced to embedded short spinules. Caudal fin small and forked or absent (tapering to a point). Lateral line single. Scales absent. Body generally metallic silvery (black in *Aphanopus*), darker dorsally; pectoral fins semi-transparent; dorsal and anal fins sometimes tinged with pale yellow. Usually no distinct marks or blotches on body.

Voracious predators distributed in tropical and temperate seas of all oceans. Generally inhabit deeper waters of continental shelf and slope. *Trichiurus* and *Lepidopus* are objects of local fisheries. Flesh tasty, but scanty in *Trichiurus*.

KEY TO GENERA

1a C present, small and forked 2
1b C absent, body tapering to a point 4

2a Head profile smooth; a notch between spinous and soft parts of D 3
2b Head profile with a prominent crest; no notch between spinous and soft parts of D ..... *Lepidopus*

3a Spinous D base subequal to soft D base; 2nd postanal spine much larger than 1st ..... *Aphanopus*
3b Spinous D base about ½ length of soft D base; 2nd postanal spine short ..... *Benthodesmus*

4a Scale-like V present; P not reaching LL; head profile convex ..... *Tentoriceps*
4b V absent; P reaching LL; head profile not convex ..... *Trichiurus*

Genus ***Aphanopus*** Lowe, 1839

Head and body blackish. First postanal spine minute, usually buried beneath skin in adults. Parin (1983) recognises 5 species, of which 2 are known from our area.

KEY TO SPECIES

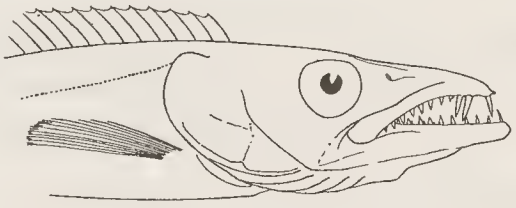
1a Total D spines + soft-rays 93-96; A II + 43-46 ..... *A. microphthalmus*
1b Total D spines + soft-rays 104-109; A II + 51-54 ..... *A. mikhailini*

248.1 *Aphanopus microphthalmus*
Norman, 1939

Aphanopus microphthalmus Norman, 1939: 71, Fig. 25 (Gulf of Aden); Parin, 1983: 1-12.

D XLI-XLIII/52-54 (total 93-96); A II + 43-46; P 12; vertebrae (44-47)+(54-56) = 99-102. Body depth 9.5, head 4.3 (60 cm SL).

Attains 100 cm. Known from 5 specimens: holotype + 1 from Equator Seamount, 2 from Aldabra Id., and 1 from Walvis Ridge. Depth range 850 - 1 022 m.



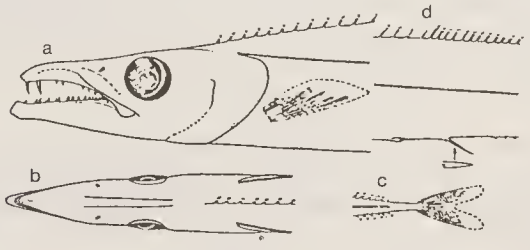
248.1 *Aphanopus microphthalmus:* head and anterior part of body of 60 cm holotype (after Norman, 1939).

248.2 *Aphanopus mikhailini*
Parin, 1983

Aphanopus mikhailini Parin, 1983: 2, Fig. 1 (Walters Shoal: 35°52′S, 40°15′E).

D XLII-XLV/61-65 (total 104-109); A II + 51-54; P 12; vertebrae (48-51)+(63-65) = 111-115. Body depth 11-12, head 5.1 (82 cm SL).

Attains 90 cm. Off Namibia, Walvis Ridge, Walters Shoal; also southeastern Indian Ocean and off Argentina. Depth range 1 035 - 1 180 m.



248.2 *Aphanopus mikhailini:* 82 cm SL holotype; a = head and anterior part of body; b = part of body above anal opening; c = caudal section of body; d = dorsal view of head (after Parin, 1983).

Genus ***Benthodesmus*** Goode & Bean, 1882

Eight species and 3 subspecies; 1 in our area.

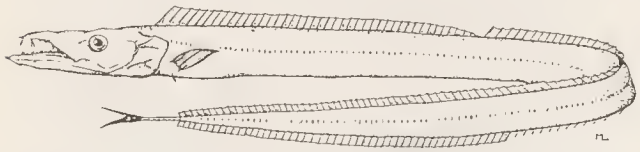
248.3 *Benthodesmus elongatus elongatus*
(Clarke, 1879)

Slender frostfish — Slank kalkvis

Lepidopus elongatus Clarke, 1879: 294, Pl. 14 (Hokitaka, South Id., New Zealand). *Benthodesmus atlanticus:* Gilchrist & von Bonde, 1924: 16; Barnard, 1927: 792. *Benthodesmus tenuis:* Smith, **SFSA No. 868*.** *Benthodesmus elongatus elongatus:* Parin & Bekker, 1970: 363; 1972: 174.

D XLIV-XLVI,98-100 (total 142-145); A II,93-101; P 12. Body extremely elongate and compressed; depth about 36, head about 9 (70 cm SL). Small cartilaginous flap at tip of each jaw. V minute, slightly posterior to P base. LL obscure.

Attains about 1 m. New Zealand, Australia and South Africa; once found off Natal. *Benthodesmus elongatus simonyi* (Steindachner, 1891) is the North Atlantic subspecies; *Benthodesmus elongatus pacificus* Parin & Bekker, 1970 is the North Pacific subspecies.



248.3 *Benthodesmus elongatus elongatus:* 43 cm (Durban).

Genus ***Lepidopus*** Gouan, 1770

Parin and Mikhailin (1982) recognise 4 species, 1 in our area.

248.4 *Lepidopus caudatus*
(Euphrasen, 1788)
PLATE 128

Buttersnoek — Bottersnoek

Trichiurus caudatus Euphrasen, 1788: 52, Pl. 9 (Fig. 2) (Cape of Good Hope). *Lepidopus caudatus:* Smith, **SFSA No. 867*;** Tucker, 1956: 93*; Smith & Smith, 1963: 133*; Parin & Bekker, 1973: 464.

D 1X,88-100; A II,61-64; P 12. Body extremely elongate and strongly compressed; head about 7, depth 11-15 (1.2 m SL). Cartilaginous flap at tip of jaws weak or absent. About 40 anterior A rays embedded; V a scale-like spine, inserted an eye diameter behind P base. Anus in about middle of body.

Attains about 2 m. Benthopelagic, down to 400 m or more. Found in inshore waters in upwelling of deep water, and often appears on surface at night during frosty weather at full moon. Mediterranean, eastern Atlantic from Norway and Iceland to South Africa, Australia and New Zealand. Sometimes caught on flesh bait but generally trawled. Flesh excellent.

Genus ***Tentoriceps*** Whitley, 1948

Monotypic.

248.5 *Tentoriceps cristatus*
(Klunzinger, 1884)

Trichiurus cristatus Klunzinger, 1884: 120, Pl. 13, Fig. 5a (Red Sea). *Tentoriceps cristatus:* Whitley, 1948: 94; Tucker, 1956: 110*; Senta, 1975: 175*. *Pseudoxymetopon sinensis* Chu & Wu, 1962: 222*.

D V,126-148; A I; P 11. Body extremely elongate and compressed; depth 17-24, head 9-11. Large cartilaginous flap on tip of lower jaw. V and A reduced to scale-like spines; A rays not visible in adult. Vertebrae (45-48)+(105-117) = 152-164.

Attains about 1 m. This species had long been known only from Klunzinger's types, but it was recently reported from Japan, the South China Sea, the Andaman Sea and the Mozambique Channel. Probably occurs in our area.

248.5 *Tentoriceps cristatus:* 30 cm (drawn after Nakamura).

Genus ***Trichiurus*** Linnaeus, 1758

One species, though many local variations have been recognised.

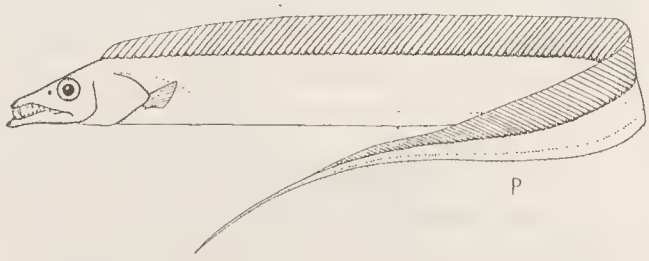
248.6 *Trichiurus lepturus*
Linnaeus, 1758
PLATE 128

Cutlass fish — Haarstert

Trichiurus lepturus Linnaeus, 1758: 246 (America and China); Smith, **SFSA No. 869*;** Tucker, 1956: 114*; Smith & Smith, 1966: 133*; Parin & Bekker, 1973: 462.

D III,124-138; A II,105-108; P 10-12. Body elongate, strongly compressed and tapering to a fine point. Head with a prominent crest. Lower rear margin of gill cover concave. Small cartilaginous knob on tip of each jaw. A not apparent, with 2 minute, triangular spines and about 105 soft-rays reduced to minute spinules.

Attains 2 m. Cosmopolitan species of tropical and temperate waters, frequently thrown ashore along our coast especially after storms. Benthopelagic, on continental shelf and slope down to 350 m depth; often enters shallow coastal waters and harbours.



248.6 *Trichiurus lepturus:* 35 cm (Port Alfred).

Family No. 249: SCOMBRIDAE

by B.B. Collette

Tunas, mackerels and bonitos — **Tunas, makriele en bonito's**

Body elongate and fusiform, moderately compressed in some genera. Snout pointed; premaxillae beak-like, free from nasal bones which are separated by ethmoid bone; mouth rather large; teeth in jaws strong, moderate or weak; no true canines; palate and tongue may be toothed. Anterior dorsal fin usually short and separated from posterior fin, depressible into a groove; finlets present behind dorsal and anal fins; pelvic fins moderate or small; caudal fin deeply forked with supporting caudal rays completely covering hypural plate. At least 2 small keels on each side of caudal peduncle, a larger keel in between in many species. Lateral line simple. Vertebrae 31-66. Body covered with small to moderate scales or a scaly corselet developed (area behind head and around pectoral fins covered with moderately large, thick scales) and rest of body naked or covered with tiny scales.

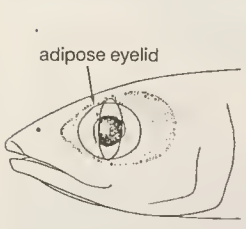
Scombrids are swift, epipelagic predators; some species occur in coastal waters, others far offshore. Many species form large schools, and most are of great importance as food-fishes both fresh and canned. If, however, the fish is left lying in the sun, histamine develops in the flesh and the peppery taste warns that it is not edible. Unlike the typical "cold-blooded" fishes, some tunas maintain elevated body temperatures several degrees above the ambient water temperature. Some species feed on plankton, others capture fishes, squids and crustaceans. Eggs and larvae planktonic. Lengths of species given here are fork length (FL), as is usual for this family. Fifteen genera and 48 species of which 12 genera and 18 species occur in our area. Recently reviewed by Collette and Nauen (1983).

KEY TO GENERA

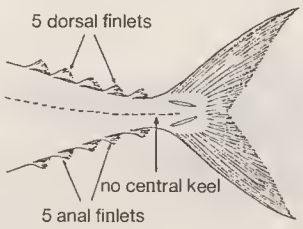
1a Body covered with large cycloid scales; V huge in juveniles, proportionally smaller at large sizes, depressible into a groove ..... *Gasterochisma*

1b Body naked or covered with small to moderate-sized scales; V small, no groove into which they fit 2

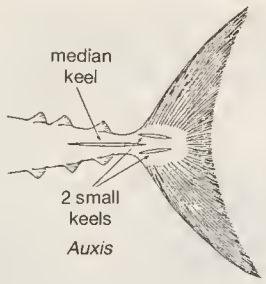
2a Two small keels on either side of C peduncle; 5 D and A finlets; adipose eyelids cover front and rear of eye 3



2a



2a



Auxis

2b Two small keels and a large median keel between them on either side of C peduncle; 6-10 D and A finlets; adipose eyelids absent 4

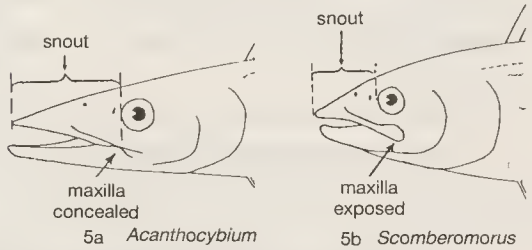
3a Entire body covered with moderately large scales; GR longer than gill filaments, plainly visible through open mouth ..... *Rastrelliger*

3b Entire body covered with small scales; GR shorter than gill filaments, barely visible through open mouth ..... *Scomber*

4a Teeth in jaws compressed, almost triangular or knife-like; corselet of scales obscure 5

4b Teeth in jaws conical, hardly compressed; corselet of scales well developed 6

5a Snout about as long as rest of head; no GR; 23-27 D spines ..... *Acanthocybium*



5a *Acanthocybium* 5b *Scomberomorus*

5b Snout much shorter than rest of head; at least 3 GR present; 15-18 D spines ..... *Scomberomorus*

6a Upper surface of tongue without cartilaginous longitudinal ridges 7

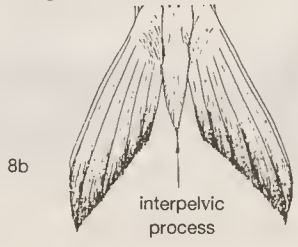
6b Upper surface of tongue with 2 cartilaginous longitudinal ridges 9

7a Teeth tiny, 40-55 on each side of upper jaw; GR 70-80; body elongate, distance from snout to 2nd D 61-65% FL ..... *Allothunnus*

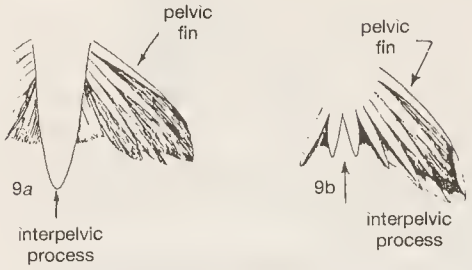
7b Teeth larger, 10-30 on each side of both jaws; GR 8-27; body less elongate, snout to 2nd D 48-61% FL 8

8a 5-10 narrow, dark longitudinal stripes on upper part of body; no teeth on tongue; interpelvic process small and bifid; teeth conical, moderate ..... *Sarda*

8b Body without stripes; 2 patches of villiform teeth on tongue; interpelvic process single; teeth conical, large ..... *Gymnosarda*



9a First and 2nd D widely separated, the space between them equal to length of 1st D base; 9-11 D spines; interpelvic process single and as long as V ..... *Auxis*



9b First and 2nd D barely separated, at most by eye diameter; 12-17 D spines; interpelvic process bifid, much shorter than V 10

10a 3-5 prominent dark longitudinal stripes on belly; GR 51-62 ..... *Katsuwonus*

10b No dark longitudinal stripes on belly; GR 19-45 (26-44 in our area) 11

11a Body naked behind corselet of enlarged and thickened scales; several black spots usually present between P and V bases; back dark blue-green with a complex striped pattern under D bases; P rays 26-29 ..... *Euthynnus*

11b Body covered with minute scales behind corselet; no black spots on body; back dark blue without stripes; P rays 30-36 ..... *Thunnus*

Genus ***Acanthocybium*** Gill, 1862

Monotypic.

249.1 *Acanthocybium solandri*
(Cuvier, 1831)

Wahoo — Wahoo

Cybium Solandri Cuvier, *in* Cuv. & Val., 1831: 192 (based on Solander's manuscript, locality unknown). *Acanthocybium solandri*: Smith, **SFSA No. 843*;** 1964: 178*; Collette & Nauen, 1983: 25*.

D XXIII-XXVII+12-16+7-10 finlets; A 12-14+7-9 finlets; P 22-24; GR 0; vertebrae (30-32)+(31-33) = 62-64. Depth 6.5-7.7; head 4.3-4.5; P 8.6-9.3. Snout and jaws elongate and beak-like. Teeth compressed, triangular, and finely serrate, 37-64 on each side of upper jaw, 31-50 in lower jaw. Villiform teeth on vomer and palatines. Swimbladder well developed. Body covered with small scales; no corselet.

Body marked with many narrow vertical bars, change rapidly at death. Attains 210 cm FL, and 83 kg. The all-tackle angling record is a 67.58 kg fish from the Bahamas taken in 1962. Epipelagic, oceanic. The wahoo is among the fastest fishes known. Rare in our waters; taken by anglers in Algoa Bay, off Durban and Sodwana Bay, and there is a record from 50 km west of Cape Point. A worldwide species of tropical and subtropical waters in all 3 major oceans and the Mediterranean Sea.

249.1 *Acanthocybium solandri*: 125 cm (Poivre Id.).

Genus ***Allothunnus*** Serventy, 1948

Monotypic.

249.2 *Allothunnus fallai*
Serventy, 1948

Slender tuna — Slank tuna

Allothunnus fallai Serventy, 1948: 132, Fig. 1 (South Id., New Zealand); Talbot, 1960: 258; Smith, 1961: 570, **No. 831b;** Talbot, 1964: 191*; Smith, 1965: 23*; Collette & Chao, 1975: 614; Collette & Nauen, 1983: 26*.

D XVII-XVIII+12-13+6-8 finlets; A 13-14+6-7 finlets; P 24-26; GR (21-25)+(49-53) = 71-78; vertebrae 20+19 = 39. Depth 4.5-6.5; head 3.7-3.9; P 7.3-8.2. Jaws with small conical teeth, 40-55 on each side of upper, 52-61 on each side of lower jaw. Vomer without teeth; broad patch of tiny teeth on palatines. Swimbladder absent. Dorsal part of body covered with small cycloid scales; anterior corselet reaching past tip of P and along bases of both D.

Body plain, without spots or bars. Attains 105 cm FL and 13.7 kg. In our area, taken at Miller's Point and Rooikrans (Cape Peninsula) and Walvis Bay. Worldwide between 20° and 50°S.

249.2 *Allothunnus fallai*: 27 cm (Walvis Bay).

Genus ***Auxis*** Cuvier, 1829

Interpelvic process single, equal in length to V. Two widespread species; apparently only 1 in our area. The smallest and most primitive of the true tunas (tribe Thun-

nini), *A. thazard* (Lacepède, 1800), is distinguished by its narrow posterior extension of the scaly corselet (1-5 scales wide below 2nd D origin) and wavy oblique dark bands on the back.

249.3 *Auxis rochei*
(Risso, 1810)

Bullet tuna — Koeël-tuna

Scomber Rochei Risso, 1810: 165 (Nice). *Auxis thazard* (*non* Lacepède): Smith, **SFSA No. 828***; Talbot, 1964: 196*. *Auxis rochei:* Talbot, 1964: 197; Collette & Nauen, 1983: 29*.

D X-XI+10-11+8 finlets; A 13-15+6-7 finlets; P 23-25; GR (9-10)+(33-37) = 42-46; vertebrae 20+19 = 39. Depth 4.1-4.7; head 3.7-3.8; P 7.8-8.1. Teeth small and conical, 45-60 on each side of upper, 50-65 on each side of lower jaw. No teeth on vomer or palatines. Swim-bladder absent. Body naked posterior to well-developed corselet which extends along LL as a band more than 6 scales wide under origin of 2nd D.

Back dark bluish, 15 or more subvertical dark bars in scaleless area above LL. Attains at least 50 cm FL and about 2 kg. Epipelagic, neritic and oceanic. Schools have been netted in Hout Bay during summer months; one specimen taken in Mossel Bay and one from Natal. Abundant from Tiger Bay northward in Angola. Cosmopolitan in warm waters.

249.3 *Auxis rochei:* 30 cm (after Collette & Nauer, 1984).

Genus ***Euthynnus*** Lütken, 1882

Three allopatric species; 1 in our area. *E. alletteratus* (Rafinesque, 1810) occurs along the west coast of Africa south to Angola where it is abundant from Tiger Bay northward. It lacks vomerine teeth and has 37-40 GR.

249.4 *Euthynnus affinis*
(Cantor, 1849)
PLATE 131

Eastern little tuna — Oostelike kleintuna

Thynnus affinis Cantor, 1849: 1088 (Sea of Pinang, Malaysia). *Euthynnus alletteratus* (*non* Rafinesque): Smith, **SFSA No. 830***; Talbot, 1964: 195. *Euthynnus affinis:* Talbot, 1964: 194*; Smith & Smith, 1966: 74*; Collette & Nauen, 1983: 33.

D XV-XVII+12-13+8 finlets; A 13-14+7 finlets; P 26-29; GR (6-9)+(23-26) = 29-35; vertebrae 20+19 = 39. Depth 3.8-4.3; head 3.5-3.7; P 5.8-6.2. Teeth small and conical, 27-43 on each side of upper, 27-37 on each side of lower jaw. A patch of teeth present on vomer, elongate patches on palatines. Swimbladder absent.

Dark spots between P and V usually appear when fish is excited or stressed. Attains about 100 cm FL and at least 13 kg. The all-tackle angling record is a 11.8 kg fish taken at Merimbula, N.S.W., Australia in 1980. Epipelagic, neritic. Cape St. Francis (or Mossel Bay?) to Delagoa Bay. Throughout warm waters of the Indo-West Pacific with a few strays caught in the eastern tropical Pacific.

Genus ***Gasterochisma*** Richardson, 1845

Monotypic. The most primitive species of the family, warranting placement in a separate subfamily, the Gasterochismatinae.

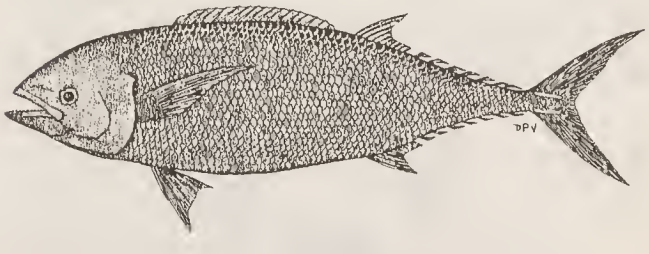
249.5 *Gasterochisma melampus*
Richardson, 1845

Bigscale mackerel — Grootskub-makriel

Gasterochisma melampus Richardson, 1845: 346 (Port Nicholson, New Zealand); Smith, **SFSA No. 844***; Collette & Nauen, 1983: 37*.

D XVII-XVIII+9-12+6-8 finlets; A 11-13+6-8 finlets; P 20-22; GR reduced to patches of spines; vertebrae (20-31)+(23) = 43-44. Depth 3.7-4.2; head 3.8-4.3; P 4.9-5.8. Teeth moderately large and conical, 25-35 on each side of upper, 20-30 on each side of lower jaw. Teeth present on vomer and palatines. Swimbladder well developed, with 2 projections penetrating deep into back of skull.

Body silvery grey without spots, stripes or other markings; V black in juveniles. Attains at least 164 cm FL. Epipelagic, oceanic. Two records from our area, one from Table Bay in 1920 and a recent one from "well south of Cape Town". Worldwide in Southern Ocean, mostly between 35° and 50°S.



249.5 *Gasterochisma melampus:* 125 cm (off Natal).

Genus ***Gymnosarda*** Gill, 1863

Monotypic.

249.6 *Gymnosarda unicolor*
(Rüppell, 1836)

Dogtooth tuna — Hoektand-tuna

Thynnus (Pelamis) unicolor Rüppell, 1836: 40, Pl. 12, Fig. 1 (Jeddah, Red Sea). *Gymnosarda unicolor:* Collette & Chao, 1967: 613; Smith, 1980: 182; Collette & Nauen, 1983: 40*.

D XIII-XV+12-14+6-7 finlets; A 12-13+6 finlets; P 25-28; GR 11-14; vertebrae 19+19 = 38. Depth 3.9-5.0; head 3.6-4.0; P 5.3-7.8. Teeth large and conical, 14-31 on each side of upper, 10-24 on each side of lower jaw; an elongate patch consisting of hundreds of tiny teeth on palatines; a few small teeth on vomer; 2 patches of fine teeth on tongue. Swimbladder well developed. Body naked behind corselet except for narrow band of scales along LL and D bases, and the caudal keel area.

Back and upper sides deep blue without any discernible pattern. The all-tackle angling record is a 206 cm FL, 131 kg fish taken in Korea in 1982. Epipelagic, usually associated with coral reefs. Tropical Indo-West Pacific, distribution not continuous, has been caught off St. Lucia.

249.6 *Gymnosarda unicolor:* 130 cm (Poivre Id.).

Genus ***Katsuwonus*** Kishinouye, 1923

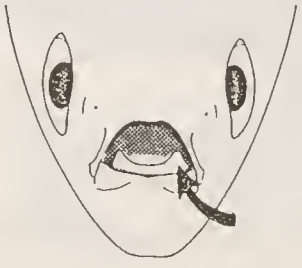
Monotypic.

249.7 *Katsuwonus pelamis*
(Linnaeus, 1758)
PLATE 131

Skipjack tuna — Pensstreep-tuna

Scomber pelamis Linnaeus, 1758: 297 ("in Pelago intertropicos"). *Euthynnus pelamis:* Smith, **SFSA No. 829*;** Smith & Smith, 1966: 74*. *Katsuwonus pelamis:* Talbot, 1964: 193; Collette & Nauen, 1983: 42*.

D XV-XVI+14-15+8 finlets; A 14-15+7 finlets; P 26-28; GR (16-21)+(34-41) = 51-62; vertebrae 20+21 = 41. Depth 3.7-4.1; head 3.1-3.4; P 6.1-7.1. Teeth small and conical, 35-40 on each side of upper, 40-45 on each side of lower jaw. No teeth on vomer or palatines. Swim-bladder absent. Body naked behind well-developed corselet.



249.7 *Katsuwonus pelamis:* head to show cartilaginous crests on tongue.

Lower sides and belly silvery with 4-6 longitudinal dark stripes. Attains 108 cm FL and 34 kg. The all-tackle angling record is a 18.14 kg fish taken at Mauritius in 1971. Epipelagic, oceanic. One of the most important tunas commercially. Common from Algoa Bay to Delagoa Bay; also taken in False Bay. Fairly abundant off Angola. Cosmopolitan in tropical and warm-temperate waters.

Genus ***Rastrelliger*** Jordan & Starks, 1908

Three species, all Indo-Pacific; only 1 in our area. Records of *Rastrelliger brachysoma* (Bleeker) from our area are based on misidentifications of *R. kanagurta*. The range of *R. brachysoma* does not extend far west of Madras, India. It is a deeper-bodied species (body depth greater than head length) with a much longer intestine (3.0-3.4 times body length compared to 1.3-1-7 times longer in *R. kanagurta*).

249.8 *Rastrelliger kanagurta*
(Cuvier, 1816)
PLATE 131

Indian mackerel — Indiese makriel

Scomber kanagurta Cuvier, 1816: 313 (based on Russell's Pl. 136, India). *Rastrelliger kanagurta:* Smith, **SFSA No. 837*;** 1964: 179*; Collette & Nauen, 1983: 48*. *Rastrelliger brachysoma* (*non* Bleeker): Smith, **SFSA No. 838.**

D IX-XI+12+5 finlets; A 1+12+5 finlets; P 19-20; GR (15-22)+(31-41) = 48-59; vertebrae 13+18 = 41. Depth 3.4-4.0; head 3.5-3.8; P 7.1-8.5. Jaw teeth very small, conical and numerous. No teeth on vomer or palatines. Swimbladder present.

Back blue-green, sides silver with golden tint, narrow dark longitudinal bands on upper part of body (golden in fresh specimens). A black spot on body near lower margin of P. Attains 35 cm FL. Epipelagic, neritic. Durban northwards to Red Sea; widespread in Indo-West Pacific. Has entered the eastern Mediterranean Sea through the Suez Canal.

Genus ***Sarda*** Cuvier, 1829

Three mostly allopatric species; 2 in our area, overlapping in Natal.

KEY TO SPECIES

1a GR 9-13; D XVII-XIX; vertebrae 44-45 ..... *S. orientalis*
1b GR 18-22; D XX-XXIII; vertebrae 52-54 ..... *S. sarda*

249.9 *Sarda orientalis*
(Temminck & Schlegel, 1844)
PLATE 131

Striped bonito — Gestreepte bonito

Pelamys orientalis Temminck & Schlegel, 1844: 99, Pl. 52 (Japan). *Sarda orientalis:* Smith, **SFSA No. 832*;** Smith & Smith, 1966: 75*; Collette & Chao, 1975: 603; Collette & Nauen, 1983: 52*.

D XVIII-XIX+15-16+6-9 finlets; A 14-15+6-7 finlets; P 24-26; GR (2-3)+(7-10) = 9-13; vertebrae (23-25)+(20-22) = 44-45. Depth 4.2-4.9; head 3.3-3.5; P 8.8-10.4. Jaw teeth conical, moderately large, 13-19 on each side of upper, 11-15 on each side of lower jaw; 8-19 teeth on palatines, none on vomer. Swimbladder absent. Body covered with small cycloid scales behind well-developed corselet.

Five to 10 dark, slightly oblique stripes running forward and downward across back. Attains 102 cm FL, and at least 11 kg. The all-tackle angling record is a 10.65 kg fish taken in 1975 at Seychelles. Epipelagic, neritic. Cape St. Francis northwards to Natal coast; widespread in Indo-Pacific, but distribution not continuous.

249.10 *Sarda sarda*
(Bloch, 1793)
PLATE 131

Atlantic bonito — Atlantiese bonito

Scomber sarda Bloch, 1793: 44, Pl. 334 (Europe). *Sarda sarda:* Smith, **SFSA No. 833*;** Smith & Smith, 1966: 75*; Collette & Chao, 1967: 607*; Collette & Nauen, 1983: 53*.

D XXI-XXIII+15-18+7-9 finlets; A 15-16+6-7 finlets; P 23-24; GR (5-7)+(13-15) = 18-22; vertebrae (27-28)+(25-26) = 52-54. Depth 4.1-4.9; head 3.7-3.9; P 7.7-9.2. Jaw teeth conical, moderately large, 17-24 on each side of upper, 13-19 on each side of lower jaw. Teeth present on palatines (8-21), sometimes on vomer. Swimbladder absent. Body covered with small cycloid scales behind well-developed corselet.

Five to 10 slightly oblique dark stripes running forward and downward on dorsal part of body. Attains 85 cm FL and 8 kg; the all-tackle angling record is a 7.6 kg fish taken in 1980 at Puerto Rico. Epipelagic, neritic. Abundant off Angola and northern Namibia. Large schools frequently appear in coastal waters between Cape Point and Mossel Bay during summer months. Range extends apparently seasonally to Port Alfred, and perhaps as far as Durban; tropical and temperate coasts of Atlantic Ocean, Mediterranean and Black seas.

249.10 *Sarda sarda:* head to show teeth and no cartilaginous crests on tongue.

Genus ***Scomber*** Linnaeus, 1758

Three species; 1 in our area.

249.11 *Scomber japonicus*
Houttuyn, 1782
PLATE 131

Mackerel — Makriel

Scomber japonicus Houttuyn, 1782: 331 (Japan); Smith, **SFSA No. 839*;** de Jager et al., 1963: 13; Smith, 1964: 179*; Smith & Smith, 1966: 94*; Baird, 1977: 347; Collette & Nauen, 1983: 56*. *Scomber capensis* Cuvier, *in* Cuv. & Val., 1831: 56 (Cape of Good Hope). *Scomber gigas* Fowler, 1935: 378, Fig. 16 (Durban).

D IX-X+12+5 finlets; A I+12+5 finlets; P 19-21; GR (12-15)+(27-34) = 39-46; vertebrae 14+17 = 31. Depth 4.8-6.8; head 3.6-4.0; P 8.1-9.3. Jaw teeth fine and conical, 50-70 on each side of upper, 35-50 on each side of lower jaw. Two patches of teeth on vomer; double row of teeth anteriorly on palatines changing to 1 row posteriorly. Swimbladder present; 12-15 interneural bones under 1st D. Space between rear end of D groove and origin of 2nd D subequal to D groove.

Attains 50 cm FL. Epipelagic and demersal to depths of 250 - 300 m. Fairly common about the Cape, becoming scarcer toward Natal. Cosmopolitan in warm waters.

249.11 *Scomber japonicus:* pelvic fin and single interpelvic process.

Genus ***Scomberomorus*** Lacepède, 1802

The Gulf of Guinea *S. tritor* (Cuvier) was thought to occur in our area under this name or as *S. maculatus* (Mitchill, 1815) (see Smith, **SFSA No. 842***), but its range stops in Angola. Eighteen species; 2 in our area; swimbladder present in both.

KEY TO SPECIES

1a LL curving abruptly downward below 2nd D; GR 3-6; body of adults crossed by many narrow bars ..... *S. commerson*

1b LL straight or gradually descending posteriorly; GR 12-15; body with various combinations of spots and lines, but without narrow vertical bars 2

2a Body marked with broken lines and some small spots; A 19-22 ..... *S. plurilineatus*

2b Body marked with about 3 rows of vertically elongated spots; A 17-20 ..... *S. tritor* (Angola northward)

249.12 *Scomberomorus commerson:* 115 cm (Kenya).

249.12 *Scomberomorus commerson*
(Lacepède, 1800)
PLATE 131

King mackerel — Katonkel

Scomber commerson Lacepède, 1800: 598, Pl. 20, Fig. 1 (after a figure from Commerson's manuscripts; locality unknown). *Scomberomorus commerson:* Smith, **SFSA No. 840*;** Collette & Russo, 1979: 9. *Scomberomorus commersoni:* Smith, 1964: 175*; Smith & Smith, 1966: 72*; Collette & Nauen, 1983: 63*.

D XV-XVIII+16-18+9-10 finlets; A 17-19+9-10 finlets; P 21-23; GR (0-1)+(3-5) = 3-6; vertebrae (19-20)+(23-25) = 42-45. Depth 5.0-6.3; head 4.3-5.1; P 7.4-8.3. Jaw teeth large, triangular and compressed, 12-31 on each side of upper, 9-23 on each side of lower jaw; vomer and palatines with teeth. Body covered with moderate-sized cycloid scales; no distinct corselet.

Attains 220 cm FL. The all-tackle angling record is a 46.4 kg fish caught off Ifafa, Natal in 1983. Epipelagic, neritic; often caught near Algoa Bay and Mossel Bay; there is a 1944 record of a large school in False Bay. Wrongly called "baracouta", "cuda", "couta" or "barracouda" by some anglers in Natal; the true barracudas are in the Family Sphyraenidae. Widespread throughout Red Sea and Indo-West Pacific.

249.13 *Scomberomorus plurilineatus*
Fourmanoir, 1966
PLATE 131

Queen mackerel — Gespikkelde katonkel

Scomberomorus leopardus (*non* Shaw): Smith, **SFSA No. 841*.** *Scomberomorus lineolatus* (*non* Cuvier): Williams, 1960: 183*. *Scomberomorus guttatus* (*non* Bloch & Schneider): Smith, 1964: 176*; Smith & Smith, 1966: 73*. *Scomberomorus plurilineatus* Fourmanoir, 1966: 223, Fig. 1 (Madagascar); Collette & Russo, 1979: 13; Collette & Nauen, 1983: 73*; Collette & van der Elst, 1984.

D XV-XVI+19-21+8-10 finlets; A 19-22+8-10 finlets; P 22-25; GR (2-3)+(9-13) = 12-15; vertebrae (19-20)+(25-29) = 45-46. Depth 4.4-4.5; head 4.5-5.7; P 8.0-10.2. Jaw teeth large, triangular and compressed, 13-23 on each side of upper, 12-19 on each side of lower jaw.

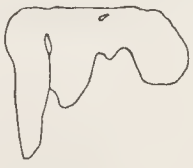
Body covered with moderate-sized scales; no distinct corselet. Attains 120 cm FL; South African angling record 10 kg. Epipelagic, neritic. Confined to western Indian Ocean from Tsitsikama to Kenya and Madagascar west coast.

Genus ***Thunnus*** South, 1845

Seven species; 5 in our area. Reports of *Thunnus atlanticus* (Lesson, 1831), which is confined to the western Atlantic, appear to have been based on misidentified specimens of *T. obesus*.

KEY TO SPECIES

1a Ventral surface of liver without striations, right lobe longer than other 2 lobes; 2nd D and A long (over 20% FL in some large adults) ..... *T. albacares*



Liver of *T. albacares*

Liver of *T. alalunga*

1b Ventral surface of liver covered with striations, 3 lobes subequal or centre lobe longest; 2nd D and A short 2

2a GR 31-44; P less than 80% head length; not reaching vertical at last D spine 3

2b GR 23-31 (26-31 in our area); P more than 80% head length, reaching at least to 2nd D 4

249.13 *Scomberomorus plurilineatus:* 77.5 cm (off Natal).

3a P 20-23% FL; caudal keels yellow; GR 32-36 ..... *T. maccoyii*
3b P 17-21% FL; caudal keels dark; GR 38-44 ..... *T. t. thynnus*

4a C with narrow white rear margin; maximum body depth at, or only slightly anterior to, 2nd D; P usually 30% FL or longer, reaching well beyond origin of 2nd D, usually to 2nd D finlet; A finlets dark ..... *T. alalunga*
4b C without white margin; maximum body depth near middle of 1st D base; P 22-31% FL in fish over 110 cm FL, but much longer in smaller specimens; A finlets bright yellow, narrowly edged with black ..... *T. obesus*

249.14 *Thunnus alalunga*
(Bonnaterre, 1788)

Albacore Albakoor

Scomber alalunga Bonnaterre, 1788: 139 (Sardinia). *Germo alalunga:* Smith, **SFSA No. 836;** Hecht & Hecht, 1978: 211*. *Thunnus alalunga:* Talbot & Penrith, 1962: 558; 1963: 609; Talbot, 1964: 199*; Gibbs & Collette, 1967: 99; Talbot & Penrith, 1968: 12; Collette & Nauen, 1983: 81*.

D XII-XIV+13-16+7-9 finlets; A 13-15+7-9 finlets; P 31-36; GR (7-10)+(19-21) = 26-31; vertebrae 18+21 = 39. Depth 3.7-4.1; head 3.3-3.5.

Attains 127 cm FL, common to 100 cm. The all-tackle angling record is a 40 kg fish taken at the Canary Islands in 1977. Epipelagic and mesopelagic, oceanic. Also called "long-finned tunny", this is the species marketed as white-meat tuna. Known here primarily from long-line catches off the western Cape region; schools have been found several hundred miles west of Walvis Bay. Cosmopolitan between 45°-50°N and 30°-40°S.

249.14 *Thunnus alalunga:* 100 cm (after Collette, 1984).

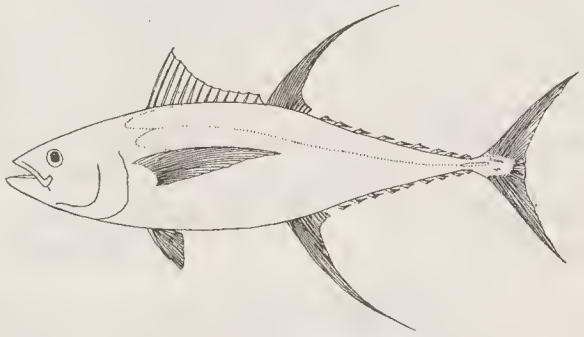
249.15 *Thunnus albacares*
(Bonnaterre, 1788)
PLATE 131

Yellowfin tuna Geelvin-tuna

Scomber albacares Bonnaterre, 1788: 140 (Jamaica). *Germo albacora:* Smith, **SFSA No. 835*.** *Germo itosibi:* Smith, **SFSA No. 834*.** *Thunnus albacares:* Talbot & Penrith; 1962: 558; 1963: 617; Talbot, 1964: 205*; Smith & Smith, 1966: 76*; Gibbs & Collette, 1967: 102; Talbot & Penrith, 1968: 8; Collette & Nauen, 1983: 83*.

D XII-XIV+13-16+8-10 finlets; A 12-15+7-10 finlets; P 33-36; GR (7-9)+(20-23) = 27-32; vertebrae 18+21 = 39. Depth 3.8-4.5; head 3.2-3.5.

Belly frequently crossed by about 20 broken, nearly vertical lines of light spots; D and A and finlets bright yellow; finlets with narrow black borders. Second D and A of some adults become very long, and these fish were considered to be a separate species, *Neothunnus itosibi.* Attains 200+ cm FL. The all-tackle angling record is a 176.4 kg fish from the west coast of Mexico taken in 1977. Epipelagic, oceanic, above and below the thermocline. Abundant off Angola. Found seasonally right round our coast; during summer months large schools frequently congregate in the Agulhas Bank area and off Cape Point and Gansbaai. An important food-fish taken by long-line off the Cape and by anglers in Natal. Worldwide in tropical and subtropical seas.



249.15 *Thunnus albacares:* sketch of 135 cm specimen from Providence Id. to show elongation of fin lobes with growth.

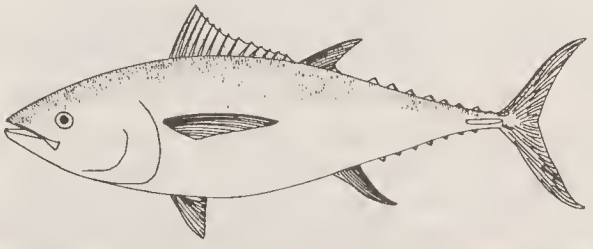
249.16 *Thunnus maccoyii*
(Castelnau, 1872)

Southern bluefin tuna Suidelike blouvin-tuna

Thynnus maccoyii Castelnau, 1872: 104 (Melbourne, Australia). *Thunnus thynnus maccoyi:* Talbot & Penrith, 1962: 558. *Thunnus thynnus orientalis* (*non* Temminck & Schlegel): Talbot & Penrith, 1963: 630; Talbot, 1964: 201*. *Thunnus maccoyii:* Gibbs & Collette, 1967: 115; Talbot & Penrith, 1968: 11; Collette & Nauen, 1983: 87*.

D XII-XIV+13-15+8-10 finlets; A 13-16+7-9 finlets; P 31-36; GR 10+(22-26) = 32-36. Depth 3.7-3.9; head 3.3-3.4.

Attains at least 225 cm FL. The all-tackle angling record is a 158 kg fish from New Zealand taken in 1981. Epipelagic,



249.16 *Thunnus maccoyii:* ca. 200 cm (after Talbot, 1964).

oceanic in cold temperature waters. A valuable food-fish taken mostly by long-line. In our waters known only from long-line catches off the Cape region during winter. Probably found throughout the southern oceans south of 30°S.

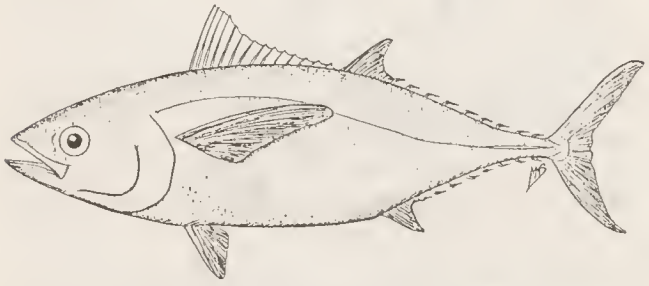
249.17 *Thunnus obesus*
(Lowe, 1839)

Bigeye tuna — Grootoog-tuna

Thynnus obesus Lowe, 1839: 78 (Madeira). *Thunnus obesus:* Talbot & Penrith, 1961: 240; 1962: 558; Talbot, 1963: 624; 1964: 203*; Gibbs & Collette, 1967: 109; Talbot & Penrith, 1968: 12; Collette & Nauen, 1983: 88*. *Thunnus atlanticus* (*non* Lesson): Smith, 1961: 569, **No. 831a***.

D XIII-XIV+14-16+8-10 finlets; A 11-15+7-10 finlets; P 31-35; GR (7-9)+(18-20) = 26-29; vertebrae 18+21 = 39. Depth 3.2-3.8; head 3.1-3.4.

Frequently confused with yellowfin tuna, but differs in having a heavier, thicker-set body and shorter 2nd D and A. Attains 200+ cm FL. The all-tackle angling record is a 197.3 kg fish from Cabo Blanco, Peru, taken in 1957. Epipelagic and mesopelagic from the surface to 250 m, oceanic. An important food-fish in many parts of its range. Worldwide in tropical and subtropical waters. In our waters, known primarily from long-line catches off the Cape region.



249.17 *Thunnus obesus:* 90 cm (off Cape Point).

249.18 *Thunnus thynnus thynnus*
(Linneaus, 1758)
PLATE 131

Bluefin tuna — Blouvin-tuna

Scomber thynnus Linnaeus, 1758: 297 ("inter Tropicos in Pelago"). *Thunnus thynnus:* Smith, **SFSA No. 831***; Talbot & Penrith, 1962: 558; 1968: 10; Collette & Nauen, 1983: 90*. *Thunnus thynnus thynnus:* Talbot & Penrith, 1963: 637; Talbot, 1964: 202; Gibbs & Collette, 1967: 116.

D XII-XIV+13-15+8-10 finlets; A 13-16+7-9 finlets; P 30-36; GR (12-15)+(26-31) = 38-44; vertebrae 18+21 = 39. Depth 3.7-4.0; head 3.6-3.9.

First D yellow or bluish, 2nd reddish-brown; A and finlets dusky yellow, edged with black. Attains over 3 m FL. Epipelagic, usually oceanic, but occasionally coming close to shore. Schools congregate during summer in the Agulhas Bank area and frequently enter False Bay. A highly prized gamefish; the all-tackle angling record is a 679 kg fish caught off Nova Scotia in 1979. This Atlantic subspecies is found from Labrador to Brazil; and from the Lofoten Ids. of Norway to the Canary Ids. and Mediterranean Sea. The other subspecies, *T. thynnus orientalis* (Temminck & Schlegel, 1846), is largely confined to the North Pacific and is not known from the western Indian Ocean. Flesh highly prized both fresh and canned.

Family No. 250: LUVARIDAE

by P.C. Heemstra

Louvars — **Louvars**

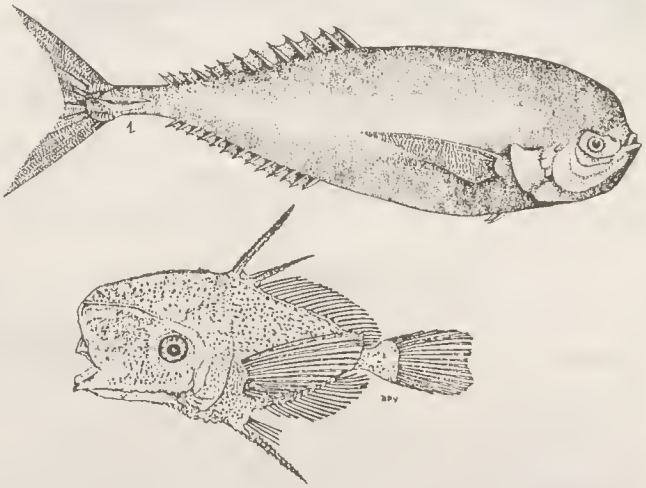
Body compressed, covered with minute, granular scales. Nostrils single, small, circular. Mouth small; maxilla very broad, covered by preorbital bone; teeth very small or absent (present on tongue and palatines in some juveniles). Pelvic fins rudimentary or absent. Juveniles with high dorsal and anal fins, which become shorter and move posteriorly with growth; dorsal and anal fins of adults with short, unbranched, bony rays. Vertebrae 22-24; dorsal and anal fin pterygiophores fused distally and produced into a bony beam extending from head to tail. Anus below pectoral-fin base, covered by scale-like remnants of pelvic fins in adults. Caudal fin lunate, with 8+7 branched rays; peduncle with distinct, fleshy, lateral keel.

One worldwide species.

250.1 *Luvarus imperialis*
Rafinesque, 1810
PLATE 131

Louvar — Louvar

Luvarus imperialis Rafinesque, 1810: 22 (Sicily); Bolin, 1940: 282; Gotshall & Fitch, 1968: 181; Topp & Girardin, 1971: 181.



250.1 *Luvarus imperialis:* top: 115 cm FL (composite, mainly after Day, 1881); bottom: postlarva, just under 1 cm (Natal).

D 11-13 (22-23 in small juveniles); A 14 (18 in small juveniles); P i,14-19; GR (4-6)+(11-14). Depth 2.9-3.2, head 3.5-3.8.

Body and head bluish dorsally, silvery pink below; C pink, with a round blackish spot at its base; D and A black; P yellow or pink; juveniles with large dark spots all over body. Attains 200 cm and 150 kg. An epipelagic fish of the high seas, the louvar feeds on jellyfishes and other planktonic animals. A mature female stranded on a beach in the U.S.A. had ovaries weighing 2 kg and estimated to contain 47 million eggs. Found in all oceans and the Mediterranean Sea; not reported in polar seas or near equator. A 117 kg specimen was recently caught 20 miles west of Cape Point and a small juvenile (RUSI 2617) collected off Richards Bay.

Family No. 251: XIPHIIDAE

by P.C. Heemstra

Swordfishes **Swaardvisse**

Body robust, slightly compressed. Upper jaw and snout greatly elongated, forming a flat, sharp-edged bony sword. In fish longer than 1 m, the first dorsal fin height is greater than length of base, which is well separated from the much smaller second dorsal fin; pelvic fins absent. Caudal peduncle (of adults) with a single keel on each side. Teeth and scales absent in adults. One genus with only one species, found in open water of all oceans.

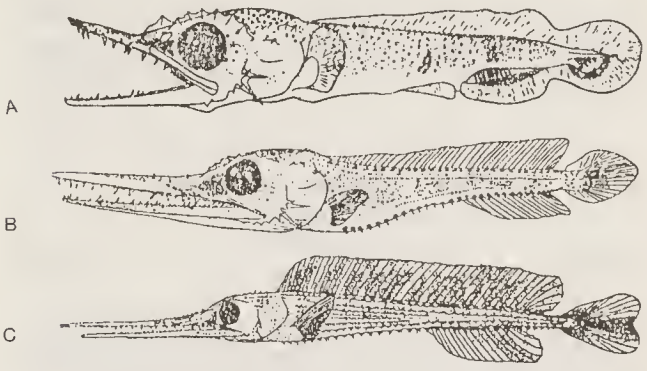
251.1 *Xiphias gladius*
Linnaeus, 1758
PLATE 133

Swordfish Swaardvis

Xiphias gladius Linnaeus, 1758: 248 (European Seas); Arata, 1954*; Smith, **SFSA No. 873***; Kondritskaya, 1970*; Beckett, 1974*; Penrith & Cram, 1974; Bozhkov, 1975*.

Length of sword (from front of eye) about ⅓ distance from tip of lower jaw to fork of tail. D about 40+4; A about 18+4. (Counts from a 352 mm TL specimen are D 47, A 17 & P 16.) In small juveniles, both jaws are equally prolonged and with minute teeth, and the skin is covered with spiny scales.

Dark grey or bronzy to purplish or bluish black dorsally, whitish ventrally. Attains 5 m and well over 500 kg. Swordfish over deep water feed on surface or near-surface fishes (e.g. flying fish, sardines, mackerel, etc.) and squid; in shallow water (less than 800 m) large swordfish also make excursions to the bottom where they catch benthic species, returning to the warmer surface waters to digest them. Swordfish and mako sharks are well-matched enemies: pieces of swordfish are occasionally found in the shark's stomach, and some makos are also observed with wounds and pieces of the sword embedded in their bodies. A formidable antagonist for big game anglers, this powerful fish sometimes charges a boat with such speed that the sword is driven right through the hull of the vessel. A rare catch in our area, occurs from Namibia to Natal.



251.1 *Xiphias gladius:* development: A = 0.78 cm SL; B = 1.5 cm SL; C = 7 cm SL (after Arata, 1954).

Family No. 252: ISTIOPHORIDAE

by P.C. Heemstra

Sailfish, spearfishes and marlins **Seilvis, speervisse en marlyne**

Upper jaw and snout more or less produced, forming a rounded (in cross-section), bony, spear-like bill (hence the name "billfish"). First dorsal fin base longer than height of fin; pelvic fins very narrow, folding into a groove on belly. Two keels on each side of peduncle at base of caudal fin. Body with small elongated scales. Swimbladder large, with many small separate chambers, each with its own blood supply and gas gland; apparently with such a mechanism the billfish can compensate rapidly for gas expansion with changes in depth.

These wide-ranging pelagic fishes are found in all oceans. One species, *Tetrapturus belone* Rafinesque, is confined to the Mediterranean Sea. Much sought after by big game fishermen, the billfishes are also an important food resource in some countries. Three genera with a total of 9 species, 7 in our area.

KEY TO GENERA

1a Height of D over mid-body region much greater than body depth; V reach almost to A origin ..... *Istiophorus*
1b Height of D over mid-body region not much greater than body depth; V reach less than ⅔ distance to A origin 2

2a Greatest height of 1st D subequal to body depth; dorsal profile of head not steeply elevated at eye; body well compressed ..... *Tetrapturus*
2b Height of 1st D lobe distinctly less than body depth; dorsal profile of head steeply elevated at level of eye ..... *Makaira*

Genus ***Istiophorus*** Lacepède, 1802

Some authors (e.g. Nakamura et al., 1968) recognise 2 species of sailfishes: *I. platypterus* of the Indo-Pacific region and *I. albicans* from the Atlantic. In juveniles of less than 90 cm, the Atlantic species was said to have longer P and C; but this distinction has not been found by other workers. Thus a single worldwide species is recognised in this book.

252.1 *Istiophorus platypterus*
(Shaw & Nodder, 1791)
PLATE 132

Sailfish — Seilvis

Xiphias platypterus Shaw & Nodder, 1791: No. 28, Pl. 88 (Indian Ocean). *Istiophorus gladius:* Smith, **SFSA No. 874*.** *Istiophorus platypterus:* Beardsley et al., 1975*; Gorbunova, 1976*; van der Elst, 1981: 180*.

D (39-48)+(6-8); 1st D very high, sail-like, with middle rays longest; A (8-15)+(5-8); P 17-20; V I,2 with well-developed membrane. Body elongate, compressed. LL distinct; abdominal cavity extending to middle of 2nd A base.

Sailfish feed on a variety of epipelagic fishes and cephalopods. Growth is rapid; one-year old fish are mature at 1.8 m. Sailfish live at least 6 years; those from the Indian and Pacific oceans grow larger than the Atlantic populations. Maximum recorded size: 2.3 m, 100 kg.

Genus ***Makaira*** Lacepède, 1802

Body robust, not much compressed; 1st D long and low, its height at level of anus less than height of 2nd D; 11+13 vertebrae. *Histiophorus granulifer* Castelnau, 1861 is a species of *Makaira,* but it cannot be determined from the original description which species Castelnau had.

Two species found in all major oceans, but the black marlin is rare in the Atlantic. Growing to well over 4 m and 700 kg, the blue and black marlins are rivalled only by the bluefin tuna for the heavyweight title of premier big game fishes. The size, strength, endurance and fortitude of these giant marlins command the awe and admiration of big game anglers all over the world.

Although there are records of fish, boats and various floating objects being impaled by marlins and other billfishes, the use of the bill to impale or stun free-swimming prey is not important in the feeding of these fishes. Along the east African coast, large bales of rubber have been found containing the broken bills of marlins. The unfortunate marlin were probably chasing the small fishes that often congregate under such floating objects and accidentally rammed the rubber bale with such force that the bill was driven up to the head in the bale. If the marlin were not able to dislodge the heavy rubber bale (assuming the bill was not broken off from the initial impact), they would soon fall prey to sharks, which are quick to take advantage of such disabled fishes.

KEY TO SPECIES

1a P rigid, cannot be folded flat against side of body without breaking the joints; body somewhat compressed ..... *M. indica*
1b P movable, easily fold back against body; body oval in cross-section ..... *M. nigricans*

252.2 *Makaira indica*
(Cuvier, 1832)
PLATE 132

Black marlin — Swart marlyn

Tetrapturus indicus Cuvier, *in* Cuv. & Val. 1832: 286 (Sumatra). *Tetrapturus brevirostris* Smith, **SFSA No. 876*.** *Istiompax indicus:* Smith & Smith, 1966: 79*. *Makaira indica:* Penrith & Cram, 1974; Nakamura, 1975*; Gorbunova, 1976*; van der Elst, 1981: 181*.

D (38-42)+(6-7); A (13-14)+(6-7); P 19-20; LL a single line, indistinct on adults.

Primarily an Indo-Pacific species, but fairly common off the Cape of Good Hope between January and April. Attains 4.5 m and 700 kg.

252.3 *Makaira nigricans*
Lacepède, 1802
PLATE 132

Blue marlin — Blou marlyn

Makaira nigricans Lacepède, 1802: 688, Pl. 13, Fig. 3 (Ile de Re, Bay of Biscay, France); Smith, 1961: 570, **No. 875a;** Penrith & Cram, 1974; Rivas, 1975; Gorbunova, 1976*; van der Elst, 1981: 182*. *Tetrapturus herschelii* Gray, 1838: 313, Pl. 10 (Table Bay, Cape of Good Hope); Smith, **SFSA No. 875*.**

D (39-46)+(6-7); A (13-15)+(6-7); P 19-22. LL obscure (visible when patch of skin is removed and dried), complex, forming a reticulate pattern.

Males mature at about 40 kg, females at 50 kg; maximum size of males is about 150 kg, but females attain 5 m and 820 kg. Worldwide in all oceans.

Genus ***Tetrapturus*** Rafinesque, 1810

Body elongate, compressed, its greatest width less than half its greatest depth; LL single, more or less distinct; vertebrae 12+12. Six species; 4 in our area.

KEY TO SPECIES

1a A origin close to anus (less than eye diameter from it); D height at level of anus much less than height of anterior lobe 2
1b A origin well back from anus; D height at level of anus more than half height of anterior lobe 3

2a Tip of P and 1st D & A lobes rounded; flesh red ..... *T. albidus*
2b Tip of P and 1st D & A lobes pointed; flesh pale ..... *T. audax*

3a Bill short, length of part in front of lower jaw contained 2 or more times in length of bill from edge of eye; P length less than greatest body depth ..... *T. angustirostris*

3b Bill long, length of part in front of lower jaw contained less than twice in length of bill from edge of eye; P length more than body depth ..... *T. pfluegeri*

252.4 *Tetrapturus albidus*
Poey, 1861
PLATE 132

White marlin — Wit marlyn

Tetrapturus albidus Poey, 1861: 237, 258, Pl. 15, Figs. 1 & 3; Pl. 16, Figs. 2-13; Pl. 17, Figs. 1-11, 21, 26 (north coast of Cuba); Penrith & Cram, 1974; Mather et al., 1975*.

D (39-45)+(5-7); A (13-18)+(5-7); P 18-22, longer than body depth.

Attains 2.8 m, 80 kg. Atlantic Ocean only.

252.5 *Tetrapturus angustirostris*
Tanaka, 1914
PLATE 132

Shortbill spearfish — Kortbek-speervis

Tetrapturus angustirostris Tanaka, 1914: 324, Pl. 88, Fig. 285 (Sagami Bay, Japan); Kikawa, 1975*; Gorbunova, 1976*.

D (46-50)+(6-7); A (12-15)+(6-7); P 18 or 19; body depth 8-10 times in its length; 2nd A origin in front of 2nd D.

Attains 2 m, 27.5 kg. Off Cape Point and Durban northwards throughout the Indo-Pacific.

252.6 *Tetrapturus audax*
(Phillipi, 1887)
PLATE 132

Striped marlin — Gestreepte marlyn

Histiophorus audax Phillipi, 1887: 34 (Iquique, Chile). *Marlina jauffreti* Smith, 1956: 31, Pl. 1, Fig. H (Mauritius). *Marlina audax:* Smith, 1961: 570; **No. 876*a;** Smith & Smith, 1966: 79*. *Tetrapturus audax:* Penrith & Cram, 1974; Ueyanagi & Wares, 1975*; Gorbunova, 1976*; van der Elst, 1981: 183*.

Body depth 6-8 times in its length (tip of lower jaw to C fork); D (37-42)+(5-7); A (11-17)+(5-6); P 18-23.

Attains 2.9 m, 230 kg. Primarily an Indo-Pacific species, but some striped marlin have also been caught off Cape Town.

252.7 *Tetrapturus pfluegeri*
Robins & de Sylva, 1963
PLATE 132

Longbill spearfish — Langbek-speervis

Tetrapturus pfluegeri Robins & de Sylva, 1963: 86, Figs. 1, 2 (San Juan, Puerto Rico); Penrith & Cram, 1974; Robins, 1975*.

D (45-53)+(5-7); A (11-18)+(5-8); P 17-20.

Attains 2.0 m, 30 kg. Apparently restricted to the Atlantic Ocean.

Suborder STROMATEOIDEI

by R.L. Haedrich

The stromateoid fishes, generally referred to as butterfishes and their relatives, are a diverse group occurring world-wide in coastal and oceanic waters of tropical and temperate regions. The chief diagnostic character for the group is the presence of toothed pharyngeal sacs in the oesophagus immediately behind the last gill arch; these sacs cannot be seen without dissection and are absent in the Amarsipidae. Stromateoid fishes have a distinctive appearance about the head as a result of the expanded lacrimal bone which almost covers the upper jaw, the slightly underslung lower jaw, the relatively large eye rimmed with adipose tissue, and the naked and often protruding snout and top of the head. The small teeth are in single series in the jaws. Scales tend to be weak and easily shed and the thin skin is beset with small pores.

Stromateoid fishes are most often confused with carangids (kingfishes), but are best distinguished from most of those by the lack of the two short spines ahead of the anal fin and/or the lack of heavy scales forming scutes on the sides of the caudal peduncle. Stromateoid fishes occur singly or in schools. The young, which may hardly resemble the adults, due to changes in colour pattern and relative proportions with growth, commonly associate with pelagic jellyfish or other floating objects. All are excellent food fishes, but only a few are fished commercially. Adult sizes range from about 15 to over 100 cm.

(Editors' note: The family level classification of the stromateoid fishes is still unsettled. Dr. Haedrich's original account recognised six families. We have modified his account by including the Ariommidae in the Nomeidae and putting the Centrolophidae in with the Stromateidae. Our decision to recognise four families here (rather than the six used by Haedrich, or the single family proposed by Robins et al., 1980) is admittedly a subjective matter, but we believe that the classification used here is not contrary to the supposed phyletic relationships of these fishes (Haedrich, 1967). Although this four-family scheme is not endorsed by Dr. Haedrich, we hope that it may prove an acceptable compromise to the six-family and one-family schemes.)

KEY TO FAMILIES
(Silhouettes appear under Order Perciformes)

1a Two dorsal fins, distinctly though scarcely separated; the 1st usually with 10-20 spines; if there are fewer than 10 spines, the longest spine is subequal to the longest dorsal-fin ray; pelvic fins present; vomer, palatines and basibranchials toothed or not 2

1b Dorsal fin continuous or two fins scarcely separated, the 1st with 1-9 spines; the longest spine less than half length of longest dorsal-fin ray; pelvic fins present or absent; vomer, palatines and basibranchials toothless ..... STROMATEIDAE (No. 254)

2a Pelvic fins jugular, their origin well before pectoral fins and under rear edge of preopercle; body translucent, no colour pattern apparent; body slender with a deep caudal peduncle; toothed pharyngeal sacs absent ..... AMARSIPIDAE (No. 253)

2b Pelvic fins thoracic, their origin usually under pectoral fins or behind; if pelvic fin origin precedes pectoral base, body has distinct dark blotches on a silvery background; if body is translucent, it is deep with a slender peduncle; pharyngeal sacs present 3

3a First dorsal fin with 10-20 short spines, the longest only half length of longest dorsal-fin ray; anal-fin rays 10-16; scales keeled, heavy, adherent; modified scales form 2 well-developed lateral keels on each side of peduncle near caudal-fin base ..... TETRAGONURIDAE (No. 256)

3b First dorsal fin with 9-12 long, slender spines, often folded into a groove; longest spine nearly as long as, or longer than, longest dorsal-fin ray; anal-fin rays 13-31; scales cycloid, thin, deciduous; fleshy lateral keels on peduncle near caudal-fin base absent or only slightly developed ..... NOMEIDAE (No. 255)

Family No. 253: AMARSIPIDAE

by R.L. Haedrich

Amarsipids **Amarsipiede**

Body elongate and compressed. Two dorsal fins, scarcely separated; first with 10-12 weak spines; second dorsal and anal about equal in length. Pelvic fins on throat, with 1 short spine and 5 weak rays. Caudal peduncle compressed. Premaxilla not protractile; preorbital bone covers only upper margin of maxilla when mouth is closed; teeth strong, a single series in jaws; a few similar teeth on vomer; no toothed pharyngeal sacs. Scales very small and easily shed.

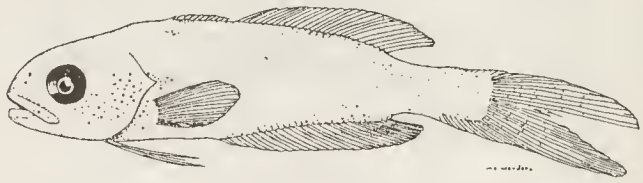
Known only from larvae and juveniles; largest specimen known is only 12 cm; pelagic in tropical Indian and Pacific oceans. A single genus with only one species.

253.1 *Amarsipus carlsbergi*
Haedrich, 1969

Amarsipus carlsbergi Haedrich, 1969: 8, Figs. 2-8 (Indian Ocean); Ahlstrom, Butler & Sumida, 1976: 307*.

D X-XII,22-27; A I,27-32; P 17-19; LL 100-150 (difficult to count); GR about 6+(12-15); vertebrae 45-47. Depth 3.4-4.8, head 3.1-4.2 in SL.

Body translucent; bases of median fins almost transparent. One 38 mm specimen taken by plankton net in Mozambique Channel is the only record from our area.



253.1 *Amarsipus carlsbergi:* 5.5 cm SL (after Haedrich & Horn, 1972).

Family No. 254: STROMATEIDAE

by R.L. Haedrich

Ruffs **Roeffe**

Body deep to elongate, with firm to flabby musculature. Dorsal fin continuous or partly divided, with 1-9 spines, the longest less than half length of longest soft-ray. Pelvic fins (absent in some species) fold into a shallow groove. Small conical or flattened teeth in a single series in jaws; no teeth on roof of mouth or tongue. Supramaxilla present or absent. Scales moderate to small, usually cycloid and easily shed, extend onto bases of median fins. Head usually naked and covered with small pores. Vertebrae 25-61.

Worldwide in tropical and temperate seas; juveniles commonly associate with floating objects, animate and inanimate. Can be quite abundant locally; taken with trawls or on longlines set in submarine canyons. Some are important food-fish and all are good eating. Some species attain 180 cm. In this book, the editors have decided to include the Centrolophidae in the Stromateidae. Nine or 10 genera, their distinctions not always clear and in need of work; about 40 species. Generic consideration by Haedrich (1967), Stehmann & Lenz (1973) and McDowall (1979, 1982).

KEY TO GENERA

1a V absent in adults, rarely present in juveniles; D base equals length of A base ..... *Stromateus*

1b V present; D base distinctly longer than A base 2

2a D spines weakly developed and graduated in length to the soft-rays 3

2b D spines 5-9, shorter than and usually not graduated in length to the soft-rays 6

3a Weak denticulations on preopercular margin; D origin usually well behind insertion of P (over P base in very small specimens); body depth 2.9-4.1 in SL 4

3b Preopercle margin with 9-20 small spines; D origin usually before P (over P base in large adults); body depth usually 1.8-2.9 in SL 5

4a Total elements in A 23-27; scales small, very deciduous; preopercle and cheek naked; LL 160-230; vertebrae 25 ..... *Centrolophus*

4b Total elements in A 25-29; scales moderate in size, not especially deciduous, present on preopercle and cheek; LL 100-130; vertebrae 50-52 ..... *Pseudoicichthys*

5a Vertebrae 25-32; no band of pores along bases of D & A ..... *Schedophilus*
5b Vertebrae 43-45; band of oblique rows of 8-10 pores on body along bases of D & A ..... *Tubbia*

6a Soft D rays 19-25; A rays 14-21; preopercle margin with small spines; scales not especially deciduous; LL arched anteriorly, straightening out over A; supramaxilla present; about 8 short D spines, usually quite strong, not increasing in length posteriorly ..... *Hyperoglyphe*
6b Soft D rays 25-40; A rays 18-30; preopercle smooth or finely denticulate; scales very deciduous; LL follows dorsal profile; supramaxilla absent; D spines 5-7, sometimes quite weak, increasing slightly in length posteriorly ..... *Psenopsis*

Genus ***Centrolophus*** Lacepède, 1803

A single species with a bipolar distribution. Revision by Haedrich (1967).

254.1 *Centrolophus niger*
(Gmelin, 1789)

Black ruff — Swartroef

Perca nigra Gmelin, 1789: 132 (Cornwall). *Centrolophodes irvini* Gilchrist & von Bonde, 1923: 3, Pl. 17, Fig. 1 (west coast, north of Paternoster Point in 85-90 fms). *Centrolophus niger*: Barnard, 1927: 895*; Smith, **SFSA No. 850***; 1949: 845; Haedrich, 1967: 65*; Krefft, 1969: 1*; McDowall, 1982: 121*. *Mupus bifasciatus* Smith, 1961: 158, Fig (off Rocky Point, Namibia).

D 37-41 (total elements); A III,20-24; P 19-23; LL 160-230; GR (5-6)+(13-16); pyloric caeca about 10. Depth 3.2-4.1, head 3.4-5.0; depth 2.4, head 2.5 in a specimen of 53 mm SL. Head conspicuously naked with prominent pores. D with about 5 weak spines graduating to soft-rays.

254.1 *Centrolophus niger*: top, 85 cm (off Cape Town); bottom: 5.5 cm juvenile holotype of *Mupus bifasciatus* (Namibia).

Colour dark brown to black, sometimes almost bluish; median and V darker than body. Young have 2-4 dark vertical bars. Attains 120 cm. Taken with trawls in 325 - 460 m; not fished commercially, but a tasty fish with market potential. Young associate with pelagic medusae and salps. Temperate waters of Australia, New Zealand, South America and South Africa, also North Atlantic and Mediterranean. Counts for Southern Ocean specimens fall at the high end of the ranges.

Genus ***Hyperoglyphe*** Günther, 1859

Vertebrae 10+15. About 6 species; 2 in our area. Generic overview by Haedrich (1967).

KEY TO SPECIES

1a Soft D rays 19-21; A III,15-17; LL 85-95; isolated patch of scales on occiput ..... *H. antarctica*
1b Soft D rays 23-25, A III,18-20; LL less than 80; no patch of scales on occiput ..... *H. moselii*

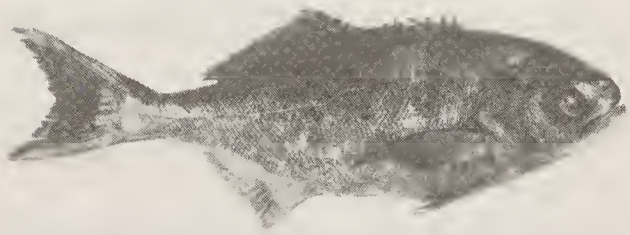
254.2 *Hyperoglyphe antarctica*
(Carmichael, 1818)

Antarctic butterfish — Antarktiese bottervis

Perca antarctica Carmichael, 1818: 501, Fig. (Tristan da Cunha). *Palinurichthys porosus*: Barnard, 1948: 395*; Smith, **SFSA No. 849a.** *Mupus perciformis* (*non* Mitchill): Smith, 1949: 843. *Palinurichthys antarcticus*: Penrith, 1967: 535. *Hyperoglyphe antarctica*: Haedrich, 1967: 58; McDowall, 1982: 106*.

D VII-VIII,19-21; A III,15-17; P 18-22; LL 85-95; GR about 5+(15-16). Depth 2.6-3.4, head 2.9-3.2. Head naked except for diagnostic patch of scales above and behind eye. Adipose tissue around eye not well developed. Very similar to *H. perciformis* (Mitchill) of the northwestern Atlantic.

Uniformly dark, sometimes almost black. Attains 110 cm. Taken in trawls or on deep lines in 300 m or more. Temperate waters; islands of South Atlantic and southern Indian oceans; New Zealand, southern Australia and South Africa.



254.2 *Hyperoglyphe antarctica*: 66 cm (off Saldanha Bay).

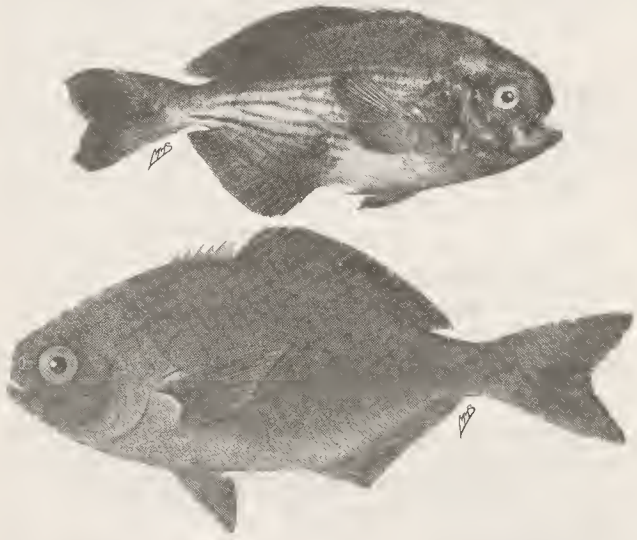
254.3 *Hyperoglyphe moselii*
(Cunningham, 1910)

Black butterfish — Swart bottervis

Leirus moselii Cunningham, 1910: 95 (St. Helena). *Palinurichthys pringlei* Smith, **SFSA No. 849*** (off Dassen Id.). *Mupus pringlei*: Smith, 1949: 844. *Palinurichthys matthewsi* Smith, 1960: 91, Fig. (off Walvis Bay); 1961: 570, **No. 849c***. *Hyperoglyphe moselii*: Haedrich, 1967: 58; Trunov, 1975: 352.

D VI,23-25; A III,18-20; P 20-22; LL about 75-80 (?); GR 7+(14-16). Depth 2.2-2.5, head 2.8-3.0. Head large, naked, with small pores; a few scales on cheeks. Top of head spongy.

Adults uniformly grey to black; young with narrow and irregular horizontal stripes on flanks. Attains 100 cm. Taken rarely in trawls from 270 m or more. Gulf of Guinea to South Africa, St. Helena.



254.3 *Hyperoglyphe moselii*: top: 28.5 cm holotype of *Palinurichthys matthewsi* (off Walvis Bay); bottom: 44 cm holotype of *Palinurichthys pringlei* (off Dassen Id.).

Genus ***Psenopsis*** Gill, 1863

About 4 species; 1 in our area. Revision by Haedrich (1967).

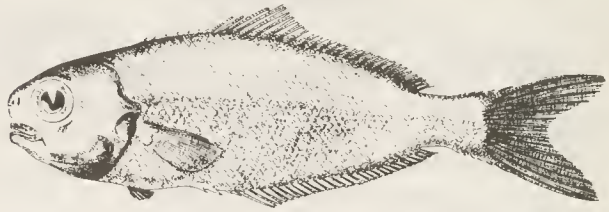
254.4 *Psenopsis obscura*
Haedrich, 1967

Obscure driftfish — Duister dryfvis

Psenopsis obscura Haedrich, 1967: 188, Fig. 1 (Molucca Passage); 1968: 873.

D V-VII,26-29; A II-III,25-28; P 18-20; LL 60-65; GR (5-6)+(15-16); vertebrae 10+15. Depth 2.6-3.2, head 2.7-3.5. Adipose tissue well developed around and in front of large eye. Sclerotic bones well ossified; golden iris appears divided by a vertical bar. A broad S-shaped scoop on surface of opercle below second spine.

Colour dark brownish blue to brown, grading to tan on the sides, with a prominent darker area on shoulder near LL; inside of opercles and peritoneum dark. Attains 20 cm. Taken in trawls over sand and mud bottoms, 200 - 800 m. Mozambique Channel (22°S, 36°E), Andaman Sea and Molucca Sea.



254.4 *Psenopsis obscura*: 13 cm SL holotype (after Haedrich, 1967).

Genus ***Pseudoicichthys*** Parin & Permitin, 1969

One species, presumed in our area. Generic consideration by Parin & Permitin (1969). Work is needed to define the limits of the genus and its relationship to similar forms.

254.5 *Pseudoicichthys australis*
(Haedrich, 1966)

Southern driftfish — Suidelike dryfvis

Icichthys australis Haedrich, 1966: 201* (New Zealand); Krefft, 1969: 4; McDowall, 1982: 130*. *Pseudoicichthys australis*: Parin & Permitin, 1969: 981*; White & North, 1980: 113.

D 38-44; A 25-29; P 15-17; GR (5-6)+(12-13); LL 100-130; vertebrae 50-52; pyloric caeca numerous, dendritic. Depth 2.9-3.9, head 3.2-5.0. Body elongate, soft and flabby. D origin well behind insertion of P. Top of head naked, but opercles and cheeks with scales. About 7 large pores on each side of head above eye and opercles.

Uniformly brown to blackish. Attains 81 cm. Oceanic in deep water, probably throughout cooler waters of Southern Ocean; New Zealand, Argentina, South Georgia, South Orkneys and the Falklands. No records from South Africa.

254.5 *Pseudoicichthys australis*: 7.5 cm SL holotype (after Haedrich, 1966).

Genus ***Schedophilus*** Cocco, 1829

About 8 species; 3, possibly 4, in our area. Overview of species by Ahlstrom, Butler & Sumida (1976). Consideration of generic limits by Stehmann & Lenz (1973) and McDowall (1980, 1982).

KEY TO SPECIES

1a Total D spines + rays 28-42; A III,16-25; D & A spines distinct; body usually firm; lower GR 15-17 2
1b Total D spines + rays 55-65; A spines + rays 33-41; D & A spines weak, not distinguishable from soft-rays; body soft and limp; lower GR 12-13 ..... *S. huttoni*

2a D IV-VIII,31-34; A III,18-25 3
2b D V-VII,23-26; A III,16-18 ..... *S. pemarco*

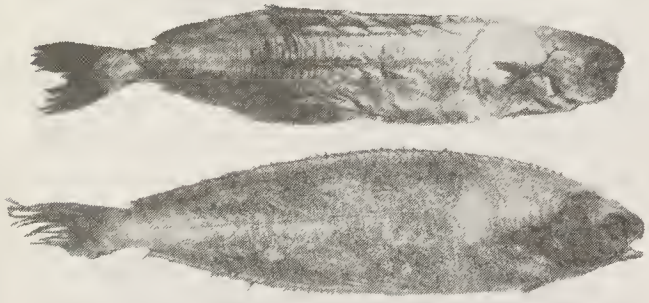
3a P rays 21-22; predorsal bones 2; vertebrae 25 ..... *S. ovalis*
3b P rays 19-21; predorsal bones 3; vertebrae 29 ..... *S. maculatus*

254.6 *Schedophilus huttoni*
(Waite, 1910)

Centrolophus huttoni Waite, 1910: 388 (Sumner, New Zealand). *Centrolophus britannicus* (*non* Günther): Smith, 1965: 506, Pl. 14. *Coroplopus dicologlossops* Smith, 1966: 1, Pl. 1, Fig. A ("off the Cape"). *Schedophilus huttoni*: Karrer, 1973: 239*; Ahlstrom et al., 1976: 319*; McDowall, 1982: 124*.

D 55-65; A 33-41; P 19-20; LL >200; GR about 5+(12-13); vertebrae 30-32. Depth 3.6-4.0, head 4.8-5.2. Head spongy; skeleton very poorly ossified. D & A bases covered with small scales; P and V short. Scales minute, present on opercles but not on head. Pyloric caeca more than 50, each caecum bifurcate.

Colour uniform blackish grey to brown; inside of mouth and opercles black. Attains 90 cm. Oceanic, probably mesopelagic and rarely seen. Circumglobal in Southern Ocean; common in 270 - 500 m off Namibia.



254.6 *Schedophilus huttoni*: top: 77.5 cm holotype (photo by J. Darby); bottom: 88 cm holotype of *Coroplopus dicologlossops* (off Cape Town).

254.7 *Schedophilus maculatus*
Günther, 1860

Schedophilus maculatus Günther, 1860: 412 (China Seas); Smith, 1949: 842; Ahlstrom et al., 1976: 322*; McDowall, 1980: 147*; 1982: 125*. *Mupus maculatus*: Smith, **SFSA No. 848*.**

D VIII-IX,27-29; A III,23-25; P 19-21; LL 100-130; GR about 6+(15-16); vertebrae 29. Depth 1.9-2.6; head 2.5-4.0. Somewhat deep-bodied with moderately firm musculature and rather heavy spines. Preopercle with 10-15 prominent spines (juveniles) or "numerous fine spines" (adults). The unusual vertebral number is diagnostic.

Juveniles with dark and light ill-defined vertical bands or dark blotches extending onto median fins; P dusky and V black. Attains 30 cm. Occurs in widespread localities around Southern Ocean, usually in deep water. Rare.

254.7 *Schedophilus maculatus*: over 2 cm early juvenile (after Ahlström *et al.*, 1976).

254.8 *Schedophilus ovalis*
(Cuvier, 1833)

Oval driftfish — Ovale dryfvis

Centrolophus ovalis Cuvier, *in* Cuv. & Val., 1833: 346 (Nice). *Seriolella velaini* Sauvage, 1879: 32, Pl. 1, Fig. 2 (Ile St. Paul). *Seriolella christopherseni* Silvertsen, 1945: 23, Fig. 16, Pl. I (Tristan da Cunha). *Schedophilus ovalis*: Barnard, 1948: 387, 392*; Haedrich, 1967: 60; Ahlstrom et al., 1976: 321. *Mupus ovalis*: Smith, **SFSA No. 848a.** *Mupus imperialis*: Smith, 1949: 843; Penrith, 1967: 537.

D VI-VIII,29-33; A III,18-24; P 21-22; LL 90-110; GR about 6+17; vertebrae 25; predorsal bones 2. Depth 2.4-3.4, head 3.2-3.6. Musculature firm. Lower jaw projects slightly. Preopercle with a series of small spines. P elongate and pointed in adults; C broad, relatively stiff and forked. This species may be a complex of closely related forms: specimens from southern hemisphere have fewer A rays (18-21 versus 21-24) than fish from northern oceans (McAllister & Randall, 1975).

Dark green on the back, silvery on the sides and below. Young have a mottled pattern. Attains 100 cm. Widespread in deep water, 80 - 240 m, near oceanic islands. Northwest Africa, Atlantic islands, Mediterranean, South Africa, Australia and Pacific.

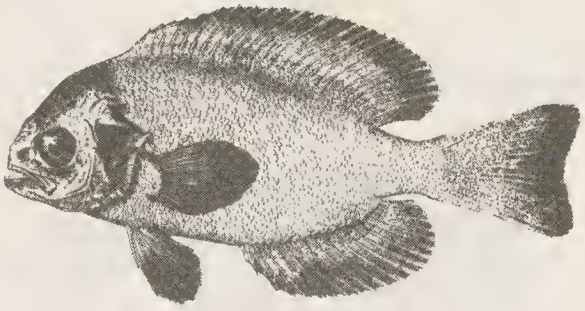
254.8 *Schedophilus ovalis*: (after McAllister & Randall, 1975).

254.9 *Schedophilus pemarco*
(Poll, 1959)

Palinurichthys pemarco Poll, 1959: 132, Fig. 45 (off Congo River). *Schedophilus pemarco*: Haedrich, 1967: 62*; Haedrich & Cervigon, 1969: 1*; Ahlstrom et al., 1976: 297.

D V-VIII,23-26; A III,16-18; P 19-22; LL 80-90; GR about 5+17; vertebrae 25. Depth 1.8-2.3, head 2.4-3.0. Musculature rather firm. No scales on head or nape. Preopercle with 12-19 distinct spines. Eye 3.4-4.8 in head, located about ½ its diameter below dorsal profile.

Colour dark grey-blue to brownish; juveniles with irregular horizontal stripes on flanks. Fins darker than body; V black. Inner side of opercles black; eye bluish. Attains 30 cm. Taken in bottom trawls in 100 - 500 m. West coast of Africa from Angola to Mauritania; 2 records from eastern Caribbean; may be found in our area.



254.9 *Schedophilus pemarco:* 24.5 cm (after Poll, 1959).

Genus ***Stromateus*** Linnaeus, 1758

Three species; 1 in our area. Revision by Horn (1973).

254.10 *Stromateus fiatola*
Linnaeus, 1758
PLATE 133

Blue butterfish — Blou bottervis

Stromateus fiatola Linnaeus, 1758: 248 (Mediterranean); Barnard, 1927: 897*; Smith, **SFSA No. 845*;** 1949: 841; Poll, 1959: 127*; Smith & Smith, 1966: 95*; Horn, 1973: 325*. *Stromateus capensis* Pappe, 1853: 26 (south Cape coast). *Stromateus fasciatus*: Smith, **SFSA No. 846*;** 1949: 841; Smith & Smith, 1966: 131*.

D 42-50; A 33-38; P 21-25; LL about 120; GR usually 3+12; vertebrae 42-45. Depth 1.8-2.8, head 2.8-4.4 in SL. Gill membranes broadly united across isthmus. V absent in adults.

Colour blue to brownish, with darker spots dorsally, silver to whitish below. Juveniles (<10 cm SL) pelagic, associated with medusae (jellyfishes), with dark vertical bars on body and small black V located directly under P. Attains 50 cm. Taken in bottom trawls in 10 - 70 m. Flesh excellent. Eastern Atlantic and Mediterranean round the Cape to Natal.

Genus ***Tubbia*** Whitley, 1943

A single species. The relationships of *Tubbia*, the soft-bodied *Schedophilus* species, and the species of *Icichthys/ Pseudoicichthys* are unclear.

254.11 *Tubbia tasmanica*
Whitley, 1943

Flabby driftfish — Pap dryfvis

Tubbia tasmanica Whitley, 1943: 179, Fig. 9 (Tasmania); McDowall, 1979: 736*; 1982: 133*. *Schedophilus medusophagus* (*non* Cocco): Smith, 1934: 95*; 1949: 842; **SFSA No. 847*.**

D 49-52 (total elements); A 34-37 (total elements); P 19-21; LL about 120; GR (6-7)+(14-16); vertebrae 43-45. Depth 2.4-3.1, head 2.9-4.6. Bones poorly ossified; body compressed, soft and flabby. Weak fin spines cannot be distinguished from soft-rays. Fin bases covered with thick skin and scales. Scales present on opercles, nape, chin and part of snout.

Colour uniform greyish to dark brown; young with numerous small spots on flanks. Attains 47 cm. Young occur at the surface, adults deeper. Taken rarely in trawls, to 800 m. Temperate waters of Southern Ocean; New Zealand, Tasmania and South Africa off Natal.

254.11 *Tubbia tasmanica:* 37 cm SL (after McDowall, 1979).

Family No. 255: NOMEIDAE

by R.L. Haedrich

Driftfishes — **Dryfvisse**

Body deep and compressed to elongate and rounded. Dorsal fin divided to the base before the last spine, the first part with 9-12 slender spines, the longest spine at least as long as the longest dorsal soft-ray; first dorsal fin folds into a groove; anal fin with 1-3 weak spines; second dorsal and anal fin bases of equal length. Pelvic fins fold into a groove. Scales small to large, easily shed.

Juveniles commonly associate with pelagic coelenterates (medusae or siphonophores). Adults of some species are pelagic, others are demersal fishes of the outer continental shelf region. Occasionally taken by trawlers. Some species attain 1 m, but most are in the 15 to 30 cm range. In this book, the editors have decided to include the Genus *Ariomma* (formerly in the Ariommidae) in the Nomeidae. Four genera with about 23 species.

KEY TO GENERA

1a Vomer, palatines and usually basibranchials with small, often barely perceptible, teeth; usually more than 15 soft-rays in D & A 2

1b Vomer, palatines and basibranchials without teeth; D & A with 13-17 short soft-rays ..... *Ariomma*

2a D origin before or (in large specimens) directly over P origin; no scales on top of head forward of the eyes ..... *Psenes*
2b D origin behind or (in small specimens) directly over P origin; scales on top of head extend forward of the eyes 3

3a A I-III,14-25; an oval patch of teeth on the tongue ..... *Cubiceps*
3b A I-II,24-29; no teeth on tongue ..... *Nomeus*

Genus ***Ariomma*** Jordan & Snyder, 1904

Two low fleshy keels on each side of C base. About 8 species; 2 in our area. Elongate species revised by Horn (1972).

KEY TO SPECIES

1a Body depth 1.8-2.4 in SL; colour silvery or bluish, sometimes with spots; LL 39-49 ..... *A. indica*
1b Body depth 3.3-5.0 in SL; colour uniform, dark blue, brown or blackish; LL 50-65 ..... *A. melanum*

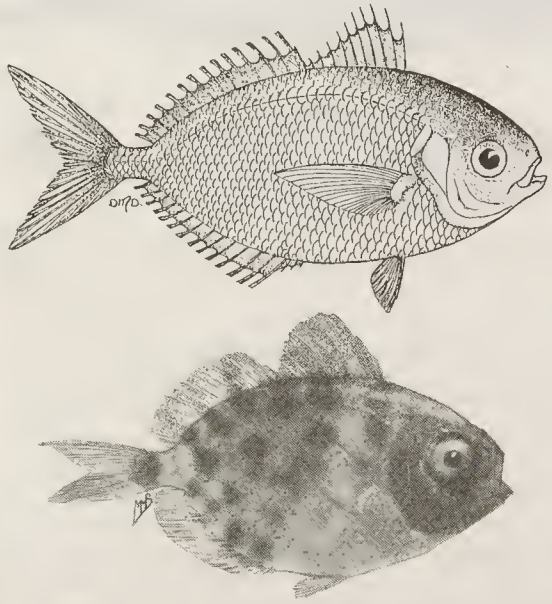
255.1 *Ariomma indica*
(Day, 1870)

Indian driftfish — Indiese dryfvis

Psenes indicus Day, 1870: 690 (Madras); Smith, **SFSA No. 852*;** 1949: 846; Silas & Prasad, 1970: 184*. *Psenes africanus* Gilchrist & von Bonde, 1923: 8, Pl. 18, Fig. 1 (off Durban). *Psenes regulus* (*non* Poey): Smith, 1961: 158*. *Ariomma indica*: Haedrich, 1967: 93.

D X-XI/I,13-16; A 1II,14-16; P 21-24; LL 39-49; GR about 8+(14-16); vertebrae 30-31. Head 2.5-3.1. Ridge over eye prominent. Vertical distance from top of eye to mid-dorsal line 4 times or more in head length.

Pale blue or silvery, sometimes almost white, rarely with spots or other pattern; inside of opercle black. Attains 25 cm. Taken in trawls over muddy bottoms in 60 - 300 m. Mossel Bay eastwards to southern Japan.



255.1 *Ariomma indica:* top: 17 cm (off South Africa); bottom: 4 cm holotype of *Psenes regulus* (Algoa Bay).

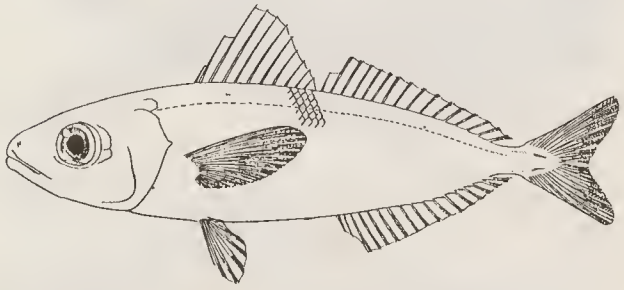
255.2 *Ariomma melanum*
(Ginsburg, 1954)

Brown driftfish — Bruin dryfvis

Cubiceps melanus Ginsburg, 1954: 260 (Gulf of Mexico off Mississippi Delta). *Ariomma melana*: Haedrich, 1967: 94. *Ariomma melanum*: Horn, 1972: 545*.

D XI/I,14-17; A III,13-16; P 21-23; LL 50-65; GR about 10+(19-20); vertebrae 30-31. Head 2.8-3.3. Interorbital scales extend forward to anterior edge of eye. Peritoneum dark, with few melanophores. Subdermal canal system highly developed.

Colour uniformly dark, although in life the fish may have a silvery cast. Attains 25 cm. Taken in bottom trawls in 200 - 600 m. Tropical west African coast south to Angola; stray specimens may be expected in our area, also known from Caribbean and Gulf of Mexico to New York.



255.2 *Ariomma melanum:* 13.5 cm SL (after Horn, 1972).

Genus ***Cubiceps*** Lowe, 1843

About 6 species; 4 in our area. Recent revision by Butler (1979). The genus is still in need of work, especially as regards its distinction from *Psenes*.

KEY TO SPECIES
(modified from Butler, 1979)

1a Teeth on roof of mouth in broad knobby patches 2
1b Teeth on roof of mouth in single rows or absent 3

2a D X-XI/I,15-17; A II,14-16; V origin behind D origin and P base ..... *C. pauciradiatus*
2b D XI/I,23-27; A III,19-24; V origin under D origin and end of P base ..... *C. caeruleus*

3a Upper procurrent C rays 7-10 ..... *C. baxteri*
3b Upper procurrent C rays 11-12 ..... *C. capensis*

255.3 *Cubiceps baxteri*
McCulloch, 1923

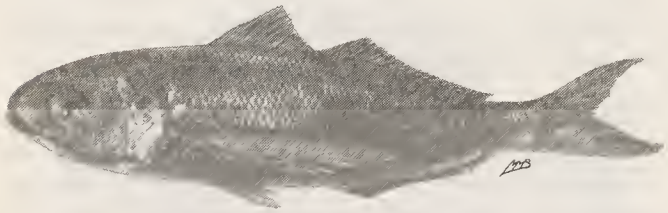
Black fathead — Swart vetkop

Cubiceps baxteri McCulloch, 1923: 15, Pl. 1 (Lord Howe Id., Australia); Butler, 1979: 228*. *Cubiceps caeruleus* (*non* Regan): Haedrich,

1967: 40; 1972: 77*; Ahlstrom et al., 1976: 339*. *Cubiceps gracilis*: Smith, 1966: 65*.

D XI/I,20-24; A III,19-22; P 21-23; upper procurrent C rays 7-10; LL 52-66; GR (6-10)+(16-18); vertebrae 31. Depth 2.8-3.9, head 2.7-3.4. Body firm; C peduncle broad; scales adherent. Eye large, equal to or greater than snout. Teeth on roof of mouth and tongue in single series. P broad and elongate, usually longer than head.

Dark brown, almost black in large specimens; median fins dark, P lighter; eye blue. May exceed 100 cm. Atlantic, Pacific and Indian oceans.



255.3 *Cubiceps baxteri:* 47.5 cm (Algoa Bay).

255.4 *Cubiceps caeruleus*
Regan, 1914

Blue fathead — Blou vetkop

Cubiceps caeruleus Regan, 1914: 15 (Tasman Sea, Three Kings Id.); Trunov, 1975: 395*; Butler, 1979: 231*. *Cubiceps capensis* (*non* Smith): Haedrich, 1967: 81; 1972: 79*; Karrer, 1975: 75; Ahlstrom et al., 1976: 343*.

D XI/I,23-27; A II,21-24; P 19-22; LL 50-56; GR (6-9)+(17-20); vertebrae 31. Depth 2.9-4.0; head 2.7-3.8. Body compressed; scales easily lost; skin thin, subdermal canal on side usually prominent. Teeth on roof of mouth and tongue in knobby patches. P usually longer than head.

Pale to dark blue-grey, back darker than sides; C dark but other fins clear. Largest known specimen about 25 cm. Southern Atlantic and Pacific oceans.

255.4 *Cubiceps caeruleus:* 29 cm SL (after Haedrich, 1972).

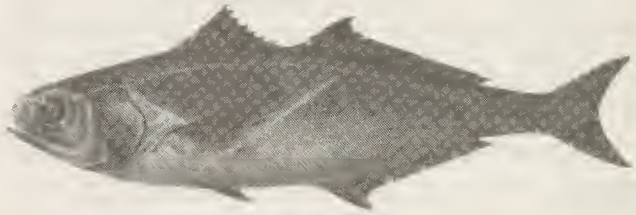
255.5 *Cubiceps capensis*
(Smith, 1845)

Cape fathead — Kaapse vetkop

Atimostoma capensis Smith, 1845: Pl. 24 (South Africa). *Cubiceps capensis*: Barnard, 1948: 389*; Haedrich, 1967: 81; Butler, 1979: 233*. *Cubiceps gracilis*: Smith, **SFSA No. 856*;** 1949: 849. *Cubiceps* sp. A: Ahlstrom et al., 1976: 352*.

D XI/I,20-23; A III,20-21; P 21-23; upper procurrent C rays 11-12; LL 66-67; GR (7-9)+(16-19); vertebrae 31. Depth 3.5-3.8, head 3.4-3.7. Head short; eye moderate, less than snout; V long; P usually longer than head. Teeth on roof of mouth and tongue in single series.

Dark brown to deep purple, fins dark. Attains 90 cm. Probably circumglobal in southern hemisphere.



255.5 *Cubiceps capensis:* holotype (after Smith, 1845).

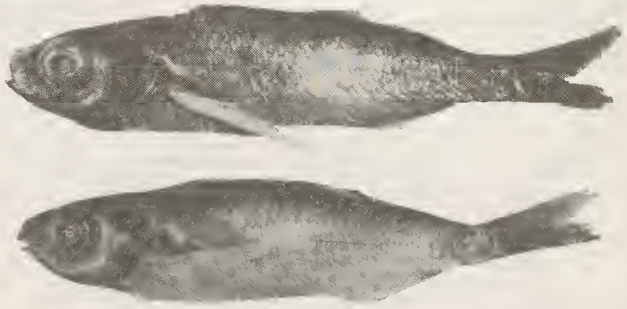
255.6 *Cubiceps pauciradiatus*
Günther, 1872

Longfin fathead — Langvin vetkop

Cubiceps pauciradiatus Günther, 1872: 418 (Misol Id.); Haedrich, 1967: 81; 1972: 79*; Ahlstrom et al., 1976: 346*; Butler, 1979: 236*. *Cubiceps longimanus* Fowler, 1934: 442, Fig. 23 (Durban). *Cubiceps brevimanus*: Smith, **SFSA No. 857*;** 1949: 850.

D X-XI/I,15-17; A II,14-16; P 17-20; LL 49-53; GR (7-9)+(16-19); vertebrae 30-31. Depth 3.5-4.9, head 3.0-3.6.Body slender; C peduncle broad; eye large, equal to snout. Teeth on roof of mouth and tongue in broad knobby patches. A conspicuous thin bony keel on the breast. P elongate.

Light tan to brown; C dusky but other fins clear. Attains 20 cm. Atlantic, Pacific and Indian oceans.



255.6 *Cubiceps pauciradiatus:* top: 10 cm; bottom: 10.5 cm (after Haedrich, 1972).

Genus ***Nomeus*** Cuvier, 1816

A single species occurs worldwide.

255.7 *Nomeus gronovii*
Gmelin, 1789
PLATE 133

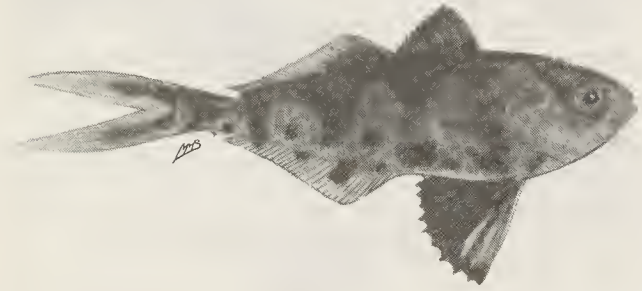
Bluebottle fish — Bloublasievis

Gobius Gronovii Gmelin, 1789: 1205 (Atlantic Ocean). *Nomeus gronovii* Fowler, 1936: 660*; Haedrich, 1967: 83*; Ahlstrom et al., 1976:

355*. *Nomeus albula*: Smith, **SFSA No. 855***; 1949: 849; Smith & Smith, 1966: 132*; Parin & Fedoryako, 1981*.

D IX-XII/I,24-28; A I-II,24-29; P 19-24; GR about 8+(15-19); vertebrae 41. Depth 2.6-4.8; head 2.6-4.0. Small conical teeth similar in both jaws. V greatly expanded in juveniles. Fin spines weak.

Juveniles with striking dark blue mottlings over a whitish or silvery base; V black. Juveniles associate with the pelagic siphonophore *Physalia* and have been observed to feed on the stinging tentacles, but they also eat chaetognaths and other pelagic invertebrates (crustaceans, molluscs and polychaets). Jenkins (1982) states that *Nomeus* is able to tolerate 10 times the quantity of venom that kills other fishes. Attains 39 cm. Adults appear to be demersal and are coloured a uniform dark brown. Circumglobal in warm waters.



255.7 *Nomeus gronovii*: 5 cm (Transkei).

Genus ***Psenes*** Valenciennes, 1833

About 6 species; 5 in our area. Consideration of species by Ahlstrom, Butler & Sumida, 1976. The appearance of members of this genus changes considerably with growth; the young are usually deep-bodied with marked colour patterns whereas the adults are slender and uniformly dark. All allometric characters should be viewed with caution. The genus is much in need of continued work.

KEY TO SPECIES

1a Lower jaw teeth pointed or only slightly flattened, similar to those in upper jaw; vertebrae 31-32 2
1b Lower jaw teeth long, compressed, contiguous, very different from those in upper jaw; vertebrae 31-42 3

2a D IX-XI/I,23-28; A III,23-28; fine horizontal lines along sides ..... *P. cyanophrys*
2b D X-XII/I,17-21; A II-III,17-20; colour pattern uniform brown ..... *P. whiteleggii*

3a D IX-XII/I-II,27-31; A III,26-31; body very soft; bases of median fins translucent; vertebrae 40-42 ..... *P. pellucidus*
3b D IX-XI/I-II,18-24; A III,21-23; body not particularly soft; bases of median fins not translucent; vertebrae 31-36 4

4a LL 55-62; body depth 1.4-2.4 in SL; vertebrae 31 ..... *P. arafurensis*
4b LL 70-85; body depth 2.4-3.4 in SL; vertebrae 34-38 .. *P. maculatus*

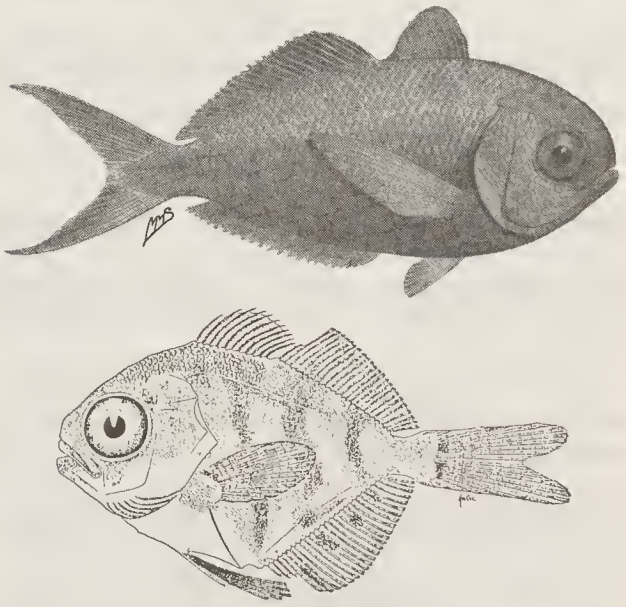
255.8 *Psenes arafurensis*
Günther, 1889

Banded driftfish — Balk-dryfvis

Psenes arafurensis Günther, 1889: 13, Pl. 2, Fig. G (Arafura Sea); Haedrich, 1967: 88; 1972: 81*; Ahlstrom et al., 1976: 365*. *Psenes rotundus* Smith, **SFSA No. 854a*** (200 fms off Dassen Id.). *Parapsenes rotundus*: Smith, 1949: 847. *Psenes benardi*: Rossignol & Blache, 1961: 384* (Gulf of Guinea).

D X-XI/I-II,18-22; A III,21-23; P 18-20; LL 55-62; GR about 8+(16-18); vertebrae 31. Depth 1.4-2.4, head 2.2-3.1. Body firm and compressed. P equals length of head. Teeth in lower jaw twice length of those in upper.

Mottled or banded colour pattern in small fish; adults uniform, almost black. Attains 23 cm. Atlantic, Pacific and Indian oceans.



255.8 *Psenes arafurensis*: top: 23 cm holotype of *P. rotundus* (off Dassen Id.); bottom: 3 cm early juvenile (after Ahlstrom *et al.*, 1976).

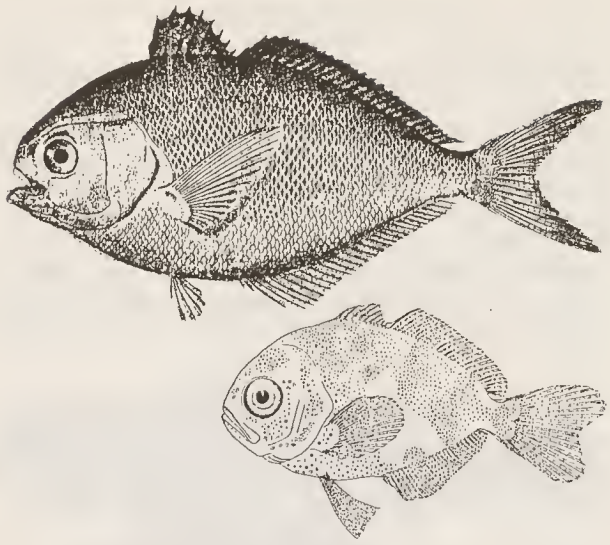
255.9 *Psenes cyanophrys*
Valenciennes, 1833

Freckled driftfish — Gevlekte dryfvis

Psenes cyanophrys Valenciennes, *in* Cuv. & Val., 1833: 260, Pl. 265 (New Ireland); Smith, **SFSA No. 854**; 1949: 847; Haedrich, 1967: 87; 1972: 82; Ahlstrom et al., 1976: 371*. *Psenes fuscus* Guichenot, 1866: 138 (Madagascar).

D IX-XI/I,23-28; A III,23-28; P 17-20; LL 60-70; GR about 8+(18-21); vertebrae 31. Depth 1.8-2.4, head 2.4-3.5. Body firm, deep and compressed; eye small, usually less than snout. P equal to or less than head. Teeth in both jaws small and pointed, not laterally flattened.

Numerous dark horizontal lines on sides. Attains 20 cm, but only immature specimens known. Atlantic, Pacific and Indian oceans.



255.9 *Psenes cyanophrys:* top: 12.5 cm (after Cuvier, 1833); bottom: ca. 1 cm early juvenile (after Ahlstrom et al., 1976).

255.10 *Psenes maculatus*
Lütken, 1880

Silver driftfish — Silwer dryfvis

Psenes maculatus Lütken, 1880: 518, Pl. 5, Fig. 2 (central Atlantic Ocean); Fowler, 1936: 664 (Fig. 298 not this species); Haedrich, 1967: 88; Ahlstrom et al., 1976: 377*.

D IX-XI/I,22-24; A III,21-23; P 20-22; LL 70-80; GR about 8+(16-19); vertebrae 34-38. Depth 2.4-3.4; head 2.4-2.9. Body somewhat elongate and thick; musculature firm; eye large, greater than snout. Teeth in lower jaw at least twice length of those in upper.

Brown, with darker brown vertical bands. Only immature specimens less than 10 cm known. Atlantic, Pacific and Indian oceans.

255.10 *Psenes maculatus:* 2.2 cm early juvenile (after Ahlström et al., 1976).

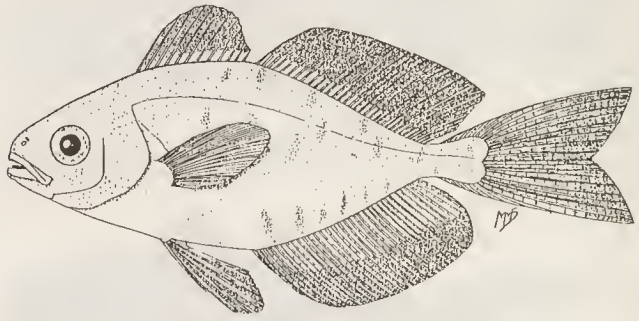
255.11 *Psenes pellucidus*
Lütken, 1880

Blackrag — Swartlap

Psenes pellucidus Lütken, 1880: 516, Fig. 601 (Java); Haedrich, 1967: 88*; 1972: 81; Ahlstrom et al., 1976: 381*. *Cubiceps niger*: Nümann, in da Franca, 1957: 10, Pl. 1, Figs. 1 & 2 (off Luanda, Angola). *Papyrichthys pellucidus*: Smith, 1934: 90*; **SFSA No. 851*;** 1949: 846.

D IX-XII/I-II,27-31; A III,26-31; P 18-20; LL 115-125; GR 8+(14-16); vertebrae 40-44. Depth 1.6-5.9, head 2.8-3.6. Body limp and flabby; musculature very soft but skin tough; eye moderate, less than snout. P short and rounded. Teeth in lower jaw flattened and knifelike, 3 times length of small pointed teeth in upper jaw.

Translucent young with brown spotted colour pattern and dark first D; adults dark brown to deep purple; eye dark blue. Attains 80 cm. Atlantic, Pacific and Indian oceans.



255.11 *Psenes pellucidus:* 11 cm (off Durban).

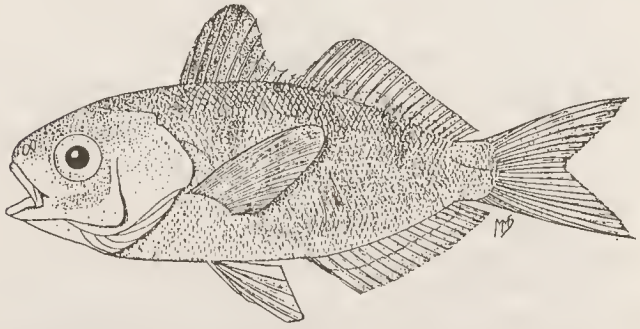
255.12 *Psenes whiteleggii*
Waite, 1894
PLATE 133

Shadow driftfish — Skaduwee-dryfvis

Psenes whiteleggii Waite, 1894: 218, Pl. 17 (Maroubra Bay, N.S.W.); Smith, **SFSA No. 853*;** 1949: 846; Smith & Smith, 1966: 131*; Haedrich, 1967: 88; Nellen, 1975: 53*. *Cubiceps natalensis* Gilchrist & von Bonde, 1923: 7, Pl. 17, Fig. 2 (Natal); Smith, **SFSA No. 858*;** Winterbottom, 1974: 7. *Psenes guttatus* Fowler, 1934: 442, Fig. 24, (Natal). *Cubiceps squamiceps*: Smith, 1949: 850; 1958: 319*; 1961: 507, **No. 858;** Butler, 1979: 237*.

D X-XII/I,17-21; A II-III,17-20; P 18-20; upper procurrent C rays 8-9; LL 56-66; GR about (6-9)+(16-19); vertebrae 31-32. Depth 2.2-3.4, head 2.4-3.3. Body musculature somewhat soft; head large; eye equal to snout; peduncle short. Teeth in lower jaw slightly flattened and knifelike; teeth on tongue pointed and in a single row; only a few teeth on roof of mouth. P winglike, about equal to head; base of fin almost horizontal.

Colour uniform light to dark brown, fins dark; eye blue; young may have a dark band near base of tail. Attains 20 cm. Indian Ocean and Australia.



255.12 *Psenes whiteleggii:* 5 cm (Natal).

Family No. 256: TETRAGONURIDAE

by R.L. Haedrich

Squaretails **Stompsterte**

Body slender and rounded. First dorsal fin of 10-21 short spines folding into a groove; second dorsal and anal fins short and similar, with 9-17 rays. Pelvic fins folding into a shallow groove. Caudal peduncle long and thick, square in cross-section. Mouth peculiar and box-like; premaxilla not protractile; maxilla covered almost entirely by expanded preorbital bone; lower jaw shuts within upper. Teeth small, pointed and curved in upper jaw; large, flattened and knife-like in lower jaw. Opercles fleshy. Scales moderate in size with heavy keels, adherent, following a geodesic pattern around body. Modified scales form 2 lateral keels on each side of peduncle near caudal fin; snout naked; cheek with scales.

Pelagic, worldwide in warmer waters. Attains 70 cm. Not food-fishes and may even at times be poisonous, but they are eaten by tunas and other large predators. Feed on soft-bodied invertebrates; juveniles commonly associate with salps. A single genus, revised by Grey (1955).

Genus *Tetragonurus* Risso, 1810

Three species; all may be expected in our area.

KEY TO SPECIES

1a Lateral series of scales to caudal keels 97-114; vertebrae 52-58; V well behind P base ..... *T. cuvieri*

1b Lateral series of scales to caudal keels 73-95; vertebrae 40-51; V under or just behind P base 2

2a D spines 10-11; lateral series of scales 73-78; vertebrae 40- 43 ..... *T. pacificus*

2b D spines 14-17; lateral series of scales 83-95, vertebrae 45-51 ..... *T. atlanticus*

256.1 *Tetragonurus atlanticus*

Lowe, 1839

Bigeye squaretail Grootoog-stompstert

Tetragonurus atlanticus Lowe, 1839: 79 (Madeira); Grey, 1955: 17*; Haedrich, 1967: 98; Ahlstrom et al., 1976: 325*.

D XIV-XVII,10-13; A I,9-12; P 14-18; interorbital distance equal to eye diameter; snout only slightly longer than eye diameter; D origin over middle of P.

Light brown to almost black. Attains 50 cm. Atlantic, Pacific and Indian oceans.

256.2 *Tetragonurus cuvieri*

Risso, 1810

Smalleye squaretail Kleinoog-stompstert

Tetragonurus cuvieri Risso, 1810: 347 (Mediterranean); Smith, 1953: 521, **No. 844a**; 1953: 62*; Grey, 1955: 27*; Haedrich, 1967: 98*; Ahlstrom et al., 1976: 329*.

D XV-XXI,10-17; A I,10-15; P 14-21; interorbital distance greater than eye diameter; snout considerably longer than eye diameter; D origin over or behind tip of P.

Light to dark brown, almost black; young greyish. Attains 70 cm. May be reasonably abundant offshore. Natal; also western Mediterranean, eastern Atlantic and Pacific oceans.

256.3 *Tetragonurus pacificus*

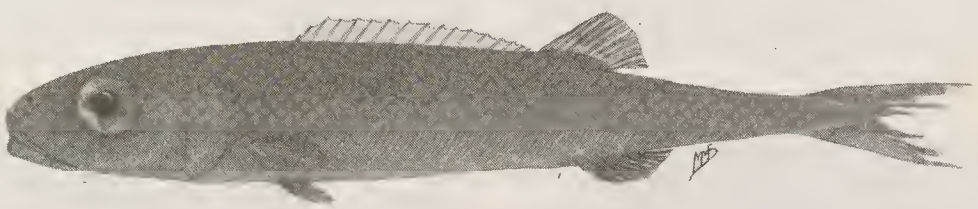
Abe, 1953

Pacific squaretail Stille oseaan-stompstert

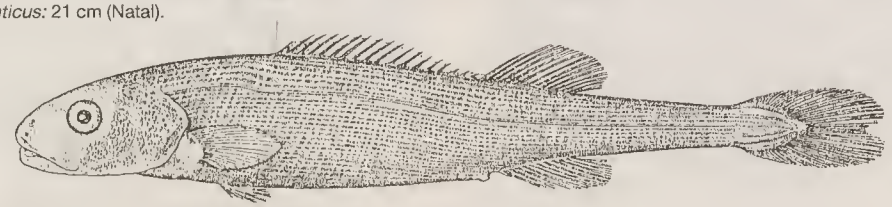
Tetragonurus pacificus Abe, 1953: 45, Figs. 5 & 6 (Solomon Ids.); Grey, 1955: 14*; Haedrich, 1967: 98; Ahlstrom et al., 1976: 333*.

D X-XI,10-12; A I,10-12; P 15-17. Interorbital distance equal to eye diameter; snout only slightly longer than eye diameter. D origin over middle of P.

Light grey to brown. Attains 30 cm? A tropical species of the Pacific and Indian oceans. Unknown from our area, but to be expected as a stray.



256.1 *Tetragonurus atlanticus:* 21 cm (Natal).



256.2 *Tetragonurus cuvieri:* 15 cm (after Grey, 1964).

Order PLEURONECTIFORMES

Flatfishes — Platvisse

The pleuronectiforms (flatfishes) are readily distinguished from all other fishes by their compressed body and head with both eyes on the same side, either right or left. The eyed (upper) side also differs from the blind (underside in colour, development of the paired fins, and in the nature of the scales and of the lateral line. The larval flatfish has an eye on each side of its head, but as it grows, one of the eyes moves over the top of the head to lie on the same side as the other. In most species of flatfishes, all the individuals are either right-sided (dextral), with both eyes on the right side of the head, or left-sided (sinistral), with both eyes on the left side, but in some species reversed specimens (a sinistral individual of a species that is usually dextral or vice versa) may occur.

Flatfishes spend most of their time on the bottom resting on their blind side, which is mostly colourless; the pigmented (upper) side is coloured to match the substrate, thus concealing the flatfish from prey and predators alike. Their ability to change their coloration to match their surroundings is remarkable. Flatfishes often bury themselves in the sediment, with only their eyes and nostrils uncovered. The eyes of some species protrude from the head and can be moved independently.

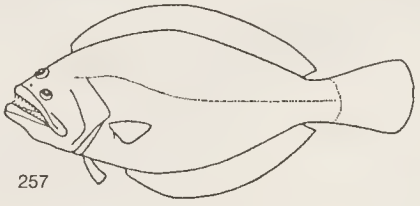
It seems reasonable to suppose that flatfishes evolved from some ancestral species that was accustomed to lying on its side to rest or hide itself. Several species of wrasses (Family Labridae) are known to bury themselves in sand or gravel to sleep or to escape predators. The most primitive flatfishes, the Psettodidae, are apparently derived from a percoid ancestor, as indicated by their pelvic fins with a spine and 5 soft-rays, dorsal and anal fin spines, teeth on the vomer and palatines, and well-developed supramaxilla. Whether all of the other flatfishes are derived from a psettodid ancestor or from some other group of fishes is a moot point.

Most flatfishes occur in depths of 10 to 200 m, a few live in deeper water, and some are found close inshore, even in estuaries. Many species are highly valued as food-fishes and are taken in considerable quantities by trawlers. Flatfishes are known from temperate and tropical waters of all three major oceans. The small buoyant eggs are produced in enormous numbers, with the larger species spawning more than a million eggs at one time. Most flatfishes are less than 1 m in length, some no more than 10 cm, but the giant halibut of the North Atlantic attains a length of 3 m and a mass of 326 kg.

Six families are currently recognised (Nelson, 1984); all six are represented in our area.

KEY TO FAMILIES

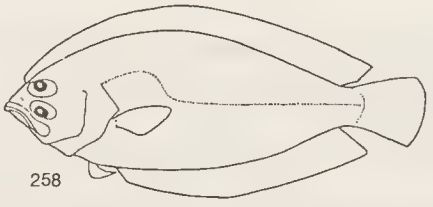
1a Dorsal, anal and pelvic fins with 1 or more spines; dorsal fin origin well behind eyes ..... PSETTODIDAE (No. 257)



257

1b No fin spines (except for the flexible pelvic fin spine of citharids); dorsal fin origin at or before eyes 2

2a Pelvic fins with 1 flexible spine and 5 (segmented) soft-rays; gill membranes widely separated; anus on eyed side ..... CITHARIDAE (No. 258)



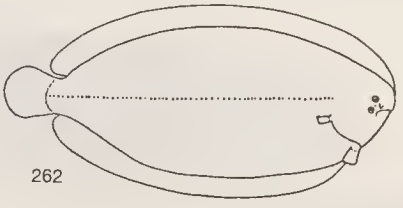
258

2b Pelvic fins with 6 or fewer (segmented) soft-rays but no spine; gill membranes united; anus on midline or on blind side 3

3a Preopercle margin hidden by skin and scales; ribs present 4

3b Preopercle edge free, distinct; ribs absent 5

4a Eyes on right side of head ..... SOLEIDAE (No. 262)



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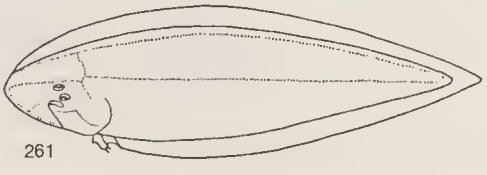
4b Eyes on left side of head ..... CYNOGLOSSIDAE (No. 261)



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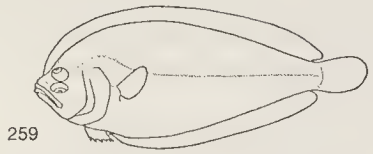
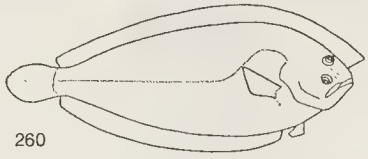
5a Eyes on left side of head in most species ..... BOTHIDAE (No. 259)



259

5b Eyes on right side of head in most species ..... PLEURONECTIDAE (No. 260)



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Family No. 257: PSETTODIDAE

by P.C. Heemstra

Adalahs **Adalahs**

Dorsal fin origin well behind eyes, the anterior rays spinous. Eyes on right or left side of head; migrating eye on dorsal edge of head. Pelvic fins with a weak spine and 5 soft-rays. Supramaxillary bone well developed. Vomer, palatines and tongue with minute teeth. Scales cycloid; lateral line developed on both sides of body. Vertebrae 10+14.

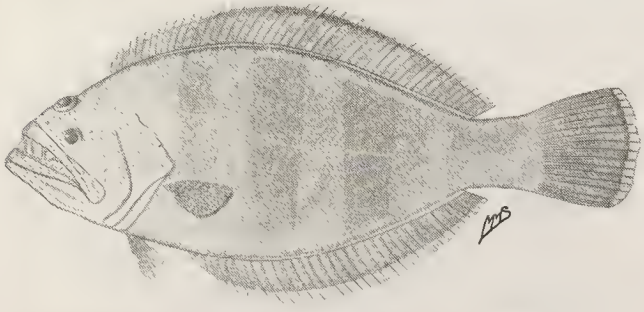
Psettodids are considered the most primitive of the flatfishes. Evidence of their percoid ancestry is seen in the anterior spinous rays of the dorsal fin, pelvic fin spine, teeth on the palate, few vertebrae, etc., and their habit of often swimming in an upright position. One genus, *Psettodes* Bennett, 1830, with 3 species; 1 species in our area.

257.1 *Psettodes erumei*

(Bloch & Schneider, 1801)

Adalah Adalah

Pleuronectes erumei Bloch & Schneider, 1801: 150 ("Tranquebariam", India). *Psettodes erumei:* Norman, 1934: 57*; Smith, **SFSA No. 299***; Stauch & Cadenat, 1965: 21.



257.1 *Psettodes erumei:* 16 cm (off S. Mozambique).

D 1X-X1,38-45; A I,33-42; P 14-16; LL 68-75; 32-38 scales around C peduncle. GR absent; gill arches toothed. Depth 2.3-2.5, head 3.2-3.6 in SL. Jaws with large canines in 2 or 3 rows, some teeth with barbed tips.

Eyed side brownish grey, sometimes with 4 or 5 broad dark bars. Attains 60 cm. Red Sea and Indo-West Pacific from Delagoa Bay to Australia and Japan; depth range 1 - 20 m.

Family No. 258: CITHARIDAE

by P.C. Heemstra

Largescale flounders **Grootskub-botvisse**

Eyes on either side of head, normally on left side in the single species in our area. Pelvic fins with 1 flexible spine and 5 branched rays; pelvics equally developed and short based, left fin median in position and slightly before right fin. Dorsal fin origin at posterior nostril of blind side; pectoral fins well developed. Lateral line present on both sides. Vomer with or without teeth; palatines and tongue toothless. Anus on eyed side. Gill membranes widely separated. Vertebrae 10 + 24-25.

Four genera and 5 species; 1 genus, *Citharoides* Hubbs, 1915, with 1 species in our area.

258.1 *Citharoides macrolepis*

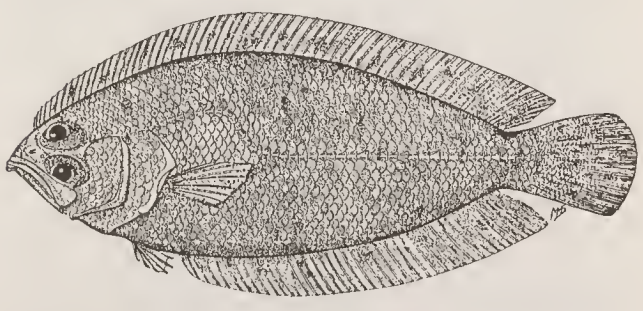
(Gilchrist, 1905)

Largescale flounder Grootskub-botvis

Arnoglossus macrolepis Gilchrist, 1905: 12, Pl. 31 (22 miles north of Tugela R.). *Paracitharus macrolepis:* Regan, 1920: 209. *Citharoides macrolepis:* Norman, 1934: 170*; Smith, **SFSA No. 305***.

D 65-72; A 45-50; P 10; GR vi,1+7,ii; LL 43-47. Depth 2.4-2.7; head 3.0-3.5 in SL; eye 4-5 in head. Urohyal with distinct hook; vomer without teeth; LL tubes T- or Y-shaped; scales large, ctenoid on eyed side of body, cycloid on blind side.

Upper side buff coloured with a few dark spots or blotches on body and D and A; 2 black spots on peduncle at base of last D and A rays. Attains 25 cm. Known only from Natal to Kenya, down to 200 m.



258.1 *Citharoides macrolepis:* 18 cm (Natal).

Family No. 259: BOTHIDAE

by D.A. Hensley

Lefteye flounders **Linkeroog-botvisse**

Most species normally sinistral (eyes on left side of head), but some showing rare reversals and some being indiscriminately sinistral or dextral. Optic chiasma monomorphic, the right optic nerve always dorsal to the left. No fin spines. Dorsal-fin origin above or anterior to upper eye. Dorsal and anal fins separate from caudal fin. Bases of pelvic fins short or that of eyed side elongate. Preopercle margin free and distinct. Branchiostegal membranes united. Anus on blind side.

Bothids comprise 30-40 genera and 205-232 species. They are found in all tropical and temperate seas, and several species are of commercial importance.

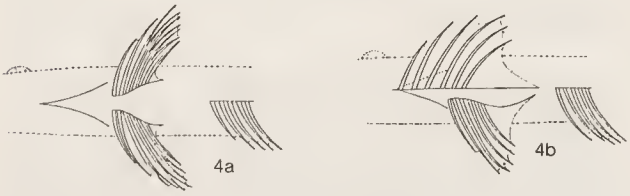
KEY TO GENERA

1a LL straight, without distinct arch anteriorly on eyed side 2
1b LL with distinct arch over P of eyed side 4

2a Both P absent; D rays 104-145; A rays 89-124 ..... *Mancopsetta*
2b Both P present; D rays 80-91; A rays 61-74 3

3a Teeth biserial in upper jaw, uniserial in lower jaw ..... *Syacium*
3b Teeth uniserial in both jaws ..... *Citharichthys*

4a Bases of V nearly equal in size and symmetrical in placement; V on eyed side above midventral line ..... *Pseudorhombus*



4b Base of V on eyed side on midventral line; 1st ray of V on eyed side anterior to that of V on blind side 5

5a 1st ray of V on blind side opposite 2nd ray of V on eyed side; P on blind side absent or rudimentary ..... *Monolene*
5b 1st ray of V on blind side opposite 3rd-6th ray of V on eyed side; P on blind side distinct 6

6a Upper jaw 1.0-1.7 in head, maxilla extending to or well beyond rear edge of lower eye; all GR rudimentary, barely visible ..... *Chascanopsetta*
6b Upper jaw 2.1-4.8 in head, maxilla not extending to rear edge of lower eye; GR not all rudimentary, easily seen 7

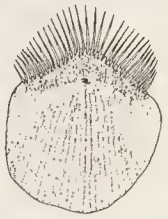
7a All upper-jaw teeth and all or nearly all lower-jaw teeth confined to blind side ..... *Laeops*
7b Teeth present on both sides of jaws 8

8a A nearly continuous bony ridge extending from anterior margin of lower eye to posterior margin of upper eye, in some species this ridge forming the entire interorbital area, in others the ventral margin of a narrow, concave interorbital area; interorbital area narrow, its width less than eye length in both sexes and at all sizes 9

8b No distinct bony ridge extending from anterior margin of lower eye to posterior margin of upper eye; interorbital area distinctly concave, in most species increasing in relative width with size and wider in males than females 11

9a Head profile deeply concave anterior to upper eye; head 4.6- 5.1 in SL ..... *Neolaeops*
9b Head profile not deeply concave anterior to upper eye; head 3.0-5.0 (3.0-4.5 in most species) in SL 10

10a Scales on eyed side with elongate ctenii ..... *Psettina*



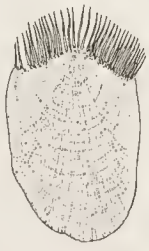
Scale from near middle of eyed side of *Psettina brevirictis*.

10b Scales on eyed side with short ctenii or cycloid ..... *Arnoglossus*

Scale from near middle of eyed side of *Arnoglossus capensis*.

11a LL scales more than 69 ..... *Bothus*
11b LL scales 36-67 12

12a Scales on eyed side with elongate ctenii; LL 50-63 ..... *Crossorhombus*



Scale from near middle of eyed side of *Crossorhombus valderostratus*.

12b Scales on eyed side with short ctenii 13

Scale from near middle of eyed side of *Engyprosopon grandisquama*.

13a GR with rounded or pointed tips, not palmate; 1st D ray shorter than or equal to 2nd and attached to D membrane for most or all of its length ..... *Engyprosopon*
13b GR palmate; 1st D ray usually longer than 2nd and free from D membrane for most or all of its length ..... *Asterorhombus*

Genus ***Arnoglossus*** Bleeker, 1862

About 26 species; 2 in our area, but *A. blachei* Stauch, 1965 (possibly conspecific with *A. imperialis* (Rafinesque, 1810)) has been collected from Angola (17°S; Poll, 1959).

KEY TO SPECIES

1a Maxilla not reaching middle of lower eye; upper jaw 2.8-3.5 in head; P 9-12 on eyed side; LL scales 49-65 2
1b Maxilla extends beyond middle of lower eye; upper jaw 2.1-2.2 in head; P 14-16 on eyed side; LL scales ca. 73-86 ..... *A. dalgleishi*

2a Lower GR 8-14; LL scales 56-65; all or nearly all of interorbital area concave except in small specimens ..... *A. capensis*
2b Lower GR 5-8; LL scales 49-58; entire interorbital area ridge-like or only anterior half concave ..... *A. blachei*

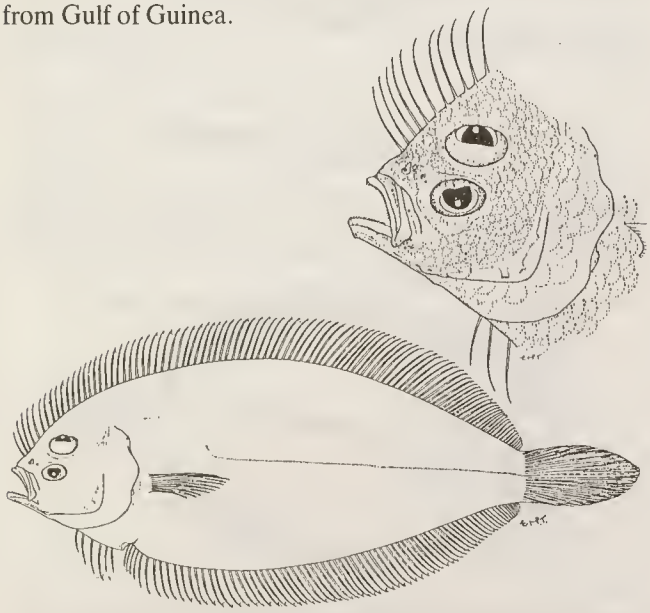
259.1 *Arnoglossus capensis*
Boulenger, 1898

Cape flounder — Kaapse botvis

Arnoglossus capensis Boulenger, 1898: 1 (False Bay); Norman, 1934: 183*; Smith, **SFSA No. 311;** Poll, 1959: 310 (in part, not Fig. 105); Nielsen, 1961: 116 (in part); Cadenat & Marchal, 1963: 1245*; Stauch, 1967: 660; Penrith, 1978: 188; Brownell, 1979: 10*.

D 96-103; A 73-82; P 10-12 on eyed side, 9-11 on blind side; GR 0°(8-14); LL 56-65. Depth 2.1-2.7, head 3.7-4.5 in SL. Scales on eyed side ctenoid. Anterior D rays somewhat prolonged in both sexes. Head profile without pronounced notch at level of upper border of lower eye.

Small, indistinct dark spots and markings on median fins, eyed side of body and head, and V of eyed side. Attains 18 cm. Natal to Angola, St. Helena and Ascension Id. In 1 - 110 m on sand and shell bottoms. Closely related to and possibly conspecific with *A. entomorhynchus* Stauch, 1967 from Gulf of Guinea.



259.1 *Arnoglossus capensis:* 7 cm SL; head of same specimen.

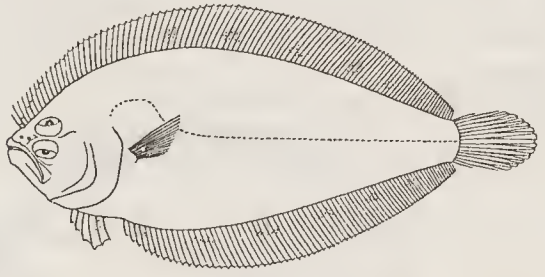
259.2 *Arnoglossus dalgleishi*
(von Bonde, 1922)

East coast flounder — Ooskus-botvis

Trichopsetta dalgleishi von Bonde, 1922: 6, Pl. 1, Fig. 1 (Natal). *Arnoglossus dalgleishi:* Norman, 1934: 193*; Smith, **SFSA No. 310*.**

D 101-108; A 78-83; P 14-16 on eyed side, 11-12 on blind side; GR 0+(7-9); LL ca. 73-86. Depth 2.4-2.8, head 3.6-3.9 in SL. Upper-jaw teeth becoming larger anteriorly; lower-jaw teeth larger and more widely spaced than posterior teeth of upper jaw.

Regular series of dark blotches on D and A; last 3 V rays on eyed side and 1st 3 D rays darkened. Attains 19 cm. Natal, Zanzibar, Mombasa and northeastern Indian Ocean in 50 - 220 m.



259.2 *Arnoglossus dalgleishi:* 15.5 cm paratype (Natal; after Norman, 1934).

Genus ***Asterorhombus*** Tanaka, 1915

Two species, *A. intermedius* (Bleeker, 1866) and *A. fijiensis* (Norman, 1931); neither in our area, but *A. fijiensis* has been collected from northern Mozambique.

Genus ***Bothus*** Rafinesque, 1810

Numerous species; 3 in our area. *B. podas* (Delaroche, 1809) is known from southern Angola (Poll, 1959).

KEY TO SPECIES

1a Lower GR 9-11; D 96-104; A 74-81 ..... *B. mancus*
1b Lower GR 5-9; D 84-97; A 61-73 2

2a Scales on eyed side very small, all cycloid except at edges of body ..... *B. myriaster*
2b Scales on eyed side ctenoid 3

3a Upper jaw 2.7-3.3, lower jaw 1.9-2.4 in head; head profile evenly convex; P of eyed side elongated in males >12 cm SL ..... *B. pantherinus*
3b Upper jaw 3.3-3.6, lower jaw 2.3-2.6 in head; head profile slightly notched above lower eye; P of eyed side not elongated ..... *B. podas*

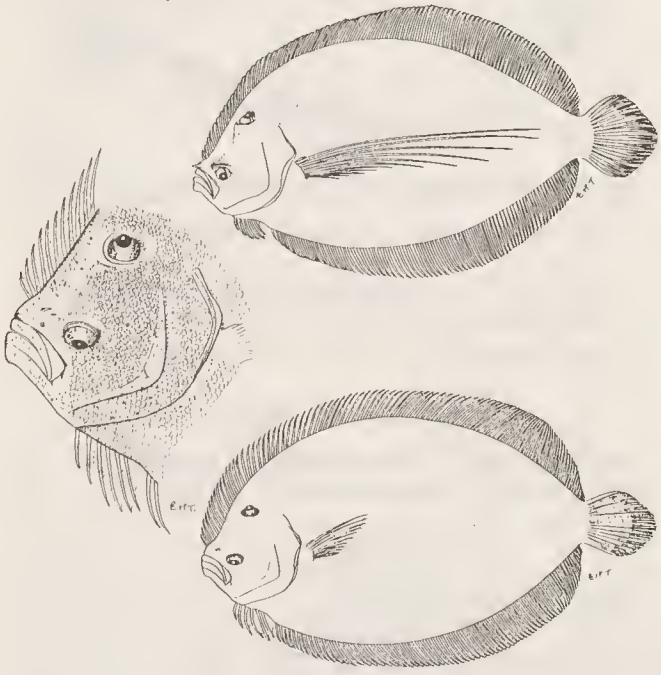
259.3 *Bothus mancus*
(Broussonet, 1782)

Tropical flounder — Tropiese botvis

Pleuronectes mancus Broussonet, 1782: no pagination or plate numbers* (Tahiti). *Bothus mancus:* Norman, 1934: 230*; Smith, **SFSA No. 318*.**

D 96-104; A 74-81; P 10-13 on eyed side, 10-13 on blind side; GR 0+(9-11); LL 76-90. Depth 1.7-2.0, head 3.2-3.8 in SL. Front margin of upper eye over rear margin of lower eye in specimens greater than ca. 13 cm SL. Scales on eyed side ctenoid. Sexual dimorphism develops at about 23 cm SL when males also have tentacles on eyes, elongated P of eyed side, wider interorbital region, and rostral and orbital spines.

Eyed side with many large light coloured spots with dark margins and numerous scattered small dark spots; usually 3 distinct dark blotches or spots on LL, 1 just posterior to junction of curved and straight sections, 1 near middle of straight section, and 1 near rear end of LL; D and A with longitudinal row of widely-spaced dark spots; P of eyed side with dark crossbars (M.M. Smith: "In life spots are in pastel shades of blue, yellow and pink – a beautiful creature."). Attains 42 cm. Widely distributed from Durban to Hawaii and Easter Id.; also reported from Mexico; juveniles and larvae possibly reach south to East London. In shallow water on sandy bottoms or flat reef areas.



259.3 *Bothus mancus*: top: 39 cm SL male (Mozambique); bottom: 18 cm SL female (Natal); head of 14 cm SL female (Natal).

259.4 *Bothus myriaster*
(Temminck & Schlegel, 1846)

Disc flounder — Diskus-botvis

Rhombus myriaster Temminck & Schlegel, 1846: 181, Pl. 92, Fig. 2 (Japan). *Bothus myriaster:* Norman, 1934: 236*; Smith, **SFSA No. 316*.** *Bothus ovalis:* Norman, 1934: 238*. ?*Bothus pantherinus* (*non* Rüppell): Nielsen, 1961: 219.

D 87-97; A 61-73; P 8-10 on eyed side, 7-10 on blind side; GR 0-5 (rudimentary)+(5-8). Relative body depth and head length reduced with growth: in specimens over 10 cm SL, depth 1.4-2.0, head 3.7-4.5 in SL. Males > 8 cm SL with eyed-side P elongated, wider interorbital, spines on snout, orbits and at symphysis of lower jaw, and flap-like appendages on eyes. Larvae show right-eye migration at ca. 30 mm SL, and remain pelagic until 35-40 mm SL; larvae and juveniles remain nearly circular in body shape until ca. 85 mm SL.

Eyed side brown with many dark brown spots; a dark brown blotch above junction of straight and curved sections of LL and another on middle of straight section of LL; distal margin of C blackish; P of eyed side with faint crossbars. Blind side yellowish white on anterior half, darker posteriorly with several dark transverse bars (transverse bars faint or missing in females and juveniles). Attains 27 cm. Extent of range in southern Africa is unknown as most records were based on larvae and small juveniles of questionable identification; definitely known from Inhambane; juveniles and larvae possibly occur south to Cape St. Blaize. Southeast Africa to Taiwan and Japan in 10 - 155 m.

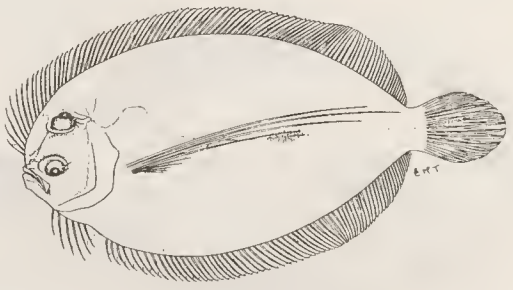
259.4 *Bothus myriaster*: 9.5 cm type of *Platophrys ovalis* (after Regan, 1908).

259.5 *Bothus pantherinus*
(Rüppell, 1830)

Leopard flounder — Luiperd-botvis

Rhombus pantherinus Rüppell, 1830: 121, Pl. 31, Fig. 1 (Red Sea). *Bothus pantherinus:* Norman, 1934: 233*; Smith, **SFSA No. 317*;** Winterbottom, 1976: 69.

D 84-97; A 61-73; P 9-12 on eyed side, 9-11 on blind side; GR 0-7 (rudimentary)+(6-8); LL 74-87 (67-92 reported in literature). Depth 1.6-1.9, head 3.3-3.9 in SL. Front margin of upper eye over middle to pos-



259.5 *Bothus pantherinus*: 15 cm SL male (Natal).

terior ⅓ of lower eye in specimens > 5 cm SL. Each eye usually with 1-3 tentacles (rarely missing) in both sexes. Males > 12-15 cm SL with eyed-side P elongated, wider interorbital, and spines on snout and edge of eye.

Eyed side with numerous dark spots, blotches and rings on body and median fins; 1 distinct dark blotch on middle of straight section of LL; P of eyed side usually with narrow dark crossbars. Attains 30 cm (records to 45 cm are questionable). Confirmed records from Port Alfred northward; larvae and juveniles possibly occur south to Cape St. Blaize. Indo-West Pacific from South Africa to Hawaii; doubtful record from eastern Mediterranean. In 1 - 110 m on sand or mud bottoms.

Genus ***Chascanopsetta*** Alcock, 1894

Three to 5 species; 1 in our area.

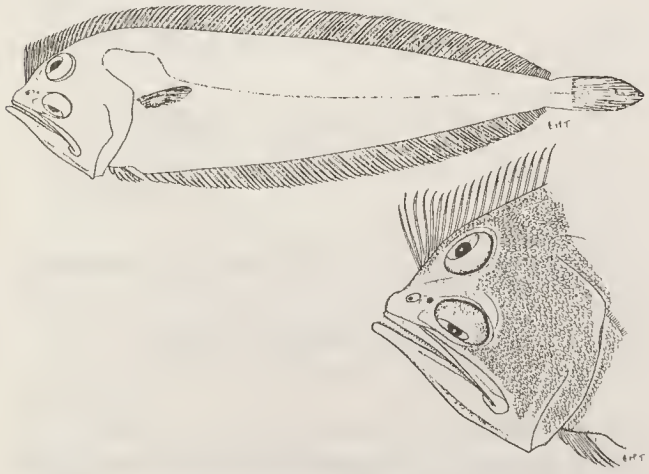
259.6 *Chascanopsetta lugubris*
Alcock, 1894

Pelican flounder — Pelikaan-botvis

Chascanopsetta lugubris Alcock, 1894: 129, Pl. 6, Fig. 4 (Bay of Bengal); Norman, 1934: 250*; Smith, **SFSA No. 306***. *Chascanopsetta gilchristi* von Bonde, 1922: 7 (Natal). *Chascanopsetta maculata* von Bonde, 1922: 8, Pl. 2, Fig. 1 (Natal). *Chascanopsetta galatheae* Nielsen, 1961: 220, Pl. 14, Figs. a-c (Natal).

D 122-128; A 84-89; P 14-17 on eyed side, 12-16 on blind side; LL 167-204 (in southeast Africa). Depth 2.7-4.2, head 4.0-5.8 in SL. Lower jaw 1.0-1.3 in head. Larvae reach very large size; metamorphosis occurs at ca. 10-12 cm SL; some juveniles remain pelagic for a period after metamorphosis. Specimens from southern Africa and possibly southern Madagascar generally have higher D and A ray and LL scale counts (D 111-124, A 76-88, LL 152-195 reported from other areas).

Eyed side brown, sometimes with numerous small dark spots; median fins dusky; peritoneum black, showing through abdominal wall. Attains 38 cm. Natal to Delagoa Bay; Indo-Pacific and Atlantic oceans, in 120 - 977 m on sand, mud and clay bottoms.



259.6 *Chascanopsetta lugubris*: 23 cm SL; head of same specimen (Kenya).

Genus ***Citharichthys*** Bleeker, 1862

Eighteen species, none recorded from our area, but *C. stampflii* (Steindachner, 1894) is known from the mouth of the Kunene River (Penrith, 1970).

Genus ***Crossorhombus*** Regan, 1920

Two to 5 species; 1 in our area.

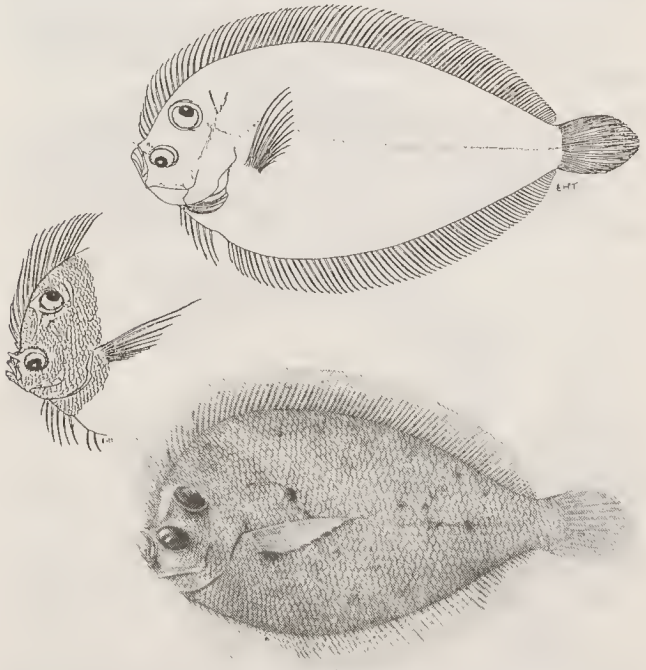
259.7 *Crossorhombus valderostratus*
(Alcock, 1890)

Broadbrow flounder — Breëkop-botvis

Rhomboidichthys valde-rostratus Alcock, 1890: 435 (Ceylon). *Platophrys dimorphus* Gilchrist, 1904: 10, Pl. 27 (Natal). *Crossorhombus valde-rostratus*: Norman, 1934: 217* (in part). *Engyprosopon valde-rostratus*: Smith, **SFSA No. 313***.

D 86-93; A 68-74; P 11-12 on eyed side, 9-11 on blind side; GR 0 (occasionally 1-3 small protuberances)+(5-8); LL 50-58. Depth 1.7-2.1, head 3.6-4.3 in SL. Tip of isthmus below rear half of lower eye. Sexual dimorphism of fish > ca. 5-7 cm: Males - interorbital width 2.0-3.1, P length of eyed side 0.5-0.9 in head; females - interorbital width 3.6-7.6, P length of eyed side 1.1-1.4 in head. Males with flap-like appendages with crenulate or scalloped margins on eyes, a sharp rostral spine and several spines on orbital rims.

Eyed side brown with dark spots roughly arranged in longitudinal rows; 2 or 3 spots on straight section of LL most prominent. Sexual dichromatism: males > 5-6 cm SL with dark spots immediately before interorbital region and on flap-like appendages on eyes and a dark brown or blackish area covering rear ½ of body on blind side. Attains 14 cm.



259.7 *Crossorhombus valderostratus*: top: 11 cm SL male; head of same specimen (Natal); bottom: ca. 7 cm female, syntype of *Platophrys dimorphus* (Natal; after Gilchrist, 1904).

Durban to St. Lucia Bay, possibly reaches East London (33°05'S) and Machanga (Mozambique); India and Ceylon; unconfirmed records from Madagascar, Comoro Ids., Somalia, Japan and Hong Kong.

Genus ***Engyprosopon*** Günther, 1862

Several species; 3 in our area. *E.* sp. has been collected from Porto Amelia, Mozambique, and *E. macrolepis* Regan, 1908 is known from the Comoro Ids. and Cargados Garajos; a 25.6 mm SL specimen from Sodwana Bay is tentatively identified as *E. macrolepis*.

KEY TO SPECIES

1a D 78-89; A 58-68 2
1b D 104-108; A 81-85 ..... *E. smithi*

2a C with 2 distinct dark blotches near dorsal and ventral margins ..... *E. grandisquama*
2b C without 2 distinct dark blotches near dorsal and ventral margins 3

3a Upper jaw 2.3-2.4 in head ..... *E.* sp.
3b Upper jaw 2.6-2.9 in head 4

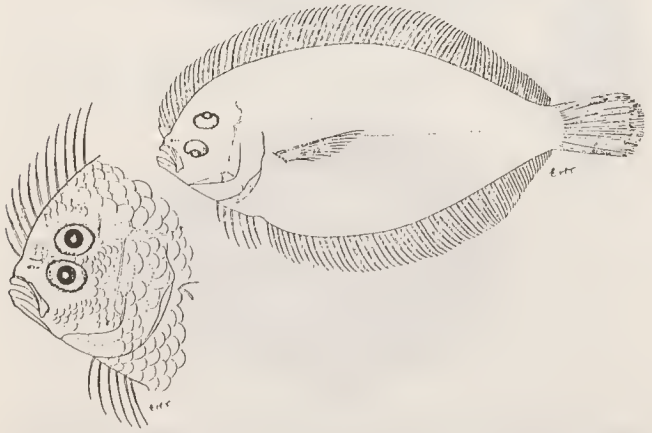
4a A 58-63; P of eyed side 0.6-1.0 in head in specimens > 4 cm SL; males with rostral and orbital spines and large ocular flaps ..... *E. macrolepis*
4b A 62-65; P of eyed side 1.4-1.7 in head; males without orbital spines or ocular flaps ..... *E. natalensis*

259.8 *Engyprosopon grandisquama*
(Temminck & Schlegel, 1846)

Warthog flounder — Vlakvark-botvis

Rhombus grandisquama Temminck & Schlegel, 1846: 183, Pl. 92, Figs. 3 & 4 (Japan). *Engyprosopon grandisquama:* Norman, 1934: 209*; Smith, **SFSA No. 314.**

D 79-89; A 59-68; P 10-12 on eyed side, 9-10 on blind side; GR 0+(5-7); LL 36-48. Depth 1.6-2.1, head 3.5-4.2 in SL. Upper jaw 2.8-4.0, length of P of eyed side 0.9-1.3 in head. Lower-jaw teeth uniserial, upper-jaw teeth biserial and somewhat enlarged anteriorly. Males with wider interorbital area than females (specimens from southern Africa possibly have narrower interorbital widths than those reported from other populations), and rostral and orbital spines (spines probably developing at 5 cm SL).



259.8 *Engyprosopon grandisquama:* 4.5 cm SL male; head of 4.5 cm SL female (Natal).

Eyed side brownish. Attains 15 cm. Durban, throughout Indo-Pacific to Japan; unconfirmed record from Red Sea. In 7 - 100 m on sand and clay bottoms.

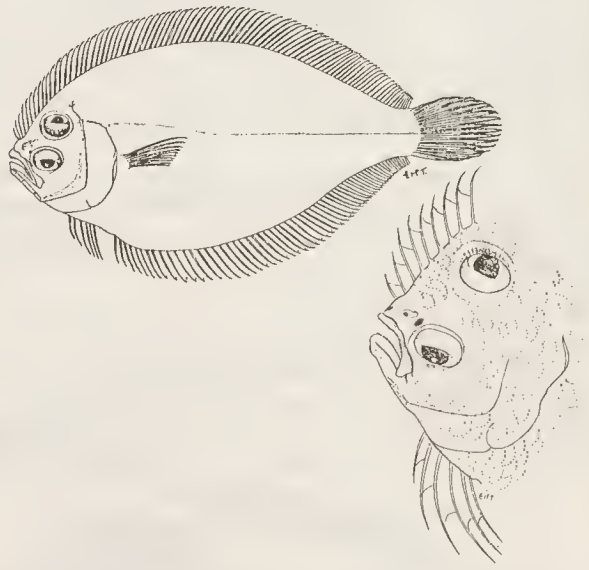
259.9 *Engyprosopon natalensis*
Regan, 1920

Natal flounder — Natalse botvis

Platophrys grandisquama (*non* Temminck & Schlegel): Gilchrist, 1908: 161. *Engyprosopon natalensis* Regan, 1920: 211 (Natal); Norman, 1934: 213*; Smith, **SFSA No. 315.**

D 81-87; A 62-65; P 11-13 on eyed side, 8-10 on blind side; GR 0+(6-7); LL ca. 40. Depth 1.9-2.1, head 3.7-4.0 in SL. Upper jaw 2.6-2.8, eye 3.2-3.5 in head. Front margin of upper eye over anterior ¼/⅓ of lower eye. Teeth uniserial in both jaws, somewhat larger anteriorly in upper jaw. Males (4-6 cm SL) - interorbital width 4.0-9.4, length of 3rd ray of V on eyed side 1.6-2.0, and length of P of eyed side 1.4-1.5 in head; females (4-6 cm SL) - interorbital width 10-22, length of 3rd ray of V on eyed side 2.5-2.9, and length of P of eyed side 1.5-1.7 in head. Males with rostral spine.

Brownish with small dark spots on median fins, P of eyed side with dark crossbar. Only known from 5-8 cm specimens collected off Amatikulu River, Natal on mud bottom in 50 m; record from Delagoa Bay unconfirmed. Probably a small species.



259.9 *Engyprosopon natalensis:* 5.5 cm SL female; head of same specimen (Natal).

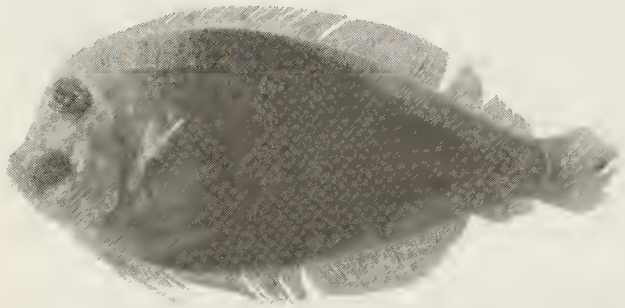
259.10 *Engyprosopon smithi*
Nielsen, 1964

Engyprosopon smithi Nielsen, 1964: 127, Fig. 1, Pl. 17 (Durban).

D 104-108; A 81-85; P 12-13 on eyed side, 8-10 on blind side; GR 0+7; LL 64-67. Depth 2.0-2.2, head 3.8-4.2 in SL. Upper jaw 2.6-2.9, eye

3.2-3.5, interorbital width 3.1-3.6, length of P of eyed side 1.6-1.7 in head. Upper-jaw teeth of outer row larger and more widely spaced than those of inner row. A blunt rostral spine present. No prolonged D rays. Females (unknown) probably lack a rostral spine and have a narrower interorbital.

Anteror ⅓ of eyed side and all of blind side light brown; posterior ⅔ of eyed side dark brown. Known only from 3 males (14-18 cm) from off Durban and Kenya in 230 m. Generic placement questionable, possibly closely related to *Tosarhombus octoculatus* Amaoka, 1969 from Japan.



259.10 *Engyprosopon smithi:* 17.5 cm holotype (off Durban; after Nielsen, 1964).

Genus ***Laeops*** Günther, 1880

Ten or 11 species; 3 in our area.

KEY TO SPECIES

1a P of eyed side longer than head; D 110-116; A 91-96; P 11-13 on eyed side ..... *L. pectoralis*
1b P of eyed side shorter than head; D 98-105; A 76-85; P 14-16 on eyed side 2

2a 1st D ray inserted over anterior nostril of blind side; 1st 3-4 D rays prolonged; teeth in both jaws short, uniserial; LL scales 133-144; A 82-85; lower GR 6-7 ..... *L. nigromaculatus*
2b 1st D ray inserted over posterior nostril of blind side; no D rays prolonged (except probably in very small specimens); teeth in both jaws long, in several series; LL scales ca. 88-100; A 76-77; lower GR 9-10 ..... *L. natalensis*

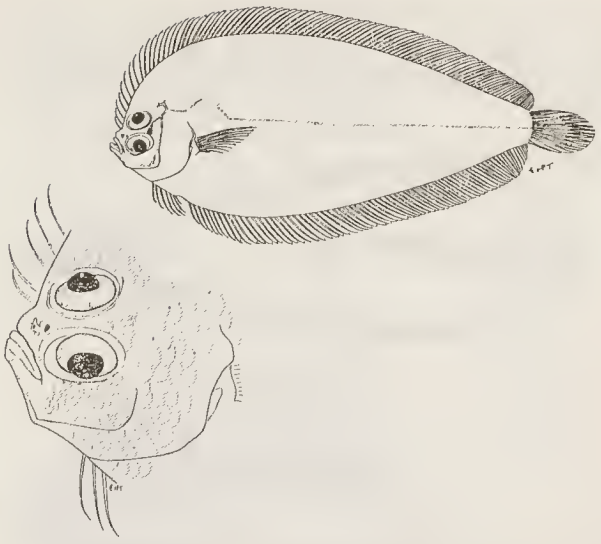
259.11 *Laeops natalensis*
Norman, 1931

Khaki flounder — Kakie-botvis

Lambdopsetta kitaharae (*non* Smith & Pope): von Bonde, 1922: 9. *Laeops natalensis* Norman, 1931: 510 (Natal); 1934: 258*. *Laeops kitaharae* (*non* Smith & Pope): Smith, **SFSA No. 308.**

D 98; A 76-77; P 14-15 on eyed side, 14 on blind side; GR 6+(9-10); LL ca. 88-100. Depth 2.2, head 5.1-5.4 in SL; upper jaw 4.5-4.6, eye 2.9-3.1 in head. Dorsal profile of head and body markedly convex above and behind eyes.

Yellowish brown; distal areas of median fins dusky. Attains 14 cm. Known only from Natal in 330 - 420 m.



259.11 *Laeops natalensis:* 9.5 cm SL paratype; head of same specimen (Natal).

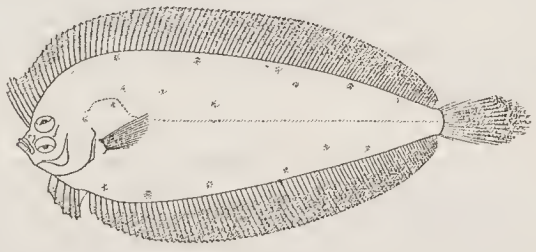
259.12 *Laeops nigromaculatus*
von Bonde, 1922

Blackspotted flounder — Swartspikkel-botvis

Laeops nigromaculatus von Bonde, 1922: 10, Pl. 3 (Natal); Norman 1934: 254*; Smith, **SFSA No. 309*.**

D 100-105; A 82-85; P 15-16 on eyed side, 13-14 on blind side; GR (2-6)+(6-7); LL 133-144. Depth 2.6-2.9, head 5.4-6.0 in SL.

Eyed side of body brown with small dark spots; distal areas of median fins and V of eyed side black. Attains 21 cm. Natal, Delagoa Bay and Japan in 100 - 290 m.



259.12 *Laeops nigromaculatus:* 18 cm paratype (Natal; after Norman, 1934).

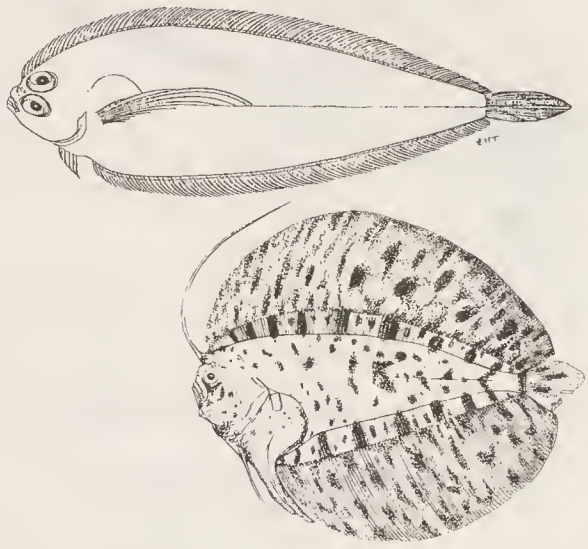
259.13 *Laeops pectoralis*
(von Bonde, 1922)

Longarm flounder — Langarm-botvis

Lambdopsetta pectoralis von Bonde, 1922: 10, Pl. 1, Fig. 3 (Natal). *Laeops pectoralis:* Norman, 1934: 261*; Smith, **SFSA No. 307*.** *Parabothus thackwrayi* Smith, 1967: 457, Figs. 1, 2A (Natal; based on larva).

D 110-116; A 91-96; P 11-13 on eyed side, 11-12 on blind side; GR (5-7)+(8-11); LL 96-104. Depth 2.8-3.0, head 5.0-6.3 in SL; eye 2.3-2.7 in head. First D ray inserted over interspace between nostrils or over posterior nostril of blind side. Teeth uniserial, but replacement teeth visible.

Larvae as illustrated; metamorphosis occurs at a large size. Eyed side brownish; median fins and P of eyed side darker. Attains 19 cm. Natal, Delagoa Bay and Mombasa in 180 - 310 m.



259.13 *Laeops pectoralis:* top: 12 cm SL (Kenya); bottom: larva, 4.5 cm SL, holotype of *Parabothus thackwrayi.*

Genus ***Mancopsetta*** Gill, 1920

Achiropsetta Norman, 1930, *Apterygopectus* Ojedo, 1978 and *Neoachiropsetta* Kotlyar, 1978 are junior synonyms. Genus poorly known; familial placement questionable, possibly most closely related to the Rhombosoleinae (dextral); widely distributed in southern oceans. Five nominal species, possibly 3 or 4 valid; 1 in our area. However, *M. maculata* (Günther, 1880) has been collected near Marion and Prince Edward Ids.

KEY TO SPECIES

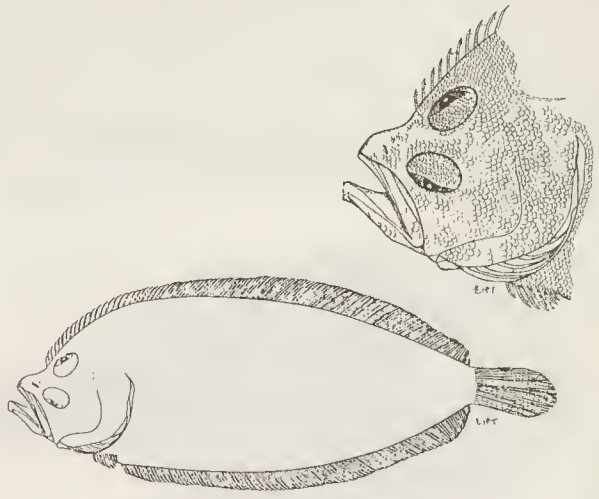
1a D 124-145; A 104-124; LL 154-212; GR (0-5)+(6-10); vertebrae 62-65 ..... *M. milfordi*
1b D 104-128; A 89-105; LL 114-159; GR (5-8)+(9-16); vertebrae 52-56 ..... *M. maculata*

259.14 *Mancopsetta milfordi*
Penrith, 1965

Mancopsetta milfordi Penrith, 1965: 181, Figs. 1, 2c, Pl. 1 (off Cape Town); Karrer, 1968: 564*. *Neoachiropsetta milfordi:* Kotlyar, 1978: 799*.

D 124-145; A 104-124; V 7 on eyed side, 6-7 on blind side; GR (0-5)+(6-10); LL 154-212. Depth 2.2-3.3, head 3.2-4.3 in SL. P probably present as small buds in larvae and small juveniles. Axial area of body noticeably thickened relative to more dorsal and ventral areas. Head profile deeply concave anterior to upper eye. LL present on both sides of body. Eyes densely scaled dorsally.

Brownish grey; median fins somewhat darker. Attains 57 cm. Off Cape Town, Argentina, Falkland Ids. and New Zealand; in 190 - 840 m.



259.14 *Mancopsetta milfordi:* 39.5 cm SL male holotype; head of same specimen (W. of Cape Town).

Genus ***Monolene*** Goode, 1881

Ten species, none reported from our area, but 2 species are known from Angola: *M. microstoma* Cadenat, 1937 (17°S; Poll, 1959) and *M. mertensi* (Poll, 1959) (10°45′S; Poll, 1959).

KEY TO SPECIES

1a Eye 2.3-3.2 in head; body depth 2.8-3.3 in SL ..... *M. microstoma*
1b Eye 4.1-5.2 in head; body depth 2.4-2.8 in SL ..... *M. mertensi*

Genus ***Neolaeops*** Amaoka, 1969

One species.

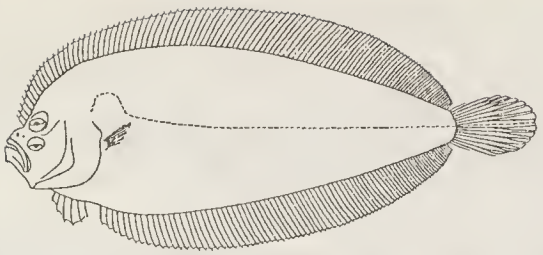
259.15 *Neolaeops microphthalmus*
(von Bonde, 1922)

Crosseyed flounder — Skeeloog-botvis

Laeops microphthalmus von Bonde, 1922: 11* (Natal). *Arnoglossus microphthalmus:* Norman, 1934: 197*; Smith, **SFSA No. 312***.

D 106-110; A 83-87; P 14-15 on eyed side; 11-14 on blind side; GR (5-6)+(8-10); LL 85-110; vertebrae 13+38. Depth 2.3-2.6 in SL; upper jaw 2.4-2.8, eye 4.1-5.3 in head. Scales on eyed side cycloid. Interorbital area a narrow ridge. Upper-jaw teeth small and closely spaced on eyed side, somewhat larger and more widely spaced anteriorly and on blind side; lower-jaw teeth widely spaced, somewhat larger anteriorly and on blind side.

Eyed side brownish; D, A and V of eyed side darker; middle C rays darkened. Attains 21 cm. One specimen from Natal in 275 m; also known from Japan, Taiwan and Indo-Australian Archipelago.



259.15 *Neolaeops microphthalmus:* 13.5 cm holotype (Natal; after Norman, 1934).

Genus ***Psettina*** Hubbs, 1915

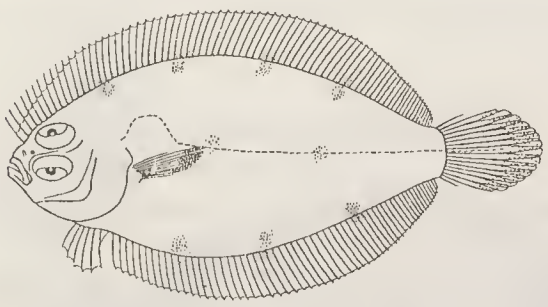
Six species; 1 in our area.

259.16 *Psettina brevirictis*
(Alcock, 1890)

Arnoglossus brevirictis Alcock, 1890: 433 (Ganjam coast, NE India). *Psettina brevirictis:* Norman, 1934: 199*.

D 78-85; A 60-67; P 11-13 on eyed side, 10-11 on blind side; GR (3-5) +(5-8); LL ca. 47-55. Depth 2.0-2.3, head 3.4-3.6 in SL; upper jaw 3.4-4.3 in head. Interorbital area a sharp, narrow ridge. Teeth uniserial in both jaws, somewhat larger on blind side.

Eyed side brownish; dark blotches along dorsal and ventral edges of body which continue onto D & A; 2 or 3 dark blotches on LL; dark area on P of eyed side; C with broad dark band. Attains 8 cm (possibly 10 cm). Record from southern Africa based on small juvenile (35 mm SL) collected off Port St. Johns, Transkei. India, Celebes and possibly Hong Kong and Taiwan. In 37 - 137 m on sand and shell bottoms.



259.16 *Psettina brevirictis:* 10 cm (after Norman, 1934).

Genus ***Pseudorhombus*** Bleeker, 1862

Numerous species; 3 in our area. The reference to *Pseudorhombus arsius* by van der Elst (1981: 110) is doubtful, as it is based in part on *P. elevatus*.

KEY TO SPECIES

1a Lower GR 15-19 (in southern Africa); D membrane between 1st D ray and snout high, flap-like; 1st interhemal spine usually projecting through body wall immediately to right side of 1st A ray ..... *P. elevatus*

Blind side of head of (A) *P. elevatus*, (B) *P. natalensis*, (C) *P. arsius* showing high, flap-like membrane between 1st D ray and snout.

1b Lower GR 9-13; D membrane between 1st D ray and snout low, not flap-like; 1st interhemal spine, when projecting through body wall, immediately before 1st A ray 2

2a LL 51-63; teeth of lower jaw small and closely spaced, 20-31 on blind side of lower jaw (14-19 in specimens less than 4 cm SL); maxilla not extending to middle of lower eye; supratemporal branch of LL reaching only ½ - ⅔ of distance to D base ..... *P. natalensis*

2b LL 67-80; teeth of lower jaw large and usually widely spaced, 8-18 on blind side of lower jaw; maxilla extending to below rear ½ of lower eye; supratemporal branch of LL reaching or nearly reaching bases of 8th-11th D rays ..... *P. arsius*

259.17 *Pseudorhombus arsius*
(Hamilton-Buchanan, 1822)
PLATE 133

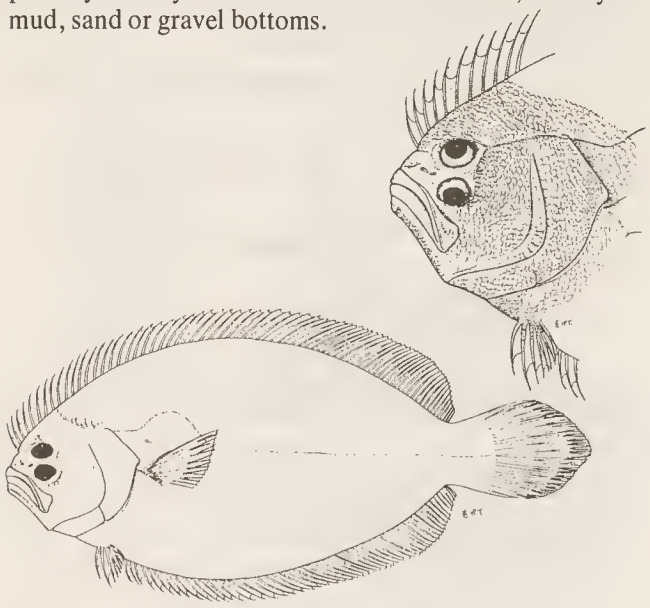
Largetooth flounder — Groottand-botvis

Pleuronectes arsius Hamilton-Buchanan, 1822: 128 (Calcutta). *Pseudorhombus andersoni* Gilchrist, 1904: 8, Pl. 26 (Durban Harbour; based on ambicoloured specimen). *Pseudorhombus russelli:* Regan, 1920: 208*; Barnard, 1925: 388 (in part, not Pl. 17, Fig. 2). *Pseudorhombus arsius:* Norman, 1934: 101*; Smith, **SFSA No. 304*** (in part).

D 72-78; A 54-60; P 11-13 on eyed side, 11-12 on blind side; GR (4-8)+ (9-13), pointed, longer than broad; LL 67-80. Depth 1.7-2.0, head 3.2-3.8 in SL. Upper jaw 2.2-2.4 in head. Scales on eyed side ctenoid, scales on blind side cycloid except those on D & A rays. First D ray inserted over anterior nostril or interspace between nostrils of blind side. Upper-jaw teeth small and closely spaced posteriorly, becoming widely spaced and enlarged anteriorly; teeth of lower jaw large and widely spaced; usually marked difference in size and spacing of posterior teeth in upper and lower jaws.

Eyed side with various dark spots and rings; usually large dark spot at junction of straight and curved parts of LL and 2 smaller ones on LL at posterior ⅓ of body and near anterior end of C peduncle; median fins with scattered dark

spots, frequently arranged in longitudinal row on D and A. Attains 36 cm. Indo-West Pacific south to Algoa Bay and possibly to Knysna. From estuaries to 100 m, usually on mud, sand or gravel bottoms.



259.17 *Pseudorhombus arsius:* 26 cm; head of same specimen (Natal).

259.18 *Pseudorhombus elevatus*
Ogilby, 1912

Ringed flounder — Geringde botvis

Pseudorhombus elevatus Ogilby, 1912: 45 (Queensland); Norman, 1934: 108*

D 68-74; A 53-57; P 10-12 on eyed side, 10-11 on blind side; GR (5-9)+(15-19) pointed, longer than broad; specimens from southern Africa and Persian Gulf appear to have longer and more numerous GR than those from other areas (lower GR 10-15 in other regions); LL 61-71. Depth 1.7-2.0, head 3.0-3.8 in SL. Upper jaw 2.0-2.3 in head; maxilla extends to rear ½ of lower eye. Scales on eyed side ctenoid, scales on blind side cycloid except those on D & A rays. First D ray inserted over or anterior to anterior nostril of blind side. Teeth in both jaws small, closely spaced, sometimes slightly enlarged anteriorly, 25-47 on blind side of lower jaw. Supratemporal branch of LL reaching or nearly reaching bases of 8th-11th D rays. Larvae metamorphose at 1 cm SL.

259.18 *Pseudorhombus elevatus:* 11.5 cm SL; head of same specimen.

Eyed side with dark rings arranged in ca. 5 longitudinal rows; usually large dark blotch at junction of straight and curved parts of LL and 2 smaller ones on LL at posterior ⅓ - ¼ of body and near anterior end of C peduncle; median fins with small dark spots and elongate markings. Attains 19 cm. Indian Ocean to Australia, south to Algoa Bay. In 7 - 200 m on clay, sand and mud bottoms.

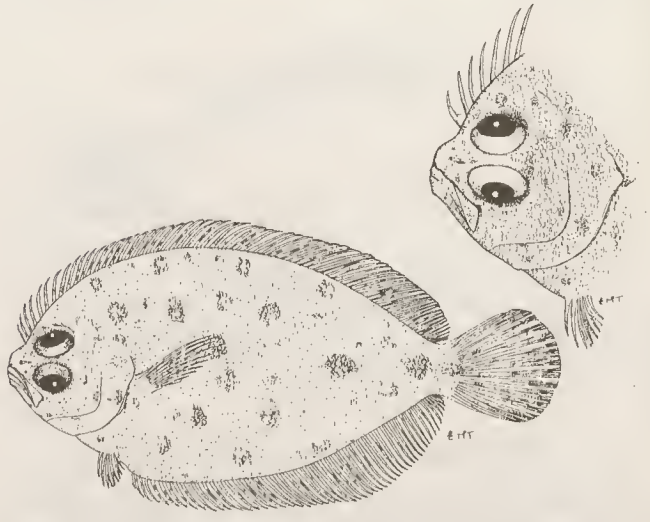
259.19 *Pseudorhombus natalensis*
Gilchrist, 1904

Smalltooth flounder — Kleintand-botvis

Pseudorhombus natalensis Gilchrist, 1904: 8, Pl. 25 (Cape Natal); Norman 1934: 104*; Nielsen, 1964: 130. *Pseudorhombus russelli* (*non* Gray): Barnard, 1925: (Pl. 17, Fig. 2 only). *Pseudorhombus arsius* (*non* Hamilton-Buchanan): Smith, **SFSA No. 304** (in part, not Fig. 304 on Pl. 10).

D 68-72; A 52-55; P 11-12 on eyed side, 9-11 on blind side; GR (3-6)+(10-13) pointed, longer than broad; LL 51-63. Depth 1.8-2.3, head 3.2-3.7 in SL. Upper jaw 2.2-2.5 in head. Scales on eyed side ctenoid, nearly all scales on blind side cycloid. First D ray inserted over interspace between nostrils or over posterior nostril of blind side.

Eyed side with dark rings arranged in ca. 5 longitudinal rows; row of small dark spots on median fins; usually dark spot near margin of V on eyed side. Attains 14 cm. Durban and off Tugela River on sandy bottoms in 60 - 260 m.



259.19 *Pseudorhombus natalensis:* 11.5 cm SL; head of same specimen (Natal).

Genus ***Syacium*** Ranzani, 1840

Four or 5 species; 1 in our area.

259.20 *Syacium micrurum*
Ranzani, 1840

Syacium micrurum Ranzani, 1840: 18, Pl. 5 (Brazil); Norman, 1934: 132*; Nielsen, 1961: 105. *Syacium ovale* (*non* Günther): Pauca, 1930: 37. *Syacium guineensis:* Fraser, 1971: 491.

D 85-91; A 66-74; P 11-12 on eyed side; lower GR 7-8; LL 51-62 (LL 57-68 in fish from western Atlantic). Depth 2.3-2.6, head 3.6-4.2 in SL. Interorbital width in eye usually greater than 2.5. Upper-jaw teeth biserial, anterior teeth of outer row enlarged canines; lower-jaw teeth uniserial. Males with somewhat wider interorbital region and longer upper P rays on eyed side than females. Larvae probably metamorphose at ca. 14 mm SL.

Eyed side brownish, usually with diffuse dark spot on LL under P and another near anterior end of C peduncle; no dark lines on head. Attains 30 (possibly 40) cm. Western Atlantic from Florida to Rio de Janeiro; in eastern Atlantic from Mauritania to Walvis Bay in 18 - 100 m (and probably shallower) on mud, sand and gravel bottoms.

259.20 *Syacium micrurum:* 16.5 cm SL; head of same specimen (Namibia).

Family No. 260: PLEURONECTIDAE

by P.C. Heemstra

Righteye flounders **Regteroog-botvisse**

Most species with eyes normally on right side of head. Dorsal fin origin above or before eyes; pectoral fins present; no fin spines. No supramaxilla; no teeth on vomer or palatines. Preopercle edge free. Vertebrae 30 or more; ribs present.

Pleuronectids comprise some 45 genera and about 100 species; they occur in all oceans, and many species are of considerable commercial importance. Five species in our area.

KEY TO GENERA

1a D origin above eyes; LL rudimentary or absent on blind side of body 2
1b D origin before eyes 3

2a Anterior rays of D and right V prolonged, more so in males; males with strong rostral spines ..... *Marleyella*
2b No fin rays prolonged; males without rostral spines ..... *Poecilopsetta*

3a LL and P well developed on both sides of body; LL with a prominent curve over P ..... *Paralichthodes*
3b LL and P rudimentary or absent on blind side; LL on eyed side nearly straight 4

4a Anterior D rays greatly prolonged; C rays not branched ..... *Samaris*
4b No D rays prolonged; middle C rays branched ..... *Samariscus*

Genus ***Marleyella*** Fowler, 1925

Monotypic.

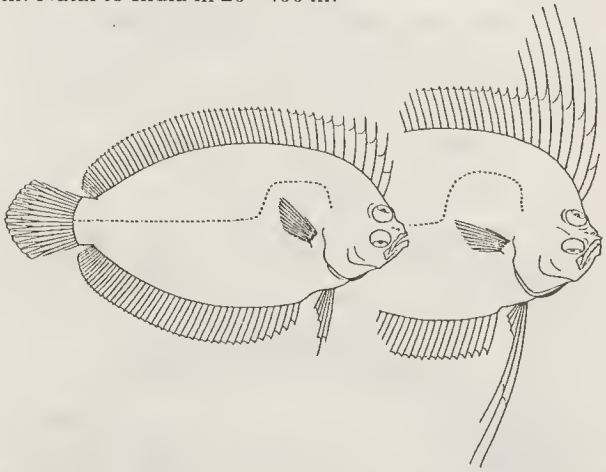
260.1 *Marleyella bicolorata*
(von Bonde, 1922)
PLATE 133

Comb flounder Kam-botvis

Poecilopsetta bicolorata von Bonde, 1922: 14, Pl. 5, Fig. 2 (Natal). *Poecilopsetta (Marleyella) bicolorata:* Fowler, 1925: 203. *Marleyella bicolorata:* Norman, 1934: 396*; Smith, **SFSA No. 300*.**

D 55-60; A 46-49; P 10-12; LL 70-78; lower GR 12; vertebrae 10+27. Depth 1.9-2.1 in SL. LL strongly curved over P. Teeth on outer surface of upper jaw in males. Scales weakly ctenoid on eyed side, cycloid on blind side.

Eyed side dark brown, spotted and blotched with black to form vague crossbars; C with dark bar at base; blind side dark brown; head with small round black spots. Attains 19 cm. Natal to India in 20 - 400 m.



260.1 *Marleyella bicolorata:* left: 17.5 cm female paratype; right: 18.5 cm male holotype (Natal; after Norman, 1934).

Genus ***Paralichthodes*** Gilchrist, 1902

Monotypic; apparently endemic to southern Africa.

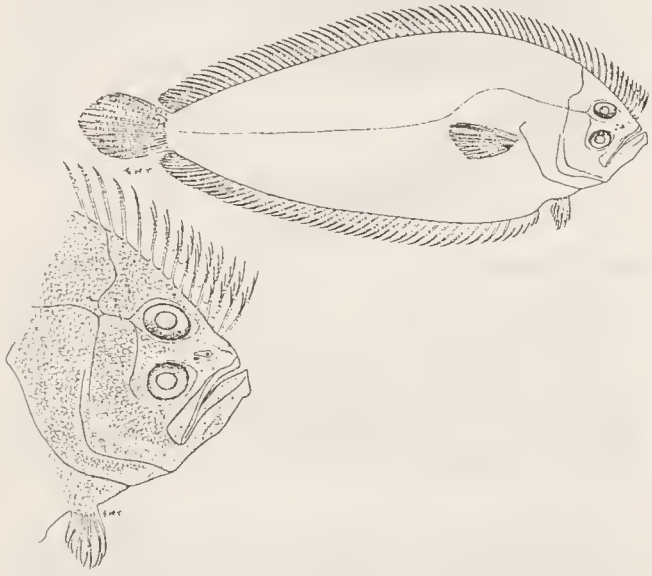
260.2 *Paralichthodes algoensis*
Gilchrist, 1902
PLATE 133

Measles flounder — Masels-botvis

Paralichthodes algoensis Gilchrist, 1902: 108, Pl. 8 (Algoa Bay); Norman, 1934: 398*; Smith, **SFSA No. 302*.**

D 67-74; A 47-54; P 12-13 on eyed side, 11 on blind side; V 6; GR (8-9)+(19-21); LL 110-125; vertebrae 10+21. Depth 2.3-2.5, head 3.8-4.5 in SL. Large opening between left and right gill chambers. Scales cycloid on both sides of body.

Eyed side brownish grey with small dark spots; blind side white. Attains 50 cm. Known only from Mossel Bay to Delagoa Bay in 1 - 100 m.



260.2 *Paralichthodes algoensis*: 19 cm SL; head of same specimen (Natal).

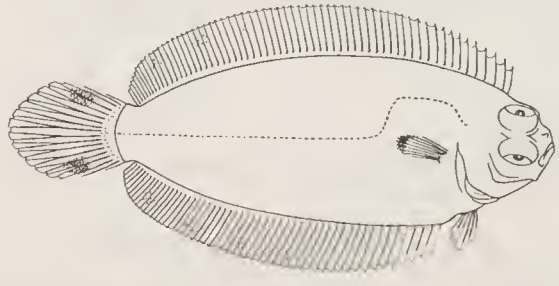
Genus ***Poecilopsetta*** Günther, 1880

Several species, 1 in our area.

260.3 *Poecilopsetta natalensis*
Norman, 1931

Poecilopsetta natalensis Norman, 1931: 426 (off Natal, 188 fms); Norman, 1934: 393*; Smith, **SFSA No. 301***; Chen & Weng, 1965: 16*.

D 60-62; A 51-54; P 10 (9 on blind side); LL about 70; GR 7+11. Depth 2.5-2.6 in SL; eye 2.3-2.5 in head. Scales deciduous, weakly ctenoid on ocular side, cycloid on blind side. Teeth in narrow bands.



260.3 *Poecilopsetta natalensis*: 14.5 cm holotype (Natal; after Norman, 1934).

Prejuvenile stage with dorsal and ventral ⅓ of body transparent and prominent black spots on both sides of body. Metamorphosis to adult stage at 7-8 cm SL; ocular side of body greyish brown; D, A and P dusky to black; 2 dark blotches on C; blind side of body pale with dusky spots. Attains 15 cm. Natal to Kenya in 250 - 450 m; also reported from Taiwan.

Genus ***Samaris*** Gray, 1831

Five species, 1 in our area.

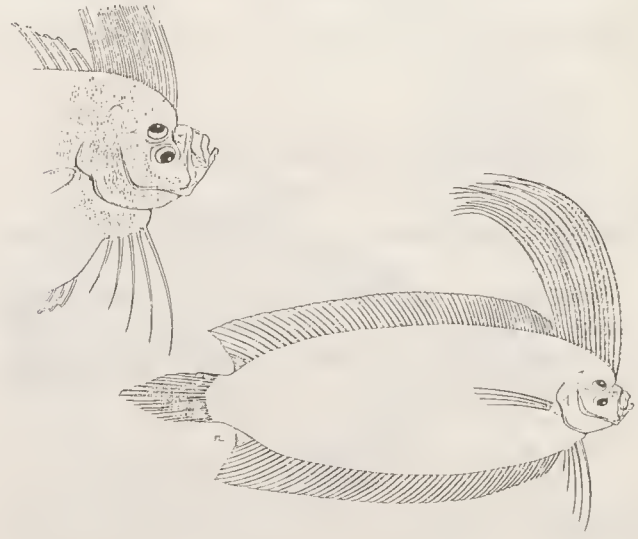
260.4 *Samaris cristatus*
Gray, 1831
PLATE 133

Crested flounder — Kuif-botvis

Samaris cristatus Gray, 1831: 5 (China); Norman, 1934: 403*; Smith, **SFSA No. 303*.** *Samaris ornatus* von Bonde, 1922: 13, Pl. 6 (Natal, 33 fms); Norman, 1934: 404*. *Samaris delagoensis* von Bonde, 1925: 289 (Delagoa Bay).

D 80-86; A 54-57; LL 80-94; P 4; GR rudimentary. LL and P of blind side rudimentary or absent. Depth 2.5-2.9 in SL; eye 3.0-4.4 in head; upper-jaw length 2.7-3.4 in head. Fold of skin from base of 1st D ray across blind side of head to rear end of lower jaw. No nasal organ on blind side. Prominent indentation in head profile before upper eye. Last 4 or 5 D and A rays smaller and closer together than preceding rays and covered by a fold of skin on ocular side.

Body brownish with 5 dark blotches along upper and 4 along lower edge; D and A dusky; P blackish. Attains 17 cm. From Natal to the Red Sea to China and Taiwan. Specimens from southern Africa have slightly more D and A rays and LL scales than reported for specimens from eastern Indian Ocean and western Pacific region.



260.4 *Samaris cristatus*: 12 cm SL; head of same specimen (S. Mozambique).

Genus ***Samariscus*** Gilbert, 1905

About 14 species, 1 in our area.

260.5 *Samariscus triocellatus*
Woods, 1966
PLATE 135

Threespot flounder — Driekol-botvis

Samariscus triocellatus Woods, 1966: 66, Fig. 149 (Bikini Atoll, Marshall Ids.); Winterbottom, 1978: 53; Smith, 1980: 175.

D 62-70; A 47-56; P 4 (not counting nubbin at base of 1st ray); LL 71-76 (82-87 reported by Winterbottom, 1978); GR rudimentary. Depth 2.4-3.1, head 3.6-4.3 in SL.

Body brown mottled with irregular darker and pale markings; 2 or 3 dark-edged ocelli along LL, 1st at tip of P, last at base of C; P blackish distally; D and A with minute black dots; C with dark spots. Attains 7 cm. Coral reef habitats at Sodwana Bay; western Pacific and Hawaii.

Family No. 261: CYNOGLOSSIDAE

by P.C. Heemstra

Tonguefishes — **Linkeroog-tongvisse**

Eyes on left side of head. Pectoral fins absent; dorsal and anal fins confluent with caudal; dorsal fin origin at or in front of fixed (lower) eye. Preopercle margin covered by skin.

Tonguefishes are found in warm waters of all oceans (between 40° latitudes). Most species occur in shallow water or estuaries; they are adept at burrowing in sand, for which their very compressed bodies are well suited. A recent revision of the genus *Cynoglossus* (Menon, 1977) recognises 3 genera in this family, with something over 100 species. Scales of the middle lateral line are counted from the vertical branch on the head.

KEY TO GENERA

1a Mouth inferior; "snout" (front part of head) produced, hooked over lower jaw; LL present, at least on ocular side of body 2
1b Mouth terminal; snout not hooked over lower jaw; no LL ..... *Symphurus*

2a Lips on ocular side of head distinctly fringed ..... *Paraplagusia*
2b Lips not fringed ..... *Cynoglossus*

Genus ***Cynoglossus*** Hamilton-Buchanan, 1822

Pelvic fin connected to A; teeth only on right (blind) side of jaws. Menon (1977) recognises 49 species; most occur in the Indian and western Pacific oceans, a few off west Africa; 9 species in our area. Smith (**SFSA No. 339**) includes *C. lingua* (Hamilton-Buchanan) from our area, based on *C. hunteri* von Bonde, 1925. The original description of *C. hunteri* (from a 78 mm specimen) does not agree completely with any of our species or with that of *C. lingua* given by Menon (1977: 65). As the holotype and only known specimen of *C. hunteri* is apparently lost, we must regard this name as a *nomen dubium*.

KEY TO SPECIES

1a Usually 8 C rays; 2 nostrils and usually 2 LL's on ocular side; no LL on blind side 2
1b Usually 10 (sometimes 8 or 9) C rays 3

2a Eyes contiguous; 10-12 scale rows between dorsal and middle LL; 64-66 scales in middle LL ..... *C. acaudatus*
2b Eyes with distinct interspace; 14 or 15 scale rows between LL's; 74-80 scales in middle LL ..... *C. gilchristi*

3a Two LL's on both sides of body; 2 nostrils on ocular side 4
3b No LL on blind side of body 5

4a 10-12 scale rows between LL's; snout length (from front of head to lower eye) 9-11% SL ..... *C. attenuatus*
4b 16-18 scale rows between LL's; snout 6.7-8.0% SL ..... *C. lachneri*

5a One nostril on ocular side; rostral hook not reaching past nostril; usually 3 LL's on ocular side of body 6
5b Two nostrils on ocular side; scales ctenoid on both sides of body 7

6a A 92-103; D 116-124 ..... *C. zanzibarensis*
6b A 81-88; D 103-110 ..... *C. capensis*

7a Snout short, 2.9-4.3 in head; rostral hook not reaching past anterior nostril; angle of mouth closer to front of head than to gill opening ..... *C. durbanensis*
7b Snout long, 2.1-3.2 in head; rostral hook extending to below lower eye; angle of mouth closer to gill opening than to front of head 8

8a Usually 2 LL's on ocular side; 12-14 scale rows between LL's; middle LL with 72-94 scales ..... *C. lida*
8b Usually 3 LL's; 18 or 19 scale rows between dorsal and middle LL, latter with 111-114 scales ..... *C. marleyi*

261.1 *Cynoglossus acaudatus*
Gilchrist, 1906
PLATE 134

Natal tonguefish — Natalse tongvis

Cynoglossus acaudatus Gilchrist, 1906: 162, Pl. 46 (off Tugela River, Natal). *Areliscus natalensis* von Bonde, 1922: 23, Pl. 4, Fig. 2 (Natal). *Cynoglossoides ecaudatus:* Smith, **SFSA No. 336***. *Cynoglossus ecaudatus:* Menon, 1977: 52*.

D 108-110; A 86-87; C 8; vertebrae 52-53; middle LL 64-66. Two LL's on ocular side, none on blind side; 2 nostrils on ocular side. Eyes contiguous; rostral hook ends in front of anterior nostril. Scales ctenoid on both sides of body.

Upper side brown, with irregular dark bars and blotches. Attains 14 cm. Natal to Somalia; also at Seychelles.

261.2 *Cynoglossus attenuatus*
Gilchrist, 1904
PLATE 134

Fourline tonguefish — Vierlyn-tongvis

Cynoglossus attenuatus Gilchrist 1904: 11, Pl. 29 (off Tugela River mouth, Natal; 24 fms); Menon, 1977: 39*. *Arelia bilineata* (*non* Lacepède): Smith, **SFSA No. 341*** (in part).

D 110-120; A 88-95; C 10; vertebrae 54-55; middle LL 82-88. Two LL's on both sides of body; 2 nostrils on ocular side of head. Body depth 3.9-4.7 in SL; snout 2.2-2.8 in head. Rostral hook reaching to below anterior nostril. Scales ctenoid on upper side, cycloid on blind side.

Upper side brown, with indistinct dark horizontal lines following scale rows; lower side whitish. Attains 31 cm. Found only from Durban to Delagoa Bay.

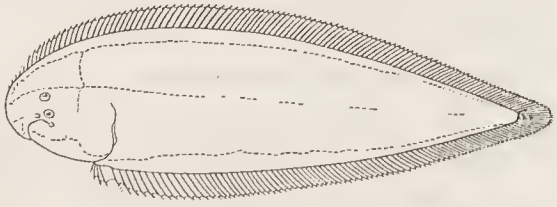
261.3 *Cynoglossus capensis*
(Kaup, 1858)

Sand tonguefish — Sand-tongvis

Trulla capensis Kaup, 1858: 109 (locality not given, presumably Cape of Good Hope); Smith, **SFSA No. 342** (in part; colour plate is of *C. zanzibarensis*). *Areliscus microphthalmus* von Bonde, 1922: 24, Pl. 4, Fig. 3 (off Umhlali River, Natal). *Cynoglossus microphthalmus:* Menon, 1977: 57*. *Cynoglossus capensis:* Menon, 1977: 59* (in part).

D 103-110; A 81-88; C 10; vertebrae 50-52; middle LL 86-104; 14-19 scale rows between dorsal and middle LL. Three LL's on ocular side, none on blind side; 1 nostril on ocular side. Body depth 2.9-4.3 in SL; snout 2.7-3.6 in head; eyes contiguous or nearly so. Rostral hook ending well in front of anterior nostril. Scales ctenoid on ocular side; anterior scales of blind side cycloid, posteriors weakly ctenoid.

Upper side brownish grey, with dark specks. Attains 31 cm. Kunene River (Namibia) to Algoa Bay.



261.3 *Cynoglossus capensis:* 17.5 cm holotype of *C. microphthalmus* (Natal; after Menon, 1977).

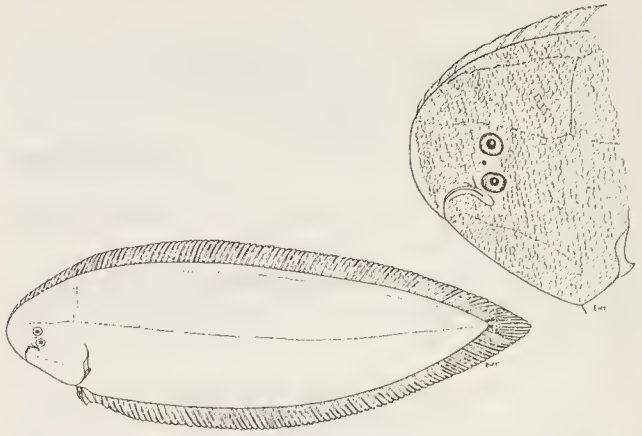
261.4 *Cynoglossus durbanensis*
Regan, 1921

Durban tonguefish — Durban-tongvis

Cynoglossus durbanensis Regan, 1921: 2 (Durban); Menon, 1977: 79*. *Cynoglossoides durbanensis:* Smith, **SFSA No. 338.**

D 98-105; A 78-84; C 8-10 (usually 10); vertebrae 48-50; 18-21 scale rows between dorsal and middle LL, latter with 90-106 scales. Two LL's on ocular side, none on blind side; 2 nostrils on ocular side. Body depth 3.2-3.9 in SL; horizontal eye diameter 10-12 in head; interorbital space subequal to vertical eye diameter. Rostral hook ends in front of anterior nostril. Scales ctenoid on both sides of body.

Upper side of body and fins pale brownish, covered with irregular dark spots and blotches. Attains 20 cm. Known only from Natal to Kenya.



261.4 *Cynoglossus durbanensis:* 13 cm; head of same specimen (S. Mozambique).

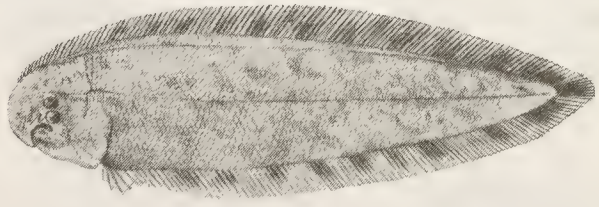
261.5 *Cynoglossus gilchristi*
Ogilby, 1910

Ripplefin tonguefish — Rimpelvin-tongvis

Cynoglossus brachycephalus (*non* Bleeker): Gilchrist, 1904: 12, Pl. 30 (off Umhlanga River, Natal). *Cynoglossus gilchristi* Ogilby, 1910: 39 (on *Cynoglossus brachycephalus:* Gilchrist, 1904); Regan, 1920: 222; Menon, 1977: 80*. *Cynoglossoides gilchristi:* Smith, **SFSA No. 337*.**

D 104-110; A 82-86; C 8; vertebrae 50; middle LL with 74-98 scales. Two LL's on ocular side of body, none on blind side; 2 nostrils on ocular side. Body depth 3.4-4.0 in SL; snout 3.1-3.8 in head. Rostral hook reaches vertical at anterior nostril. Scales ctenoid on both sides of body.

Upper side brown, with irregular dark spots and horizontal black lines following the scale rows; fins with dark streaks and blotches. Attains 16 cm. Natal and Delagoa Bay; also Madagascar.



261.5 *Cynoglossus gilchristi:* length unknown; holotype of *C. brachycephalus* (after Gilchrist, 1904).

261.6 *Cynoglossus lachneri*
Menon, 1977

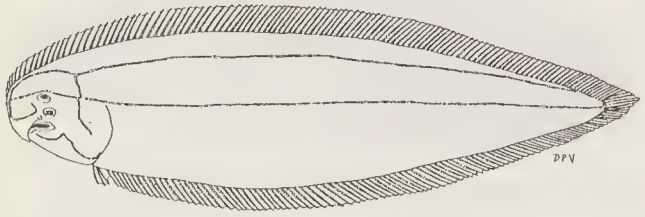
Twoline tonguefish — Tweelyn-tongvis

?*Cynoglossus hunteri* von Bonde, 1925: 293 (Delagoa Bay). *Cynoglossus lachneri* Menon, 1977: 40*.

D 113-121; A 92-98; C 10; vertebrae 55-58; middle LL with 100-117 scales. Two LL's on both sides of body; 2 nostrils on ocular side. Body depth 3.6-4.1 in SL; snout 2.5-3.5 in head. Rostral hook ends well in front

of anterior nostril. Scales ctenoid on upper side of body, cycloid on blind side.

Upper side uniformly tan. Attains 46 cm. Delagoa Bay to Kenya; also Seychelles, Mauritius, Madagascar, Comoro Ids., Red Sea and Gulf of Oman.



261.6 *Cynoglossus lachneri:* 24 cm SL paratype (Seychelles).

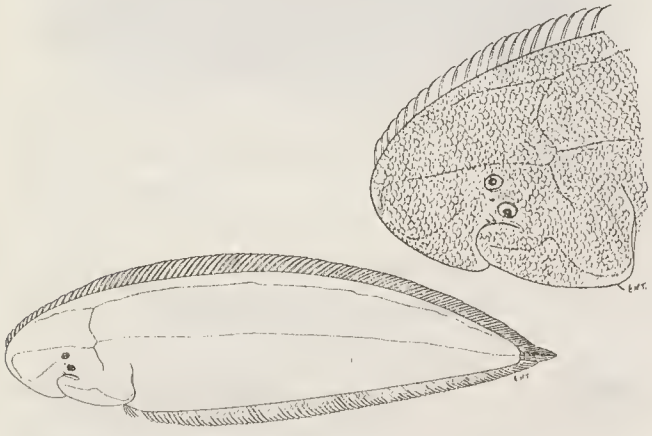
261.7 *Cynoglossus lida*
(Bleeker, 1851)

Roughscale tonguefish — Ruweskub-tongvis

Plagusia lida Bleeker, 1851: 413 (Batavia). *Cynoglossus lida:* Smith, **SFSA No. 340;** Menon, 1977: 81*.

D 99-108; A 77-86; C 10; vertebrae 47-52. Two LL's on ocular side of body, none on blind side; 2 nostrils on ocular side. Body depth 3.6-4.5 in SL. Rostral hook reaches past anterior nostril. Scales ctenoid on both sides of body.

Upper side of body brown, covered with black specks; fins dusky. Attains 20 cm. Widely distributed from the Philippines to Mozambique, south to Durban.



261.7 *Cynoglossus lida:* 17.5 cm SL; head of same specimen (Natal).

261.8 *Cynoglossus marleyi*
Regan, 1921
PLATE 134

Threeline tonguefish — Drielyn-tongvis

Cynoglossus marleyi Regan, 1921: 418 (off Umvoti River, Natal); Menon, 1977: 85*. *Areliscus marleyi:* Smith, **SFSA No. 343*.**

D 126-130; A 105-110; C 10; vertebrae 60-62; middle LL with 111-115 scales. No LL on blind side; 2 nostrils on ocular side. Body depth 3.9-4.6 in SL. Rostral hook reaches past anterior nostril. Scales ctenoid on both sides of body.

Upper side uniformly brown; C and posterior parts of D and A blackish. Attains 35 cm. Durban to Delagoa Bay.

261.9 *Cynoglossus zanzibarensis*
Norman, 1939
PLATE 134

Redspotted tonguefish — Rooigespikkelde tongvis

Cynoglossus zanzibarensis Norman, 1939: 105, Fig. 36 (Zanzibar); Menon, 1977: 58*. *Cynoglossus capensis* (*non* Kaup): Boulenger, 1900: 4. *Trulla capensis* (*non* Kaup): Barnard, 1925: 416; Smith, **SFSA No. 342*** (in part - colour plate).

D 116-124; A 92-103; C 10; vertebrae 54-60; middle LL 80-95; 13-17 scale rows between dorsal and middle LL's. Three LL's on ocular side, none on blind side; 1 nostril on ocular side. Body depth 3.5-4.6 in SL. Interorbital space distinctly less than vertical eye diameter. Rostral hook ends well in front of nostril of eyed side. Juveniles (< 15 cm SL) with ctenoid scales on both sides of body; adults (> 20 cm SL) with cycloid scales anteriorly on blind side and ctenoid scales posteriorly.

Attains 32 cm. Western Cape Province to Kenya; common off our south coast and one of our best eating "soles".

Genus ***Paraplagusia*** Bleeker, 1865

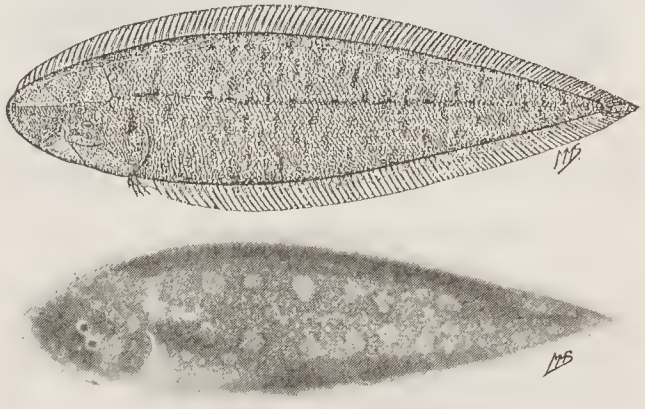
Pelvic fin connected to A; teeth only on right (blind) side of jaws; lips on ocular side with fringe of branched tentacles. Single nostril on ocular side. Four species, 1 in our area.

261.10 *Paraplagusia bilineata*
(Bloch, 1787)

Fringelip tonguefish — Fraiingbek-tongvis

Pleuronectes bilineatus Bloch, 1787: 29, Pl. 188 (China). *Plagusia robinsoni* Regan, 1919: 203, Fig. 5 (Durban). *Paraplagusia bilineata:* Smith, **SFSA No. 335*.**

D 99-110; A 75-86; C 8; vertebrae 50; 2 LL's on ocular side, separated by 16-19 rows of scales; no LL on blind side; middle LL with 100-117



261.10 *Paraplagusia bilineata:* top: 19 cm; bottom: 17.5 cm (both Natal).

scales. Body depth 3.5-4.2 in SL. Eye diameter subequal to interorbital width. Rostral hook reaches past lower eye. Scales ctenoid on both sides of body.

Upper side of body tan, marbled with dark wavy anastomosing lines enclosing pale patches. Attains 25 cm. Tropical Indo-Pacific; east coast of Africa south to Durban.

Genus ***Symphurus*** Rafinesque, 1810

Mouth more or less terminal; no LL on either side of body; left V only present, not connected to A; 2 nostrils on ocular side; D origin at vertical through eyes. About 50 species, represented in all oceans; most are found on the continental slopes (200 - 1 000 m), but a few species occur in shallower depths.

KEY TO SPECIES

1a Head length = body depth; anterior D rays separate; eyes contiguous, without intermediate row of scales ..... *S. variegatus*
1b Head < body depth; front D rays not separate; eyes close together, but with a row of scales between 2

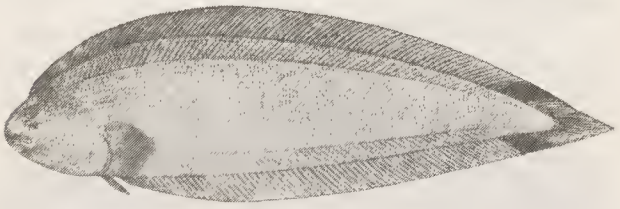
2a D 95-102; A 80-90; black spot at rear of D & A ..... *S. ocellatus*
2b D 107-117; A 95-104; no black spot on D & A ..... *S. strictus*

261.11 *Symphurus ocellatus*
von Bonde, 1922

Symphurus ocellatus von Bonde, 1922: 26, Pl. 1, Fig. 2 (Natal); Smith, **SFSA No. 334*.**

D 95-102; A 80-90; about 90 oblique series of scales from upper end of operculum to C base. Body depth 3.3-4.0, head 5.0- 5.6 in SL.

Upper side uniformly brownish; black spot covering about 10 rays at rear end of D and A. Attains 12 cm. Known only from Durban to Mozambique in 430 - 640 m.



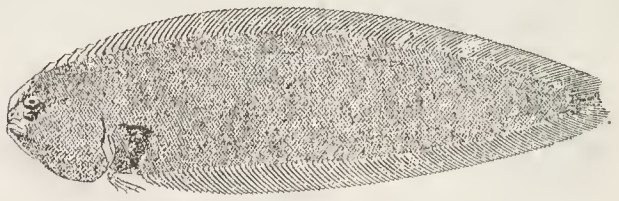
261.11 *Symphurus ocellatus:* ca. 10.5 cm type (Natal; after von Bonde, 1922).

261.12 *Symphurus strictus*
Gilbert, 1905

Symphurus strictus Gilbert, 1905: 691, Fig. 272 (Oahu, Hawaii); Smith, **SFSA No. 333;** Ochiai, 1963: 104*.

D 107-117; A 95-104; 110-126 series of scales from operculum to C base. Body depth 3.6-4.3 in SL, much greater than head length.

Upper side brown, with faint horizontal dark lines following scale rows; abdomen black; fins dusky. Attains 14 cm. Hawaii, Japan and off Delagoa Bay in 476 m.



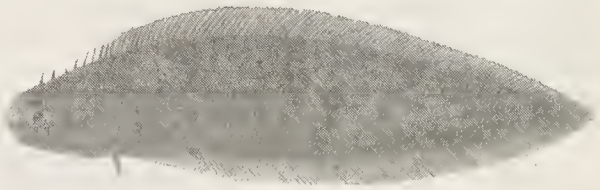
261.12 *Symphurus strictus:* 10 cm holotype (after Gilbert, 1905).

261.13 *Symphurus variegatus*
(Gilchrist, 1903)

Aphoristia variegata Gilchrist, 1903: 211, Pl. 18 (off East London). *Symphurus variegatus:* Smith, **SFSA No. 332*.**

D 93-100, 1st 4-7 rays free; A 88-95. Body depth = head, 4.6-5.0 in SL; about 125 scales from operculum to C.

Upper side brown with vague dark cross bars. Attains 9 cm. Known only off East London in 550 - 800 m.



261.13 *Symphurus variegatus:* 8 cm holotype (off East London; after Gilchrist, 1903).

Family No. 262: SOLEIDAE

by P.C. Heemstra & O. Gon

Soles **Regteroog-tongvisse**

Both eyes on right side of head. Dorsal fin origin above or before eyes; pectoral fins present or absent; no fin spines. Preopercle edge covered by skin and scales. Vertebrae 24-50; ribs absent; no postcleithrum. Lateral-line scales are counted from above upper end of gill opening to base of caudal fin.

Soles are benthic, neritic fishes occurring in all oceans; some species are of considerable economic importance. About 30 genera and 120 species. The taxonomy of this family needs revision; the genera and species are not at all well differentiated.

KEY TO GENERA

1a Snout distinctly hooked; mouth inferior, markedly contorted; C completely separate from D and A ..... *Heteromycteris*
1b Snout not or only slightly hooked; mouth slightly contorted; C separate from or joined to D and A 2

2a D and A with a pore on each (upper and lower) side of almost every fin ray; C separate from D and A ..... *Pardachirus*
2b No pores along D and A rays 3

3a D and A more or less continuous with C; last D and A rays not much shorter than anterior rays 4
3b C completely separate from D and A, or last D and A rays joined basally by membrane to C base but noticeably shorter than anterior rays 9

4a Left P rudimentary or absent; maximum size of fish less than 20 cm; body with blackish brown bars 5
4b Both P well developed; maximum size of fish 40-80 cm; no dark bars on body 6

5a Scales rough, distinctly ctenoid; 1st D ray not enlarged ..... *Zebrias*
5b Scales smooth, cycloid or weakly ctenoid; 1st D ray enlarged ..... *Aesopia*

6a P ½ length of head or longer, right P longer than left ..... *Austroglossus*
6b P subequal, less than ⅓ of head length 7

7a Anterior nostril of blind side a small, thin tube (not enlarged); ..... *Synaptura*
7b Anterior nostril of blind side distinctly enlarged 8

8a Anterior nostril of blind side a fringed rosette close to posterior nostril ..... *Pegusa*
8b Anterior nostril of blind side cup-like, edged with short papillae, surrounded by a bare area of skin and well separated from posterior nostril ..... *Synapturichthys*

9a P completely absent ..... *Parachirus*
9b P present, at least on right side 10

10a Left P rudimentary or absent; right P well developed ..... *Monochirus*
10b Both P well developed 11

11a Body depth 3.1-3.5 in SL; LL describes an angular S-shaped path on upper rear part of head ..... *Dicologlossa*
11b Body depth 2.2-2.7 in SL; LL not curved backwards on head ..... *Solea*

Genus ***Aesopia*** Kaup, 1858

Anterior nostril tube on right side fleshy, very short, that of blind side much longer. Body scales smooth. P small, each with 10-15 simple rays; D and A rays branched; 1st D ray thickened and elongated; C completely joined to D and A; C rays 11-16; V separate from A and genital papilla, each with 4 simple rays. Monotypic?

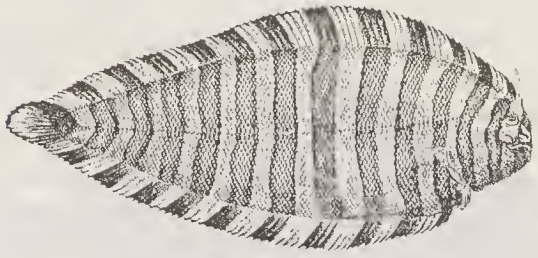
262.1 *Aesopia cornuta*
Kaup, 1858

Unicorn sole — Eenhoring-tongvis

Aesopia cornuta Kaup, 1858: 98 (India ?); Barnard, 1925: 409; Ochiai, 1963: 61*. *Coryphaesopia cornuta barnardi* Chabanaud, 1934: 430 (off Amatikulu, Natal; 26 fms). *Coryphaesopia cornuta:* Smith, **SFSA No. 319*.**

D 69-79; A 59-66; P 11-15; LL 90-100; vertebrae 46. Body depth 2.7-3.0 in SL.

Greyish or brown, with 15-16 dark bars, edged with black, the 1st 3 on head; C blackish, with some pale spots. Attains 22 cm. Natal to Mozambique; Red Sea, India, Japan.



262.1 *Aesopia cornuta:* 11.5 cm (after Ochiai, 1963).

Genus ***Austroglossus*** Regan, 1920

D and A joined to C; right P longer than left, more than ½ head length. Anterior nostril of right side tubular, rear nostril between front of eyes. Body scales ctenoid. V rudimentary, of 4 rays. D, A and C rays branched. Two species, both endemic to southern Africa.

KEY TO SPECIES

1a Right P longer than head; head 5.5-7.0 in SL ..... *A. pectoralis*
1b Right P shorter than head; head 4.4-5.0 in SL ..... *A. microlepis*

262.2 *Austroglossus microlepis*
(Bleeker, 1863)

West coast sole — Weskus-tongvis

Synaptura microlepis Bleeker, 1863: 456 (Cape of Good Hope). *Austroglossus microlepis:* Smith, **SFSA No. 326;** O'Toole, 1977*; Brownell, 1979: 11*.

D 82-100; A 65-78; P 10; LL 170-180; vertebrae 55-57. Body depth 3.0-3.7 in SL.

262.2 *Austroglossus microlepis:* 14.5 cm SL (west coast of South Africa).

Brownish, with small dark specks; sometimes with faint dark or light bars on body. Attains 75 cm (4 kg). An important commercial species occurring in depths of 100 - 300 m from northern Namibia to False Bay.

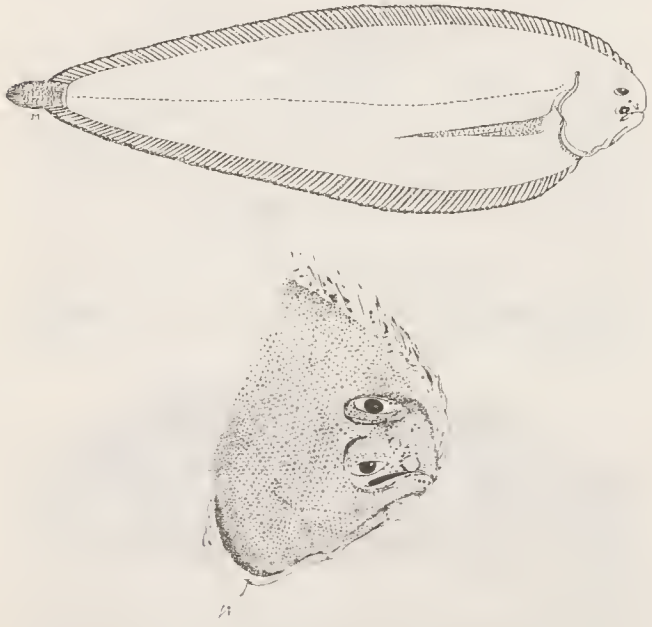
262.3 *Austroglossus pectoralis*
(Kaup, 1858)
PLATE 134

East coast sole — Ooskus-tongvis

Synaptura pectoralis Kaup, 1858: 96. *Austroglossus pectoralis:* Smith, **SFSA No. 325*;** Nielsen, 1964: 131; Zoutendyk, 1974: 99; Hecht & Hecht, 1978: 210.

D 90-110; A 80-95; P 10; LL 150-170; vertebrae 58. Body depth 3.2-3.8 in SL.

Brownish, with a small dark spot at base of each scale; right P blackish. Attains 58 cm. Known only from the Cape to Natal; reported from Namibia (Lloris, 1982: 14), but this record needs confirmation. Common in 10 - 120 m. Once very abundant, the catches of this species have declined noticeably in recent years; but the east coast sole is economically still the most important of the South African flatfishes.



262.3 *Austroglossus pectoralis:* 25.5 cm; head of same specimen (Algoa Bay).

Genus ***Dicologlossa*** Chabanaud, 1927

P equally developed; D origin over front of upper eye; D and A rays unbranched, the last rays joined by membrane to C peduncle. Anterior nostril tube of right side not reaching lower eye. Two species of the eastern Atlantic; 1 in our area.

262.4 *Dicologlossa cuneata*
(de La Pylaie, 1881)

Wedge sole — Keil-tongvis

Solea cuneata de La Pylaie, *in* Moreau, 1881: 312 (coast of France). *Solea cleverleyi* Gilchrist, 1906: 160, Pl. 44 (Walvis Bay). *Dicologlossa cuneata:* Smith, **SFSA No. 331*.**

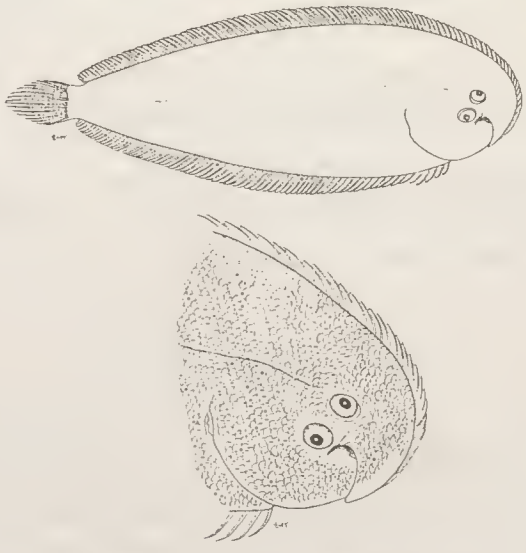
D 81-89; A 65-77; P 8-10; LL 105-132; vertebrae 43-45. Snout truncate.

Brownish grey, speckled with small darker spots; P blackish with pale margin. Attains 30 cm. A common species in 50 - 150 m from the western Mediterranean to Namibia (Walvis Bay).

262.4 *Dicologlossa cuneata:* 25.5 cm holotype of *Solea cleverleyi* (Walvis Bay; after Gilchrist, 1906).

Genus ***Heteromycteris*** Kaup, 1858

Snout greatly hooked. D and A separate from C; fin rays unbranched. Right V median, joined to A, its base longer than left V base; D origin near tip of snout, ventral to mouth. No P; C rays 19. Anterior nostril of blind side a short, thick tube, the opening with a fringed flange and inner, branched, papilla; anterior nostril of right side a tapered tube reaching rear nostril, which is at front edge of eye. Interbranchial septum perforate. Three (?) species, 1 in our area.



262.5 *Heteromycteris capensis:* 6 cm SL; head of same specimen (Knysna).

262.5 *Heteromycteris capensis*
Kaup, 1858
PLATE 134

Cape sole — Kaapse tongvis

Heteromycteris capensis Kaup, 1858: 103 (locality not given; Cape Province, by inference); Smith, **SFSA No. 321;** Stauch, 1965: 8; Smith & Smith, 1966: 99*; Day, Field & Penrith, 1970: 92; Brownell, 1979: 11*.

D 95-102; A 64-75; V 5; LL 80-85; vertebrae 40-43. Body depth 2.5-2.8 in SL. Lips of right side fringed.

Pale greyish brown, with dark specks; 3 vague dark spots along LL. Attains 15 cm. Common in shallow water (1 - 25 m); juveniles abundant in sandy estuaries, easily found by sifting sand under water at low tide. Known only from Walvis Bay to Maputo.

Genus ***Monochirus*** Rafinesque, 1814

D and A separate from C; right P well developed, left smaller or absent. V small, equal, symmetrical, of 4 or 5 rays; all fin rays branched, except for outer C rays. Anterior nostril tube of right side reaches lower eye. Three species, 2 in our area.

KEY TO SPECIES

1a No white-edged black ocelli on body; D 71-78 ..... *M. luteus*
1b Body with 4 white-edged black ocelli; D 62-70 ..... *M. ocellatus*

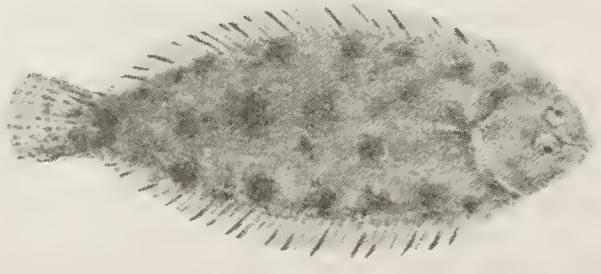
262.6 *Monochirus luteus*
(Risso, 1810)

Yellow sole — Geel tongvis

Pleuronectes luteus Risso, 1810: 312 (Nice, France). *Buglossidium luteum:* Torchio, 1973: 631; Lloris, 1982: 14.

D 71-78; A 55-63; right P 3-5; C 18; LL 60-70; vertebrae 36-40.

Pale brownish yellow, sometimes speckled with small grey or brown spots; D and A with every 5th or 6th ray black; P also blackish. Attains 10 cm. A common sole of the eastern Atlantic and Mediterranean in depths of 10 - 80 m; extends south to Namibia.



262.6 *Monochirus luteus:* (after Rey, 1960).

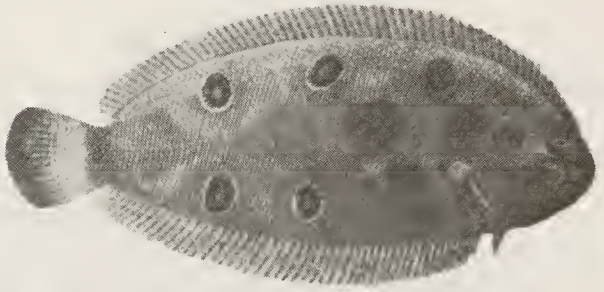
262.7 *Monochirus ocellatus*
(Linnaeus, 1758)
PLATE 134

Foureye sole — Vieroog-tongvis

Pleuronectes ocellatus Linnaeus, 1758: 269 ("Surinami" (erroneous)). *Solea quadriocellata* von Bonde, 1922: 20, Pl. 2, Fig. 2 (off Umhloti R., Natal; 60 m). *Monochirus quadriocellatus:* Smith, **SFSA No. 330*.**

D 62-70; A 48-57; P 7-8; V 5; LL 70-75; vertebrae 37-38. Body depth 2.0-2.2 in SL.

Greyish, median fins darker; 2 pairs of round, white-edged, black ocelli on rear part of body; white-edged, black band across peduncle; black blotch on LL behind tip of P and a few faint dark spots on front part of body. Attains 15 cm. Eastern Atlantic and Mediterranean to Gulf of Guinea in depths of 30 - 300 m; in our area, known only from Natal. Rare.



262.7 *Monchirus ocellatus:* (after Rey, 1960).

Genus ***Parachirus*** Matsubara & Ochiai, 1963

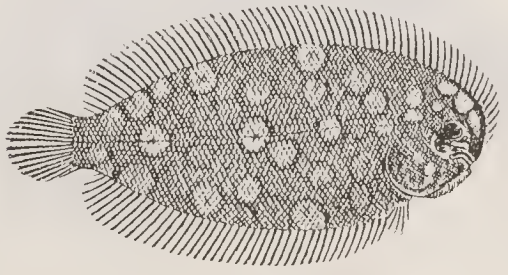
Anterior nostril tube of right side reaches lower eye. Body scales ctenoid. P absent; D and A not joined to C; V 5; all fin rays branched except 1 or 2 upper and lowermost C rays.

262.8 *Parachirus xenicus*
Matsubara & Ochiai, 1963
PLATE 135

Dwarf sole — Dwerg-tongvis

Parachirus xenicus Matsubara & Ochiai, 1963: 94, Figs. 6-8 (Amami Id., Japan); Clark & George, 1979: 107*.

D 67-74; A 45-51; C 18; LL 53-64; vertebrae 33-37. Body depth 2.3-2.5 in SL.



262.8 *Parachirus xenicus:* 7.5 cm (after Ochiai, 1963).

Body tan, with pale blotches and blackish brown dots. Attains 8 cm. Our specimens from Sodwana Bay and Porto Amelia, Mozambique; otherwise known only from Japan.

Genus ***Pardachirus*** Günther, 1862

No P; D and A completely separate from C; all fin rays branched except for upper and lowermost C rays. D and A with a series of paired ampulla-like glands which produce a milky toxin that makes these soles distasteful to predators (even large sharks will not bite them). The toxin is secreted through the pores (1 on each side) of almost every D and A ray (Clark & Chao, 1973). In their review of the genus, Clark and George (1979) recognised 4 species; 2 species occur in our area, including *P. morrowi* (Chabanaud), which was overlooked by Clark and George.

KEY TO SPECIES

1a D 73-81; A 53-62; colour pattern of irregular, black-edged, pale spots on a darker brown background; juveniles (<10 cm SL) with round or oval dark brown and cream coloured spots ..... *P. morrowi*

1b D 63-74; A 48-55; ground colour pale; head, body and fins covered with blackish brown dots and ring-like larger dark brown marks ..... *P. marmoratus*

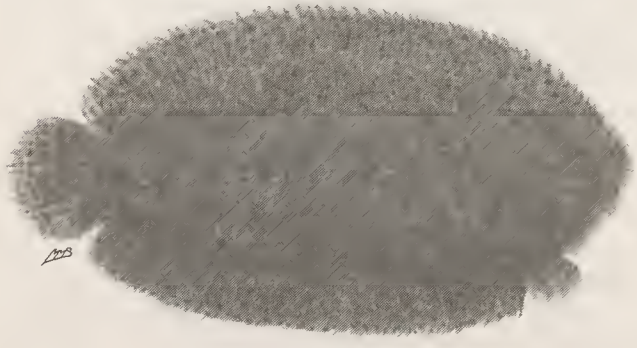
262.9 *Pardachirus marmoratus*
(Lacepède, 1802)
PLATE 135

Speckled sole — Gespikkelde tongvis

Achirus marmoratus Lacepède, 1802: 658 (Mauritius). *Pardachirus marmoratus:* Smith, **SFSA No. 322*;** Clark & Chao, 1973: 53*; Clark & George, 1979: 110*.

D 63-74; A 48-55; C 18; LL 83-102; vertebrae 37-39. Body depth 2.1-2.3 in SL.

Attains 25 cm. Red Sea and western Indian Ocean from Sri Lanka and Persian Gulf to Durban in depths of 1 - 15 m.



262.9 *Pardachirus marmoratus:* 18 cm (N. Mozambique).

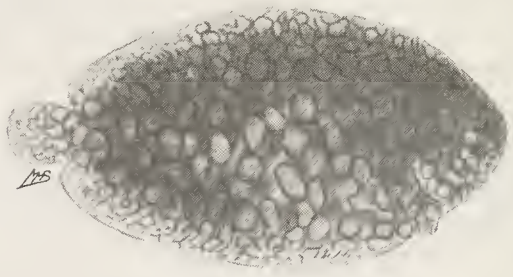
262.10 *Pardachirus morrowi*
(Chabanaud, 1954)
PLATE 135

Persian carpet sole — Persiese tapyt-tongvis

Aseraggodes morrowi Chabanaud, *in* Morrow, 1954: 800, Pl. 24 (Shimoni, Kenya). *Asserragodes morrowi:* Smith, 1981: 175.

D 73-81; A 53-62; C 16-18; LL 80-82; vertebrae 41-42. Body depth 2.6-2.7 in SL.

Attains 18+ cm. Kenya to Sodwana Bay; Aldabra; in depths of 1 - 10 m.



262.10 *Pardachirus morrowi:* 7.5 cm (Kenya).

Genus ***Pegusa*** Günther, 1862

D and A separate from C, but basal ½ of last D and A rays joined to C base by a membrane; both P well developed. Anterior nostril of blind side a thickly fringed rossette; rear nostril a thin tube with oblique aperture; nostrils on eyed side close together on upper lip, anterior one longer. Scales ctenoid on eyed side, cycloid on blind side.

Three (?) species, known only from eastern Atlantic and Mediterranean; 1 species may occur in our area.

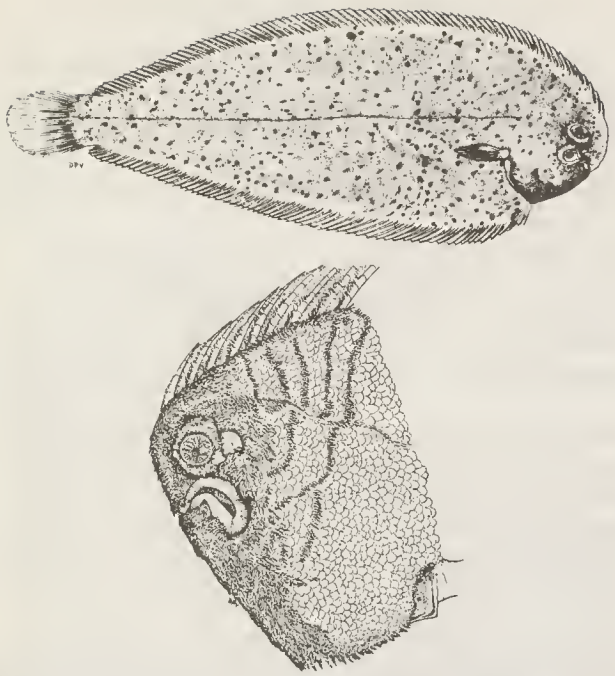
262.11 *Pegusa lascaris*
(Risso, 1810)

Atlantic sole — Atlantiese tongvis

Pleuronectes lascaris Risso, 1810: 311, Pl. 7, Fig. 32 (Nice, France). *Pegusa lascaris:* Chabanaud, 1929: 231*; Smith, **SFSA No. 327.**

D 77-89; A 61-73; P 7-10; C 20 (3 upper and lower rays unbranched); LL 98-145; vertebrae 42-46. Body depth 2.6-2.9, head length 4.9-5.1 in SL.

Brownish yellow or reddish brown, with obscure pale blotches and specks; right P blackish, with a pale margin. Attains 40 cm. Eastern Atlantic, Mediterranean and Black Sea; extends south at least to southern Angola (Chabanaud, 1927). The South African occurrence of *P. lascaris* is doubtful, as Chabanaud's (1927) record from South Africa is based on his erroneous synonymy of *Solea bleekeri* and *P. lascaris*.



862.11 *Pegusa lascaris:* 12 cm; blind side of head of 9.5 cm specimen (Gulf of Guinea).

Genus ***Solea*** Quensel, 1806

D and A mostly separate from C; P small but distinct, subequal; V subequal, symmetrical, of 5 rays; all fin rays branched except 2-4 upper and lower rays of C. Anterior nostril of blind side not enlarged. Body scales ctenoid. About 6 (?) species, 2 in our area.

KEY TO SPECIES

1a Body and especially fins yellow; rear nostril between eyes; A 60-69 ..... *S. fulvomarginata*

1b Body and fins brownish, with darker specks and spots; rear nostril at front edge of lower eye; A 46-59 ..... *S. bleekeri*

262.12 *Solea bleekeri*
Boulenger, 1898
PLATE 134

Blackhand sole — Swarthand-tongvis

Pegusa impar (*non* Bennett): Bleeker, 1863: 458. *Solea bleekeri* Boulenger, 1898: 2 (Cape of Good Hope; on *Pegusa impar* of Bleeker, 1863); Smith, **SFSA No. 328*;** Smith & Smith, 1966: 97*; Wallace, 1975: 14. *Solea turbynei* Gilchrist, 1904: 10, Pl. 28 (Mossel Bay). *Solea simonensis* von Bonde, 1922: 19, Pl. 5, Fig. 1 (Simonstown, False Bay).

D 61-74; A 46-59; P 7-8; C 20; LL 95-105; vertebrae 32-37. Body depth 1.9-2.7 in SL. Anterior right nostril tube reaches rear nostril. Snout slightly hooked, mouth inferior. Basal ½ of last D and A rays joined by membrane to C base.

Brown, with darker spots and specks; right P usually blackish. Attains 17 cm. False Bay to Maputo in 1 - 60 m. Common in estuaries; juveniles abundant on shallow sand banks.

262.13 *Solea fulvomarginata*
Gilchrist, 1904
PLATE 135

Lemon sole — Suurlemoen-tongvis

Solea fulvomarginata Gilchrist, 1904: 13, Pl. 33 (False Bay); Smith, **SFSA No. 329*;** Smith & Smith, 1966: 98*.

D 75-81; A 60-69; P 5; C 20; LL 105-110; vertebrae 41-43. Body depth 2.3-2.5 in SL. Mouth almost terminal. Anterior right nostril tube reaches lower eye. Basal ½ of last D and A rays joined to C base.

Brownish yellow, the yellow more intense on median fins; body with cloudy dark patches extending more or less onto bases of D and A. Attains 26 cm. False Bay to Transkei.

Genus ***Synaptura*** Cantor, 1849

D and A continuous with C; P well developed; V small, symmetrical, of 3 or 4 rays. Nostrils of right side fleshy papillose tubes; rear nostril between front edges of eyes; anterior nostril of blind side a small thin tube, rear nostril hidden under edge of fringed flap and opening from side of papillose stalk. Lower lip of right side with 8 or 9 finger-like, villose papillae. Body scales on right side markedly ctenoid, those on left side smooth. About 3 or 4 species, 1 in our area.

262.14 *Synaptura marginata*
Boulenger, 1900
PLATE 135

Shallow-water sole — Vlakwater-tongvis

Synaptura marginata Boulenger, 1900: 11, Pls. 2 & 3 (Algoa Bay); Smith, **SFSA No. 324*;** Smith & Smith, 1963: 97*. *Synaptura ciliata* Gilchrist, 1904: 14, Pl. 34 (Durban Harbour). *Synaptura barnardi* Smith, 1931: 148, Pl. 16 (Great Fish Point).

D 70-76; A 54-63; P 7-8; C 18; LL 100-124; vertebrae 46.

Dark brown, uniform or with darker specks; edges of D and A pale; right P blackish. Attains 50 cm. Knysna to Delagoa Bay, often in quite shallow water; also known from Japan. During the summer, many of these soles are speared by people wading in the sea and estuaries.

Genus ***Synapturichthys*** Chabanaud, 1927

Anterior nostril of blind side as described in key; that of right side tubular, almost reaching lower eye; rear nostril of right side at front edge of lower eye. Last D and A rays joined by membrane to C base for more than ½ the length of the rays; P distinct, equally well developed; V equal, symmetrical, of 5 rays; fin rays branched, except upper and lowermost C rays. One (?) species.

262.15 *Synapturichthys kleini*
(Risso, 1833)
PLATE 135

Lace sole — Galon-tongvis

Solea Kleini Bonaparte, 1833: Icon. 3, punt. 26, Pl. (Adriatic; based on *Rhombus Kleinii* Risso, 1826: 255). *Solea capensis* Gilchrist, 1902: 110, Pl. 9 (South Africa). *Solea melanoptera* Gilchrist, 1904: 13, Pl. 32 (off East London; 43 fms). *Solea alboguttata* Fowler, 1929: 251, Fig. (off Durban Bluff). *Synaptura kleini:* Smith, **SFSA No. 323*;** Smith & Smith, 1966: 97*.

D 75-92; A 63-72; P 8-9; C 20; LL 116-125; vertebrae 46-47. Body depth 2.5-3.0 in SL.

Brownish, with irregular white or dark lines, spots and ocelli; fins more or less blackish. Attains 40 cm. Eastern Atlantic and Mediterranean to South Africa and round our south coast to Durban. Mainly in shallow water.

262.15 *Synapturichthys kleini:* blind side of head of 26 cm SL specimen (Natal).

Genus ***Zebrias*** Jordan & Snyder, 1900

D and A continuous with C; P small, especially the left; V small, equal, symmetrical, of 4 rays; fin rays branched. Anterior nostril tube on right side fleshy, not reaching lower eye; rear nostril at front edge of lower eye; left nostrils inconspicuous. Body scales ctenoid. About 7 species, 1 in our area.

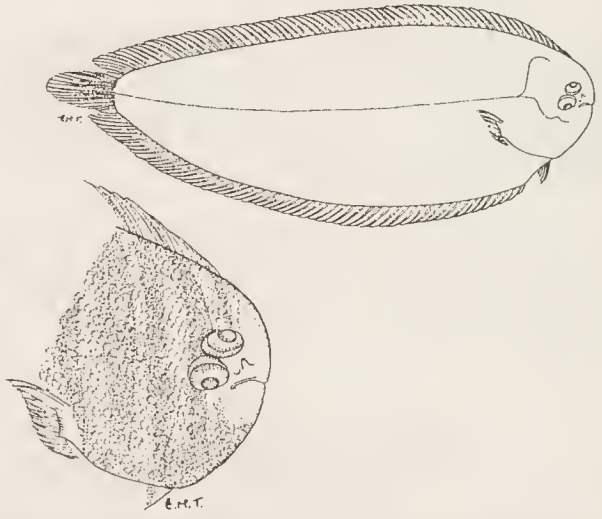
262.16 *Zebrias regani*
(Gilchrist, 1906)
PLATE 135

Zebra sole — Sebra-tongvis

Synaptura zebra (*non* Bloch): Gilchrist, 1902: 144. *Synaptura regani* Gilchrist, 1906: 160, Pl. 45 (off Umhlanga River, Natal; 22-26 fms). *Zebrias regani:* Smith, **SFSA No. 320*.**

D 65-70; A 56-60; right P 11; C 16; LL 86; vertebrae 46. Upper end of opercular membrane fused to P. Eyes contiguous, without tentacles. Base of right P longer than eye.

Greyish with 13 pairs of dark brown bars across body and head and onto D and A; posterior 1 or 2 pairs of dark bars may be fused into single bars; C blackish, with white spots. Attains 16 cm. Known only from the coast of Natal in 40 - 50 m.



262.16 *Zebrias regani:* 10 cm; head of same specimen (Natal).

Order TETRAODONTIFORMES

Gill openings restricted to lateral slits; opercular bones and branchiostegal rays covered by thick skin or bony hexagonal scale plates. Parietals, nasals and circumorbital bones absent; no sensory canals in the skull bones; branched caudal fin rays 7-10 (except in Molidae, which lack a proper caudal fin); anal fin spines absent.

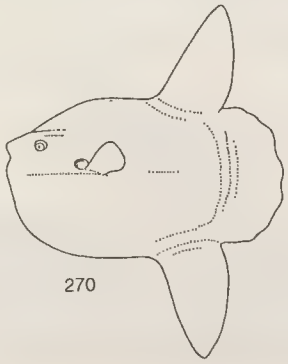
The Tetraodontiformes (also known as the Plectognathi) are a morphologically diverse and highly specialised group of teleosts. Rosen (1984) has added the Zeiformes to Tetraodontiformes, but until his work is given a critical evaluation, we shall retain these two taxa as separate orders. Tyler (1980) has produced a profusely illustrated and comprehensive work on the osteology and higher classification of the tetraodontiforms. This classification agrees fairly well with that proposed by Winterbottom (1974), based on the myology of 46 species. There are some 330 species arranged in 8 or 9 families. The Monacanthidae are included in the Balistidae by some authors (e.g. Nelson, 1984), but in this book we have kept them separate. Eight families are represented in our area. Triacanthids are known from the northern Indian Ocean, but have yet to be found in our area.

KEY TO FAMILIES

1a Teeth fused to one another and to jaw bones to form sharp-edged dental plates; left and right halves of jaws (dentaries and/or premaxillae) often fused to their opposite members 2

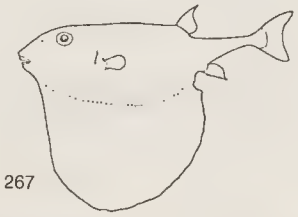
1b Teeth separate, protruding from sockets in the jaws; dentaries and premaxillae not fused to their opposite members 5

2a Body orbicular or elongate-oval, compressed, truncate posteriorly, as if the rear end were chopped off; caudal fin replaced by a thick, rudder-like structure without visible fin rays ..... MOLIDAE (No. 270)


270

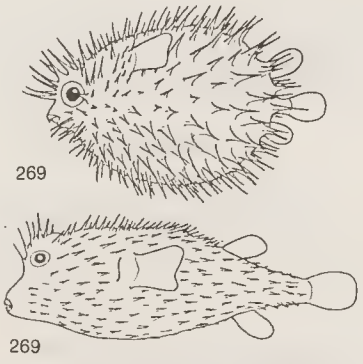
2b Body not truncate posteriorly; typical caudal fin present 3

3a Large expansible dewlap of skin between end of pelvis and anus, but no inflatability of the abdominal region; caudal fin with 12 principal rays (10 branched rays) and several small procurrent rays ..... TRIODONTIDAE (No. 267)


267

3b No expansible dewlap of skin in front of anus; pelvis absent; abdominal region inflatable; caudal fin with 11 or fewer principal rays and no procurrent rays 4

4a A single, undivided tooth plate in each jaw; premaxillae and dentaries fully fused to their opposite members; skin beset with large, sharp spines ..... DIODONTIDAE (No. 269)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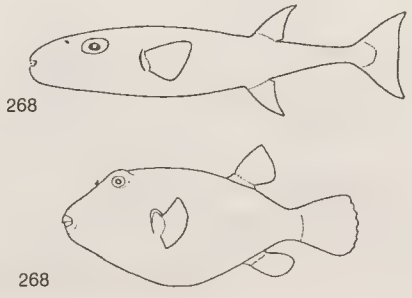
4b Tooth plates and jaws with a distinct median suture (line of division); skin naked or with small spines or prickles ..... TETRAODONTIDAE (No. 268)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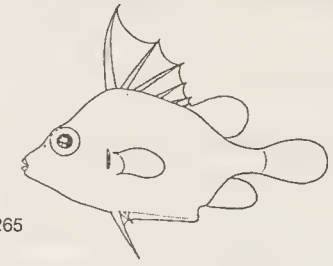
5a Pelvic fins present, each with a long stout spine and 1 or 2 smaller soft-rays; dorsal fin with 6 spines, the posterior spines sometimes rudimentary and barely visible ..... TRIACANTHODIDAE (No. 265)

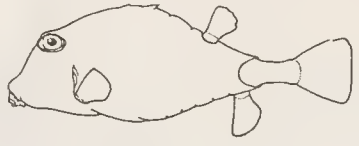


265

5b Pelvic fins absent; spinous dorsal fin absent or with 2 or 3 spines 6

6a Body oval to oblong, compressed; two dorsal fins, the first of at least 1 spine 7

6b Body robust, encased in a hard bony armour of hexagonal plates fused to form a solid box; single dorsal fin of a few soft-rays ..... OSTRACIIDAE (No. 266)



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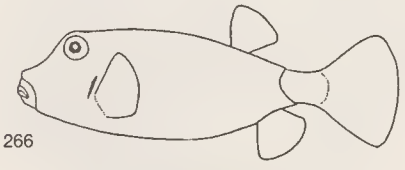

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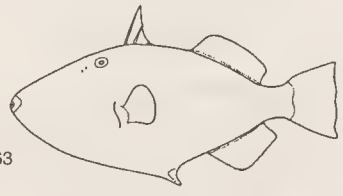
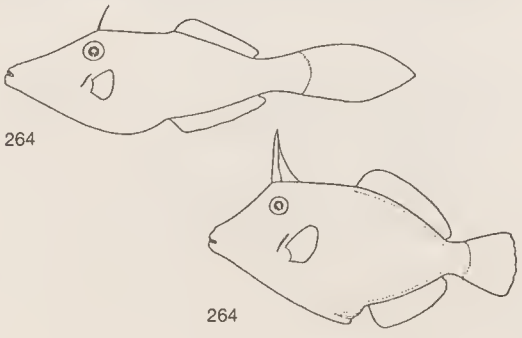
7a Body covered with hard, plate-like, bony scales; second dorsal fin spine more than ½ length of first spine; upper and lower jaws each with 8 (outer) teeth ..... BALISTIDAE (No. 263)



263

7b Body covered with minute scales bearing 1 or more slender, microscopic spinules; second dorsal spine less than ½ length of first spine; upper jaw with 6, lower jaw with 4 or 6 (outer) teeth ..... MONACANTHIDAE (No. 264)



264

264

Family No. 263: BALISTIDAE

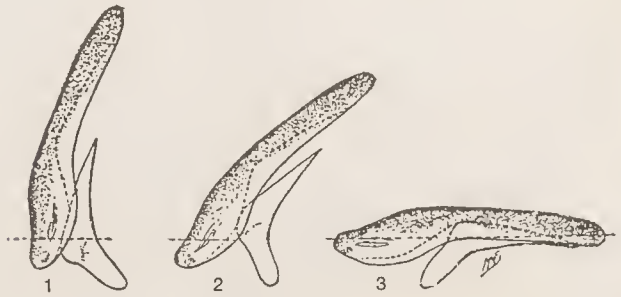
by M.M. Smith & P.C. Heemstra

Triggerfishes **Snellervisse**

Body compressed, covered with strong, rough, plate-like scales in regular series; pelvic fins reduced to a rudiment; first dorsal fin of 3 spines, first spine strong, can be locked in upright position by second D spine; the third spine is small and usually insignificant. Second dorsal and anal fins similar and consist of branched rays; caudal fin with usually 10 branched rays, one above and one below being simple; pectoral fin with uppermost ray rudimentary (and not included in the counts). Upper jaw not protractile; each jaw has 8 strong incisors, the upper with 6 smaller inner teeth; gill opening a small slit in front of pectoral fin base; vertebrae 7+11 = 18.

Most species occur on coral reefs where these fishes often dart for shelter into crevices and lock their dorsal spines and erect the pelvic girdle to make it impossible to dislodge the fish without tearing it to pieces. When the first dorsal spine is locked upright, it cannot be folded down unless the second spine (the "trigger") is depressed. Triggerfishes swim by undulating the soft dorsal and anal fins; they use their tail fin only when they are in a hurry. One of the favourite foods of triggerfishes is the long-spined sea urchin, *Diadema*. The spines present no problem to the fish, as it first turns the urchin over and then manages to smash the "shell" quite easily with its powerful teeth. Triggerfishes are generally good eating, but some large specimens are occasionally toxic. The eggs (of those species whose reproduction is known) are demersal and are guarded by the male. Some divers have received painful bites from an aggressive male triggerfish that was protecting eggs.

Closely related to the Monacanthidae, which are included in the Balistidae by some authors. Recent works on the Balistidae are Tyler (1981), dealing with osteology, generic and higher-level classification; Shen & Lin (1974, Taiwan) deals with 12 of our species; Klausewitz (1974, Maldives) and Matsuura (1980, Japanese forms) deal with 16 of our 19 species.



1 2 3

Trigger mechanism: 1. fully erect; 2. partly erect; 3. depressed.

KEY TO GENERA

1a Prominent lateral protuberances on each side below P ..... *Xenobalistes*
1b Body below P without large lateral protuberances 2

2a Cheeks normally scaly, no naked areas or longitudinal grooves (*Balistoides virescens* with a naked groove posteriorly from corner of mouth) 4
2b Cheeks naked anteriorly or fully scaled but with naked longitudinal grooves 3

3a Cheeks fully scaled but with 3-6 narrow longitudinal naked grooves; no enlarged scales behind gill slit ..... *Xanthichthys*
3b Cheeks naked in front, with scales smaller than those on body in separate rows behind; enlarged scales just behind gill slit ..... *Pseudobalistes*

4a Teeth red, 2 upper lateral canines produced and fang-like ..... *Odonus*
4b Teeth white, not greatly produced 5

5a A distinct groove before eye and below nostrils 6
5b No groove before eye 11

6a C peduncle depressed (dorsoventrally), wider than deep ..... *Abalistes*
6b C peduncle normal, not wider than deep 7

7a C peduncle without spines, enlarged tubercles, or longitudinal ridges 8
7b C peduncle and posterior body scales with spines, enlarged tubercles or longitudinal ridges (in some specimens of *S. fraenatus*, the "enlarged" tubercles are visible only with a microscope) 9

8a Enlarged plates immediately behind gill opening ..... *Balistes*
8b No enlarged plates behind gill opening ..... *Canthidermis*

9a Soft D & A higher in front; anterior teeth even and incisor-like ..... *Melichthys*
9b Soft D & A about uniform, not higher in front; teeth notched ... 10

10a Spines or enlarged tubercles of C peduncle scales extend well forward on body (at least to below front ½ of D); C truncate or slightly emarginate ..... *Sufflamen*
10b Spines or enlarged tubercles of C peduncle scales do not extend anteriorly beyond rear part of 2nd D; C rounded ..... *Balistoides*

11a 3rd D spine moderate, distinctly visible in lateral view ..... *Balistapus*
11b 3rd D spine minute, barely visible above dorsal edge of body ..... *Rhinecanthus*

Genus ***Abalistes*** Jordan & Seale, 1904

Recognised immediately by the depressed C peduncle; mouth terminal. Monotypic.

263.1 *Abalistes stellatus*
(Lacepède, 1798)
PLATE 136

Starry triggerfish — Ster-snellervis

Balistes stellatus Lacepède, 1798, Allegemeine Literatur-Zeitung, 3 (288), p. 682 (based on "Baliste étoilé" Lacepède, 1798, *Hist. Nat. Poiss.*, I: 333, 350, Pl. 15, Fig. 1; Mauritius). *Abalistes stellaris:* Smith, **SFSA No. 1156***; Tyler, 1980: 117*. *Abalistes stellatus:* Matsuura, 1980: 39*.

D III+25-27; A 24-26; P 13-15; LS 33-41; head scale rows 27-32; enlarged bony scales behind gill slit; tubercles on hind scales; teeth uneven, notched; deep groove before eye below nostrils; C double emarginate, upper and lower lobes extended with growth.

Colour often olive brown with numerous blue spots on back. White blotches and midlateral stripe can disappear with growth. Attains 60 cm. Over muddy and sandy bottoms of Red Sea and Indo-West Pacific, south to Mossel Bay; taken in trawls to 50 m. Reported from the eastern tropical Atlantic by Winterbottom and Tyler (1981).

Genus ***Balistapus*** Tilesius, 1820

Immediately recognised by the numerous curved yellow-orange bands on body; no groove before eye. Monotypic.

263.2 *Balistapus undulatus*
(Mungo Park, 1797)
PLATE 136

Orangestriped triggerfish — Oranjestreep-snellervis

Balistes undulatus Mungo Park, 1797: 37 (Suma-Tra = Sumatra). *Balistapus undulatus:* Smith, **SFSA No. 1171***; Matsuura, 1980: 53*; Tyler, 1980: 101*, 111 *et seq.**

D III+24-27; A 20-24; P 12-14, 1st and last unbranched; LS 36-40. Mouth terminal; teeth uneven, notched; enlarged bony plates behind gill slit; cheeks fully scaled; 6 large antrorse spines on C peduncle forming 2 longitudinal rows.

Ground colour dark green or dark brown with orange bands, adult male with no bands on dark snout. Attains 30 cm. Red Sea and Indo-West Pacific south to Natal; bites savagely and can inflict wounds with spines on C peduncle.

Genus ***Balistes*** Linnaeus, 1758

Three species in the eastern Atlantic. *B. capriscus* Gmelin, 1788 and *B. punctatus* Gmelin, 1788 differ in colour pattern from *B. vetula* and are said to have slightly fewer D and A rays.

263.3 *Balistes vetula*
Linnaeus, 1758
PLATE 136

Queen triggerfish — Koningin-snellervis

Balistes vetula Linnaeus, 1758: 329 (Ascension Id.); Smith, **SFSA No. 1157***.

D III,29-32; A 27-29; P 13-15; LS 58-66; shallow groove before eye; mouth terminal, teeth uneven, notched; enlarged rounded bony plates behind gill slit; C peduncle scales smooth; soft D & A higher in front; D and C lobes produced into long filaments in large adults.

A beautiful creature with blue lines and bars as illustrated. Attains about 55 cm. Tropical Atlantic to southern Angola; recorded from "Cape of Good Hope" by Günther (1870). Smith's records (**SFSA No. 1157**) of Port Alfred and

Durban are doubtful, as there are no specimens of this species from South Africa in the J.L.B. Smith Institute or in the South African Museum. Rare; specimens wanted.

Genus ***Balistoides*** Fraser-Brunner, 1935

Mouth terminal; teeth uneven, notched; enlarged bony scales behind gill slit; deep groove before eye below nostrils; 2-4 longitudinal rows of large tubercles on C peduncle and forward slightly onto body; C rounded. Two species, both in our area.

KEY TO SPECIES

1a Ventral part of body with large round white blotches; cheek entirely covered with scales; body scales small, LS 39-50 ..... *B. conspicillum*

1b No white blotches on ventral part of body; naked longitudinal groove behind corner of mouth; body scales large, LS 29-32 ..... *B. viridescens*

263.4 *Balistoides conspicillum*
(Bloch & Schneider, 1801)
PLATE 136

Clown triggerfish — Nar-snellervis

Balistes conspicillum Bloch & Schneider, 1801: 474 (Indian Ocean). *Balistoides conspicillum:* Smith, **SFSA No. 1161*;** Smith, 1979: 44*; Matsuura, 1980: 44*.

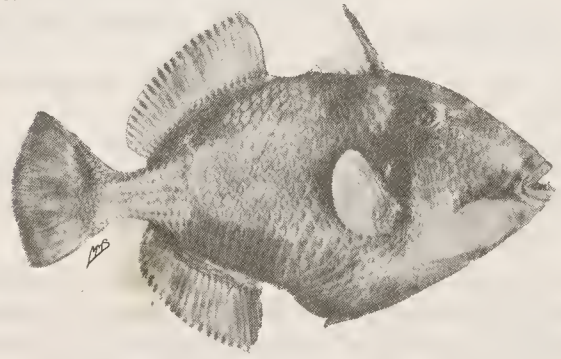
D III+25-27; A 21-22; P 14; LS 39-50, head scale rows 33-37.

A very striking fish, sometimes called *B. niger* Bonnaterre, 1788; but this name was preoccupied by *Balistes niger* Bloch, 1786 (now known as *Melichthys niger*). Attains 50 cm. Found on outer reef terraces with surge channels. Indo-West Pacific south to Durban; not in Red Sea.

263.5 *Balistoides viridescens*
(Bloch & Schneider, 1801)
PLATE 136

Dotty triggerfish — Gestippelde snellervis

Balistes viridescens Bloch & Schneider, 1801: 477 (Mauritius). *Balistoides viridescens:* Smith, **SFSA No. 1160*;** Matsuura, 1980: 46*; Tyler, 1980: 122*.



263.5 *Balistoides viridescens:* 30 cm (Seychelles).

D III+24-26; A 23-24; P 14; LS 29-32.

A plump, ovate fish. Attains 70 cm. Red Sea and Indo-West Pacific south to Delagoa Bay, rare.

Genus ***Canthidermis*** Swainson, 1839

Mouth terminal, teeth uneven, notched; deep groove before eye, below nostils; no grooves on cheeks. Two species; *C. sufflamen* (Mitchill, 1815) from the western Atlantic has more D, A and P rays.

263.6 *Canthidermis maculatus*
(Bloch, 1786)
PLATE 136

Rough triggerfish — Ruwe snellervis

Balistes maculatus Bloch, 1786: 25, Pl. 151 (American waters). *Canthidermis maculatus:* Smith, **SFSA No. 1166*;** 1965: 35*; Matsuura, 1980: 66*; Tyler, 1980: 117*, 127*.

D III+23-25; A 20-22; P 14-15; LS 37-46; head scale rows 28-32.

Small juveniles with spots not confined to ventral surface, adult body and head dark, lighter below with elongated white spots that can disappear with growth; fins dark. Attains over 50 cm. All warm and temperate oceans; in our area found from the Cape to Natal; often well offshore.

263.6 *Canthidermis maculatus:* top: 34 cm (Mossel Bay); bottom: 8 cm juvenile (Transkei).

Genus ***Melichthys*** Swainson, 1839

Body dark brown to black; mouth slightly supraterminal; teeth notched, except median pair in each jaw, which are truncate; depressed circular zone of bony plates behind gill slit; a groove below nostrils from eye; cheeks wholly scaly; no enlarged tubercles or spinules on scales, but those on

rear part of body with slight mid-longitudinal ridge; pelvic terminus movable. Transformation from prejuvenile occurs at 9-14 cm SL. Revised by Randall and Klausewitz (1973); 3 species, all in our area.

KEY TO SPECIES

1a Soft D & A pale with prominent black edging (juveniles have black longitudinal lines on fins); C pale with narrow black line distally on upper and lower margins ..... *M. vidua*
1b Soft D & A black with white line along base; C mostly black 2

2a C emarginate to lunate, upper and lower lobes produced (except in juveniles); scale rows from corner of mouth to lower end of gill slit 20-25 ..... *M. niger*
2b C slightly rounded to slightly emarginate; scale rows from corner of mouth to lower end of gill slit 27-31 ..... *M. indicus*

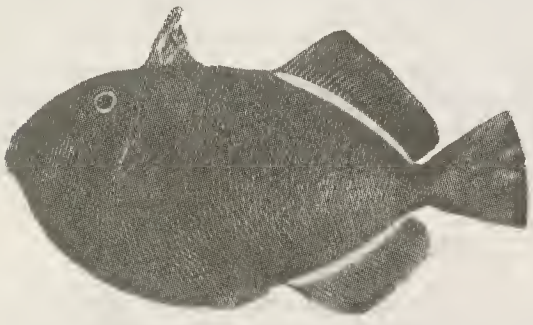
263.7 *Melichthys indicus*
Randall & Klausewitz, 1973

Indian triggerfish — Indiese snellervis

Melichthys ringens (*non* Osbeck): Smith, **SFSA No. 1159***. *Melichthys indicus* Randall & Klausewitz, 1973: 64, Figs. 4-6 (Thailand); Smith, 1980: 186 (not No. 1158).

D III+30-35; A 27-30; P 14-16; LS 60-70; head scales 24-31; a very shallow oblique groove on cheek; ridges along hind scales less developed than those in *M. niger*.

Narrow white margin round C; shallow groove on cheek sometimes bluish or violet in life. Attains about 25 cm. Tropical Indian Ocean, south to Sodwana Bay.



263.7 *Melichthys indicus:* 22 cm (Kenya).

263.8 *Melichthys niger*
(Bloch, 1786)

Black triggerfish — Swart snellervis

Balistes niger Bloch, 1786: 27, Pl. 152, Fig. 2 (incorrectly labelled *Balistes ringens;* China Sea). *Melichthys niger:* Randall & Klausewitz, 1973: 60*; Smith, 1975: 82; Tyler, 1980: 121*.

D III+32-35; A 28-31; P 15-17; LS 57-66; head scales 20-25; longitudinal ridges along C peduncle scales prominent.

In life: submarginal blue line on C bends into lobes, blue line along base of soft D and A, and blue lines radiate from eye. Blue disappears with death, leaving black fish with white line along base of soft D and A. Attains at least 35 cm. Circumtropical, has been found at Durban. Klausewitz (1974) noted that *M. niger* is found on upper reef edge of outer slope of seaward reef, predominantly eating calcerous algae; also feeds on zooplankton.

263.8 *Melichthys niger:* 23 cm (N. Mozambique).

263.9 *Melichthys vidua*
(Solander, 1844)
PLATE 139

Pinktail triggerfish — Pienkstert-snellervis

Balistes vidua Solander, *in* Richardson, 1844: 128, Pl. 59, Figs. 9, 10 (Tahiti). *Melichthys vidua:* Smith, **SFSA No. 1158***; Randall & Klausewitz, 1973: 62*.

D III+32-35; A 28-31; P 14-16; LS 62-74; head scale rows 28-32; C slightly emarginate, double emarginate or truncate; ridges formed by spinules on hind body scales not prominent.

Juveniles lighter with longitudinal dark lines on A and soft D, and dark lines radiating from eye. Attains nearly 40 cm. Tropical Indo-Pacific, south to Durban; rare.

Genus ***Odonus*** Gistel, 1848

Easily recognised by the jutting lower jaw, the bluish black body and red fangs. Monotypic.

263.10 *Odonus niger*
(Rüppell, 1836)

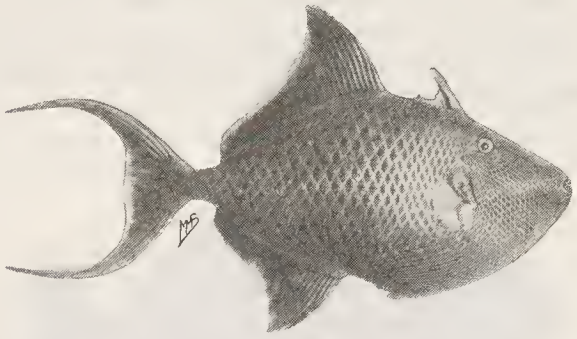
Redfang triggerfish — Rooitand-snellervis

Xenodon (Balistes) niger Rüppell, 1836: 53, Pl. 14, Fig. 3 (Red Sea). *Odonus niger:* Smith, **SFSA No. 1155***; Tyler, 1980: 101*, 118*, 121*; Matsuura, 1980: 34*.

D III+33-36; A 28-30; P 14-15; LS 29-34; head scale rows 19-23; enlarged bony scales behind gill slit; deep groove before eye below nostrils; C lunate, the lobes greatly produced.

Attains 50 cm. Widespread in tropical Indo-West Pacific

south to Durban, once to Port Alfred. Found on upper part of outer slope of seaward reef below reef edge; feeds on sponges (Klausewitz, 1974) and zooplankton (Randall, 1983).



263.10 *Odonus niger:* 35 cm (Seychelles).

Genus ***Pseudobalistes*** Bleeker, 1866

Mouth terminal; teeth uneven, notched; enlarged bony plates behind gill slit; groove before eye under nostrils; scales behind naked cheek area smaller than body scales. Three species, 2 in our area; *P. naufragium* Jordan & Starks, 1895 is restricted to the eastern Pacific.

KEY TO SPECIES

1a No spines on C peduncle; soft D & A elevated in front .... *P. fuscus*
1b C peduncle with 5 or 6 longitudinal rows of small spines; soft D & A rounded, not elevated in front ..... *P. flavimarginatus*

263.11 *Pseudobalistes flavimarginatus*
(Rüppell, 1829)
PLATE 136

Yellowface triggerfish — Geelkop-snellervis

Balistes flavimarginatus Rüppell, 1829: 33 (Red Sea). *Psuedobalistes flavomarginatus* (sic): Smith, **SFSA No. 1167*;** Matsuura, 1980: 36*.

D III+24-26; A 22-24; P 15; LS 28-33; shallow horizontal grooves on upper cheek; C rounded in young to emarginate or double emarginate with lobes produeed in adult.

Attains 60 cm. Red Sea and tropical Indo-Pacific south to Natal. Found on lagoon slope and lagoon floor (Klausewitz, 1974).

263.12 *Pseudobalistes fuscus*
(Bloch & Schneider, 1801)
PLATES 137 & 139

Rippled triggerfish — Gerimpelde snellervis

Balistes fuscus Bloch & Schneider, 1801: 471 (on Lacepède; no locality). *Pseudobalistes fuscus:* Smith, **SFSA No. 1168*;** Matsuura, 1980: 37*.

D III+24-27; A 21-24; P 14-I5; LS 35-46; shallow horizontal grooves on lower cheek; C rounded in young, lobes produced with growth.

Dark brown, each scale with yellow spot; P, soft D, A and C dark with wide yellow margins. Juveniles yellowish brown covered with bluish grey spots and blotches. Attains 55 cm. Red Sea and Indo-West Pacific, south to Durban.

Genus ***Rhinecanthus*** Swainson, 1839

Mouth terminal; teeth unequal, notched; enlarged bony scales behind gill slit; no groove before eye; 3rd D spine very small; C peduncle with 3-5 rows of small spines. Six species (Randall & Steene, 1983); 2 species in our area. *R. verrucosus* (Linnaeus, 1758), an Indo-West Pacific species reported from Chagos Ids. and Mauritius but not yet found in our area, has a large elliptical black blotch on ventral part of body not reaching P or upper body. *R. cinereus* (Bonnaterre, 1788), known from Mauritius, Réunion, Madagascar and the Comores, has a black band from eye to P base, C mostly yellow with white rear margin and black peduncle.

KEY TO SPECIES

1a Four or 5 longitudinal rows of antrorse spines on C peduncle ..... *R. rectangulus*
1b Three longitudinal rows of small antrorse spines on C peduncle, upper 2 longer than lowest ..... *R. aculeatus*

263.13 *Rhinecanthus aculeatus*
(Linnaeus, 1758)
PLATE 137

Blackbar triggerfish — Swartbalk-snellervis

Balistes aculeatus Linnaeus, 1758: 328 (India). *Rhinecanthus aculeatus:* Smith, **SFSA No. 1169*;** Sanches, 1963: 177*; Matsuura, 1980: 56*.

D III+23-26; A 21-22; P 12-I4; LS 32-39; lowest longitudinal row of tail spines restricted to C peduncle.

Attains 30 cm. Common in tropical Indo-West Pacific, south to Algoa Bay. Sleeps on its side at night and makes a whirring noise when startled. Found in quiet waters of lagoon sandy areas and parts of seaward reef (Klausewitz, 1974).

263.14 *Rhinecanthus rectangulus*
(Bloch & Schneider, 1801)
PLATE 137

Patchy triggerfish — Gelapte snellervis

Balistes rectangulus Bloch & Schneider, 1801: 465 (Indian Ocean). *Rhinecanthus rectangulus:* Smith, **SFSA No. 1170*;** Tyler, 1980: 126*. *Rhinecanthus echarpe:* Matsuura, 1980: 55*.

D III+22-24; A 20-21; P 13-15; LS 33-39; C rounded; lobes only slightly produced in adults. The species name "echarpe" used by Lacepède is not valid as it is a French vernacular name.

Body orange-brown above; head and belly white; soft D, A and P pale, C dusky. Attains 20-30 cm. Tropical Indo-West Pacific, south to East London. Found on outer reef and outer sand zone (Klausewitz, 1974).

Genus ***Sufflamen*** Jordan, 1916

Mouth terminal; teeth uneven, notched; enlarged bony scales behind gill slit; deep groove before eye below nostrils; more or less enlarged tubercles on posterior body scales; C truncate or slightly emarginate. Five species, 3 from our area; *S. verres* (Gilbert & Starks, 1904), restricted to the eastern Pacific, has D III+30-33; A 27-30; P 14-18. *S. albicaudatus* (Rüppell, 1829), a Red Sea endemic, differs from *S. chrysopterus* in having the whole C encircled by a white band becoming very thin on rear margin of fin.

KEY TO SPECIES

1a Two dark vertical curved bands: one from above eye to end below P base where it almost joins the other across P base upwards to below 2nd D spine ..... *S. bursa*
1b No dark vertical curved bands 2

2a C of adults uniformly dark (light yellow in juveniles); males have a line from corner of mouth down and back, with another round chin ..... *S. fraenatus*
2b Dark with white upper and lower margins and broad white distal band ..... *S. chrysopterus*

263.15 *Sufflamen bursa*
(Bloch & Schneider, 1801)
PLATE 139

Boomerang triggerfish — Boemerang-snellervis

Balistes bursa Bloch & Schneider, 1801: 476 (Indian Ocean). *Hemibalistes bursa:* Smith, **SFSA No. 1163*.** *Sufflamen bursa:* Matsuura, 1980: 48*; Smith, 1980: 186.

D III+27-30; A 25-27; P 13-14; LS 43-50; head scale rows 27-30.

Blue line from corner of mouth turns white (or disappears) on preservation. Attains 25 cm. Tropical Indo-West Pacific, south to Sodwana Bay.

263.16 *Sufflamen chrysopterus*
(Bloch & Schneider, 1801)
PLATES 139 & 140

Halfmoon triggerfish — Halfmaan-snellervis

Balistes chrysoptera Bloch & Schneider, 1801: 466 (East Indies & Coramandel). *Hemibalistes chrysoptera:* Smith, **SFSA No. 1164*.** *Sufflamen chrysopterus:* Matsuura, 1980: 49*.

D III+26-28; A 23-26; P 12-14; LS 41-47; head scale rows 23-28; scales with small spines forming longitudinal lines from C peduncle to below middle of soft D.

Attains 30 cm. Common in Indo-West Pacific, especially about reefs, south to Durban.

263.17 *Sufflamen fraenatus*
(Latrielle, 1804)
PLATE 139

Bridle triggerfish — Toom-snellervis

Balistes fraenatus Latrielle, 1804: 74 (no locality). *Sufflamen capistratus:* Smith, **SFSA No. 1162*.** *Sufflamen fraenatus:* Matsuura, 1980: 51*; Smith, 1980: 186; Tyler, 1980: 125*.

D III+27-31; A 24-28; P 14-15; LS 43-54; head scale rows 25-32. In some specimens, the "enlarged" tubercles on the posterior body scales are scarcely discernible.

In males the yellow band from corner of mouth obliquely backwards and band under chin turn white on preservation; females and juveniles have no bands running backwards from corner of mouth and the uniformly coloured young are common among weeds. Attains nearly 40 cm. Indo-West Pacific south to Natal.

Genus ***Xanthichthys*** Kaup, 1858

Mouth supraterminal, lower jaw juts out; teeth uneven, notched; no enlarged bony scales behind gill slit; 3rd D spine minute, not visible above dorsal edge of body. Revised by Randall et al. (1978); 5 species: 1 West Atlantic, 4 Indo-West Pacific, differentiated by colour patterns and various morphological features; 1 species in our area.

263.18 *Xanthichthys lineopunctatus*
(Hollard, 1854)
PLATE 137

Striped triggerfish — Gestreepte snellervis

Balistes lineopunctatus Hollard, 1854: 65 (Réunion). *Xanthichthys ringens* (*non* Linnaeus): Smith, **SFSA No. 1165*.** *Xanthichthys lineopunctatus:* Randall et al., 1978: 695*; Matsuura, 1980: 60*; Tyler, 1980: 121*; I28*.

D III+28-30; A 25-27; P 13-14; LS 44-50; C 12; head scale rows 17-2I.

As illustrated, only 3 brown lines on cheek. Attains 30 cm. Indo-West Pacific, south to Port Alfred, rare.

Genus ***Xenobalistes*** Matsuura, 1981

Characterised by outrigger effect below P caused by large bony disc-shaped expansion of the coracoids. Mouth terminal; teeth notched. Two species, *X. tumidipectoralis* Matsuura, 1981 (partly digested in the stomach of a blue marlin caught near Mariana Ids. in the Pacific) differs in P 13, LS 35 and other minor points.

263.19 *Xenobalistes punctatus*
Heemstra & Smith, 1983

Outrigger triggerfish — Vlerkprou-snellervis

Xenobalistes punctatus Heemstra & Smith, 1983: 1, Figs. 1-3 (thrown ashore at Van Staaden's River mouth, west of Algoa Bay).

D III+27; A 25; P 14; LS 46; head scale rows 21; shallow groove before eye below nostril about half way to mouth; lips rugose; supraorbital ridges

well developed; cheek fully scaled, no enlarged scales on cheek or behind gill slit; body scales without spines but with normal erect flat-topped tubercles; front of 1st D spine with spinules or spiny ridges; 3rd D spine short, inclined forwards; C truncate.

Dark brown with silvery white spots, 1st D membrane with black comma-shaped mark, fins light, a faint brownish vertical line just before middle of C. A single specimen, 96 mm (TL), thrown up west of Algoa Bay. Probably a pelagic form associated with flotsam. All specimens should be preserved.

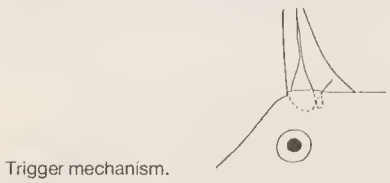
263.19 *Xenobalistes punctatus:* 8.5 cm SL holotype (W. of Port Elizabeth).

Family No. 264: MONACANTHIDAE

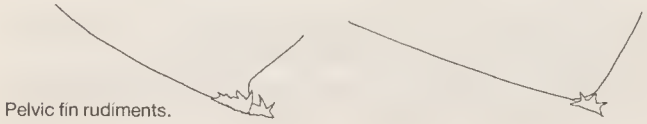
by J.B. Hutchins

Filefishes **Vylvisse**

Small to medium-sized fishes, usually with deep, highly compressed bodies, covered by smooth to rough shagreen-like skin. Mouth small, generally terminal, non-protractile; teeth pointed and not fused together. Gill opening a short vertical to oblique slit in front of or above pectoral fin base. Two dorsal fins; the first consists usually of a prominent spine that is capable of being locked in an upright position by a very much smaller second spine; the second fin is long-based, consisting of 24-51 unbranched soft-rays. Anal fin similar to second dorsal fin. Pelvic fins represented either by a series of 3 or fewer pairs of scales encasing the posterior end of the pelvis which projects through the skin, or a single scale anterior to the posterior end of pelvis which disappears with age, or rudiments absent. Pelvis generally capable of vertical movement giving rise to a ventral abdominal flap. Caudal peduncle generally naked (armed with either 2 pairs of prominent spines or a dense patch of fine bristles in some species). One species possesses either stout elongate spines or a toothbrush-like patch of bristles on mid-side of body.



Trigger mechanism.



Pelvic fin rudiments.

Adults found either in shallow weed beds, on coral reefs or in deep water to depths of over 150 m. One species may attain a length of 1 m, but most reach only 10-20 cm. The larger species are excellent eating. Occur in all oceans, but not abundant in this region where 20 genera and 16 species have been found. *Penicipelta vittiger* (Castelnau), an Australian temperate species, was doubtfully reported by Barnard (1927: 957, as *Cantherines peroni*) from Natal. This record seems erroneous (see Smith, **SFSA No. 1148**). *Stephanolepis freycineti* (Smith, **SFSA No. 1142**) is also indeterminable.

KEY TO GENERA

1a First D spine fully erectile, usually capable of being locked in position by a 2nd very small spine 2
1b First D spine not fully erectile, enveloped in a loose flap of skin attached to back ..... *Paraluteres*

2a Snout produced into a slender tube, turning upwards at mouth ..... *Oxymonacanthus*
2b Snout not produced into a tube 3

3a Soft D & A each with 41 or more rays 4
3b Soft D & A each with 39 or fewer rays 5

4a First D spine originates well in advance of eye ..... *Pseudalutarius*
4b First D spine originates over eye ..... *Aluterus*

5a V rudiment fixed 6
5b V rudiment movably articulated with pelvis 8

6a Soft D rays 26-29; A rays 22-25; adults with toothbrush-like patch of bristles or several long spines on middle of side ..... *Amanses*
6b Soft D rays 31-38; A rays 28-36; no bristles or spines on mid-side of body, although 2 pairs of spines or an elongate patch of fine bristles may be present on each side of C peduncle 7

7a V rudiment not projecting prominently rearwards of ventral flap; 1st D spine with a row of minute posteriorly-directed barbs along each posterolateral edge, the spine received into a deep groove in back when depressed; C peduncle armed with paired spines, a patch of fine bristles, or naked ..... *Cantherhines*
7b V rudiment projecting prominently rearwards of ventral flap; 1st D spine with a row of laterally directed barbs along each lateral edge; groove for D spine shallow or absent; C peduncle always unarmed ..... *Thamnaconus*

8a V rudiment large, with prominent barbs; 1st D spine strong, with large barbs, its origin over centre or front ½ of eye; no produced fin rays in D or C ..... *Pervagor*
8b V rudiment moderate to small, with small barbs; 1st D spine slender, with moderate to small barbs, origin over rear ½ of eye; adult male usually with 1 or 2 anterior D soft-rays produced into filaments 9

9a Margin of ventral flap convex, the V rudiment not extending prominently beyond flap; mid-body scales of adult represented by clumps of many small spinules, giving skin a rather coarse feel ..... *Stephanolepis*

9b Margin of ventral flap straight to concave, the V rudiment extending prominently beyond flap; spinules on body scales of adult not clumped together, the skin smooth to slightly roughened ..... *Paramonacanthus*

Genus ***Aluterus*** Cloquet, 1816

D spine slender and feeble, often broken in capture; V rudiment inconspicuous, usually lost with age. Four species; 2 in our area.

KEY TO SPECIES

1a C usually shorter than snout; C peduncle longer than deep; no blue lines and dashes on sides ..... *A. monoceros*

1b C longer than snout; C peduncle deeper than long; longitudinal blue lines and dashes on sides ..... *A. scriptus*

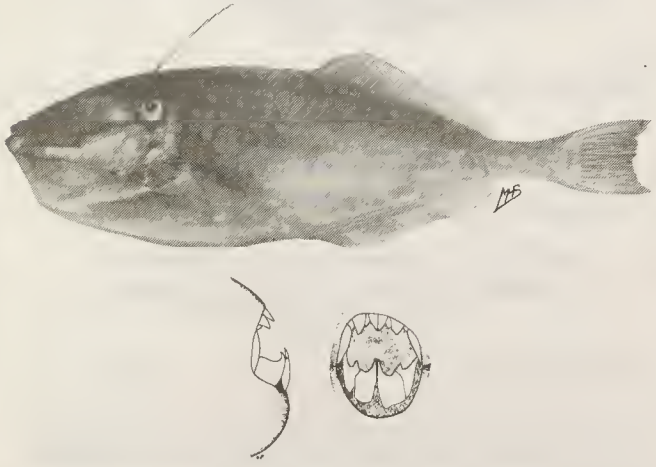
264.1 *Aluterus monoceros*
(Linnaeus, 1758)
PLATE 137

Unicorn leatherjacket — Eenhoring-leerbaadjie

Balistes monoceros Linnaeus, 1758: 327 (China). *Alutera monoceros:* Smith, **SFSA No. 1152*;** Berry & Vogele, 1961: 65*; Smith & Smith, 1966: 140*; Penrith, 1969: 235.

D II+45-51; A 47-53; P 14. Snout profile slightly concave in juveniles, convex in adults.

Sandy to grey in colour, often with numerous brown spots on upper sides of body. Soft D and A pale yellowish to brownish; C membranes blackish brown. Juveniles with a reticulate pattern of pale lines enclosing grey blotches and brown spots; this pattern may persist on small adults. Attains 75 cm. Worldwide in tropical/subtropical seas; from Saldanha Bay to Beira.



264.1 *Aluterus monoceros:* 40 cm (W. of Port Elizabeth) and teeth.

264.2 *Aluterus scriptus*
(Osbeck, 1765)
PLATE 137

Scribbled leatherjacket — Bekrapte leerbaadjie

Balistes scriptus Osbeck, *in* Georgi, 1765: 145 (China). *Alutera scripta:* Berry & Vogele, 1961: 66*. *Osbeckia scripta:* Smith, **SFSA No. 1153*;** Smith & Smith, 1966: 141* (in part).

D II+43-49; A 46-52; P 13-15. Snout profile prominently concave.

Ground colour olive brown to grey. Pelagic juveniles may be yellowish brown with dark spots. Attains 1 m. Worldwide in tropical and subtropical seas, south to Knysna.

Genus ***Amanses*** Gray, 1835

Monotypic.

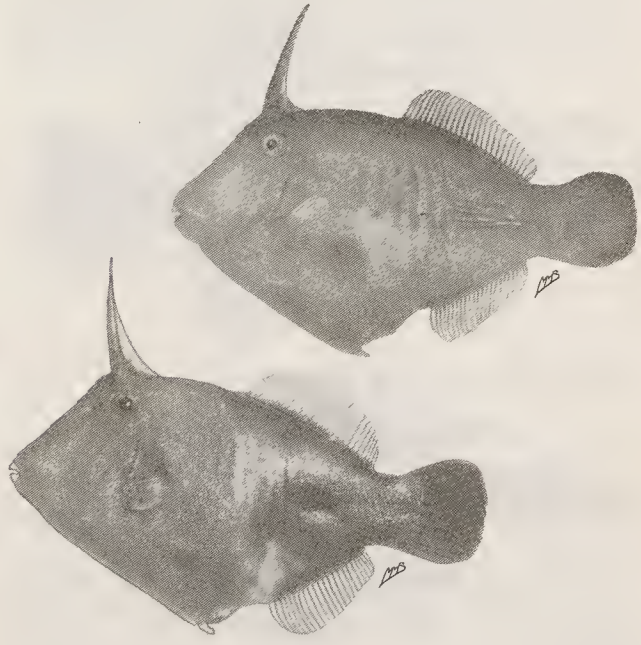
264.3 *Amanses scopas*
(Cuvier, 1829)

Broom filefish — Besem-vylvis

Balistes scopas Cuvier, *in* Cuv. & Val., 1829: 373 (Mauritius). *Amanses scopas:* Smith, 1955: 26*; 1961: 572, **No. 1145a*.**

D II+26-29; A 22-25; P 13. First D spine over front ½ of eye, with minute posteriorly-directed barbs along each posterolateral edge; deep groove for reception of 1st D spine; V rudiment fixed, projecting prominently beyond ventral flap.

Colour brown with up to 12 narrow dark brown crossbars on mid-side of body; C dark brown; soft D, A and P pale, lips dark brown. Attains 20 cm. Tropical Indo-West Pacific, except Hawaii; south to Maputo.



264.3 *Amanses scopas:* top: 20 cm male (Zanzibar); bottom: 18 cm female (Seychelles).

Genus ***Cantherhines*** Swainson, 1839

First D spine origin over front ½ of eye, received into a deep groove when depressed. Nine species; 3 in our area.

KEY TO SPECIES

1a P rays 15 (rarely 14); 2 pairs of spines on each side of C peduncle, small and difficult to detect in juvenile and adult female, enlarged and recurved in adult male ..... *C. dumerilii*

1b P rays 12-13 (rarely 14); no spines on peduncle 2

2a C 1.6-2.0 times longer than least depth of peduncle; no prominent dark bars joining eyes across in adult male ..... *C. dumerilli*

2b C 2.2-2.4 times longer than least depth of peduncle; 2 dark bars join eyes across interorbital region ..... *C. fronticinctus*

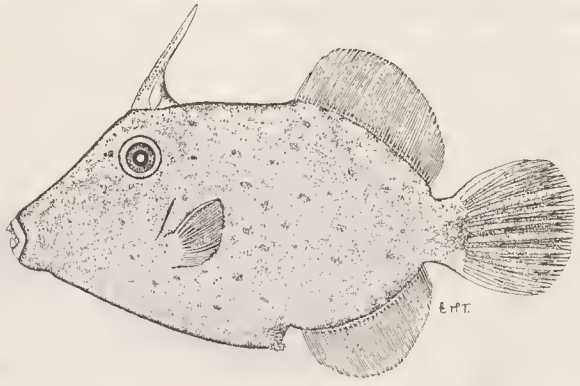
264.4 *Cantherhines dumerilii*
(Hollard, 1854)
PLATE 138

White-spotted filefish — Witkolle-vylvis

Monacanthus dumerilii Hollard, 1854: 361 (Mauritius). *Cantherhines dumerili:* Randall, 1964: 339*; Smith, 1975: 81.

D II+34-39; A 28-35; P 15 (rarely 14).

Greyish brown to yellowish brown in colour, with about 12 faint vertical dark brown bars on rear ⅔ of body; lips whitish. Peduncle spines of adult male orange; soft D, A and P pale yellowish; C orange with dusky rays. Juveniles and subadults with white spots on head and body. Attains 35 cm. Tropical Indo-Pacific, south to Algoa Bay.



264.4 *Cantherhines dumerilii:* 19.5 cm SL (Algoa Bay).

264.5 *Cantherhines fronticinctus*
(Günther, 1867)
PLATE 138

Spectacled filefish — Bril-vylvis

Monacanthus fronticinctus Günther, *in* Playfair & Günther, 1867: 136, Pl. 19, Fig. 2 (Zanzibar). *Amanses fronticinctus:* Smith, **SFSA No. 1145***. *Cantherhines fronticinctus:* Randall, 1964: 348*; Hutchins & Randall, 1982: 176*.

D II+33-35; A 31-32; P 12-14.

Colour yellowish brown with 5 longitudinal darker bands on side of body, each band enclosing an obscure row of dark brown spots; usually a thin blue line surrounds eye; broad white to yellowish band encircles anterior ⅔ of peduncle. Soft D, A and P rays pale brown; C yellowish brown, with broad dark brown band along rear margin. Attains 23 cm. Tropical Indo-West Pacific, south to Durban.

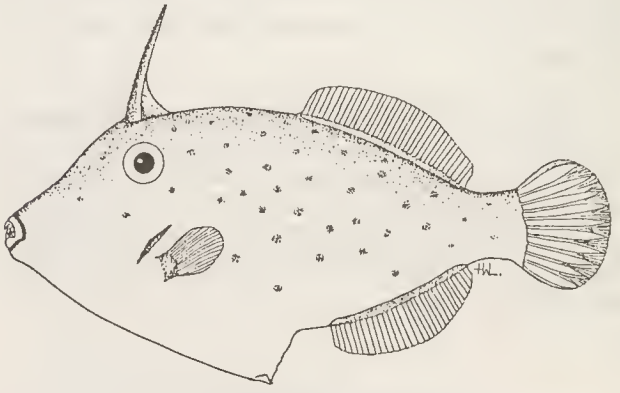
264.6 *Cantherhines pardalis*
(Rüppell, 1837)
PLATE 138

Honeycomb filefish — Heuningkoek-vylvis

Monacanthus pardalis Rüppell, 1837: 57, Pl. 15, Fig. 3 (Red Sea). *Monacanthus natalensis* Gilchrist & Thompson, 1911: 48 (Natal). *Hanomanctus bovinus* Smith, **SFSA No. 1143*** (East London, South Africa). *Amanses sandwichiensis* (*non* Quoy & Gaimard): Smith, **SFSA No. 1144***. *Cantherines pardalis:* Randall, 1964: 355*. *Amanses pardalis:* Smith, 1975: 14.

D II+32-36; A 29-32; P 12-14.

Usually pale green to blue reticulations on side producing a wire-netting or honeycomb appearance; alternating blue (or green) and brown lines running from eye and gill slit to mouth; usually a blue ring encircles eye. Silver patch usually present at rear base of soft D and A. Attains 20 cm. Tropical/subtropical Indo-West Pacific, south to Mossel Bay.



264.6 *Cantherhines pardalis:* 5 cm juvenile (Transkei).

Genus ***Oxymonacanthus*** Bleeker, 1866

Two species; 1 in our area.

264.7 *Oxymonacanthus longirostris*
(Bloch & Schneider, 1801)
PLATE 138

Harlequin filefish — Harlekyn-vylvis

Balistes longirostris Bloch & Schneider, 1801: 464 (East Indies). *Oxymonacanthus longirostris:* Smith, 1957: 399; 1961: 572, **No. 1145b.**

D II+32-35; A 29-32; P 11-12; V rudiment absent; ventral flap small.

Bristles on C peduncle of adult male more elongate than those on rest of body.

Attains 10 cm. Tropical Indo-West Pacific, south to Maputo.

Genus ***Paraluteres*** Bleeker, 1866

Two species; 1 in our area.

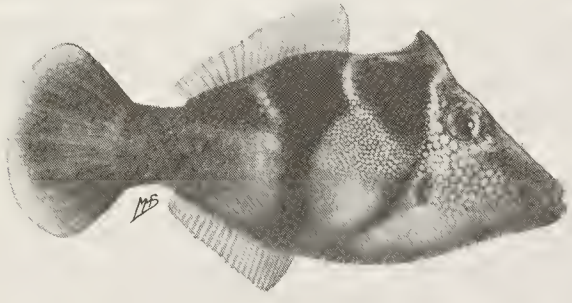
264.8 *Paraluteres prionurus*
(Bleeker, 1851)
PLATE 139

Blacksaddle mimic — Swartsaal-nabootser

Alutarius prionurus Bleeker, 1851: 290 (Banda, Indonesia). *Paraluteres prionurus:* Smith, 1958: 61*; 1961: 572, **No. 1151.**

D 11+25-28; A 22-25; P 10-11; V rudiment and ventral flap absent. Membrane of 1st D spine reaching to or almost to soft D. Peduncle of adult male with 2 pairs of recurved spines on each side, and a patch of bristles extending anteriorly onto mid-side of body (naked in female and juvenile). Gill opening located directly above base of P.

Ground colour varies from pale greenish to a dirty white; prominent blackish-brown saddles on dorsal surface, the middle 2 extending down sides of body towards ventral surface; usually a round dark blotch above origin of A. Soft D and A hyaline, tips of rays dusky; C yellowish. Attains 11 cm. Tropical Indo-West Pacific; south to Aliwal Shoal, Natal. This species closely resembles the blacksaddled toby, *Canthigaster valentini,* with which it is usually associated.



264.8 *Paraluteres prionurus:* 9.5 cm (N. Mozambique).

Genus ***Paramonacanthus*** Bleeker, 1866

Six species; 2 in our area.

KEY TO SPECIES

1a Two rows of downward-directed barbs on anterior face of 1st D spine; P rays usually 12 ..... *P. cingalensis*
1b Barbs on anterior face of 1st D spine either directed upwards or obsolete; P rays usually 11 ..... *P. barnardi*

264.9 *Paramonacanthus barnardi*
Fraser-Brunner, 1941
PLATE 138

Wedgetail filefish — Keilstert-vylvis

Paramonacanthus barnardi Fraser-Brunner, 1941: 193, Fig. 6 (Zanzibar); Smith, **SFSA No. 1139***; Day, 1974: 96.

D II+24-27; A 25-28; P 10-12 (usually 11). First D spine with a row of small to moderate, downward-directed barbs along each postero-lateral edge; no groove for receiving 1st D spine; anterior rays of soft D and A elevated in adult male; 2nd and 3rd D rays somewhat filamentous; middle rays of C elongate, giving the fin a wedge-shaped appearance; generally more A rays than D rays.

Ground colour a pale greenish grey; body covered with small close-packed dark spots; indications of 2 dark stripes, one from eye curving down to P and thence to C base, the other from above P to front ½ of soft D base; soft D, A and P pale yellow. In adult male 2 lines run obliquely from eye to throat, while others commence behind mouth, and follow ventral profile to V rudiment; A with a prominent brown border; C with 2 dark wedge-shaped bands, membranes with dark spots. Attains 9 cm. East coast of Africa to Durban in the south.

264.10 *Paramonacanthus cingalensis*
(Fraser-Brunner, 1941)

Blackstriped filefish — Swartstreep-vylvis

Laputa cingalensis Fraser-Brunner, 1941: 191, Fig. 5 (Ceylon); Smith, 1958: 320*; 1961: 572, **No. 1138a***. *Laputa umgazi* Smith, **SFSA No. 1138*** (Umgazi River mouth).

D 11+27-28; A 26-28; P 12. First D spine with 4 rows of small downward-directed barbs, 2 on anterior face and 1 along each postero-lateral edge; no groove for receiving 1st D spine. Anterior rays of soft D and A elongated; 2nd soft D ray elongate in adult male; C wedge-shaped in adult; generally more D rays than A rays.

Ground colour greenish with 4 dark bands along side, the uppermost from interdorsal space generally to upper edge of peduncle and the 2nd sometimes reaches uppermost C rays. Attains 19 cm. Tropical areas of Indian Ocean south to Umgazi River, Transkei.

264.10 *Paramonacanthus cingalensis:* 4 cm (Natal).

Genus ***Pervagor*** Whitley, 1930

Four species; 1 in our area.

264.11 *Pervagor melanocephalus*
(Bleeker, 1853)
PLATE 138

Redtail filefish — Rooistert-vylvis

Monacanthus melanocephalus Bleeker, 1853: 95 (Solor, Indonesia). *Pervagor melanocephalus:* Smith, 1957: 399; **SFSA No. 1137*.** *Pervagor scanleni* Smith, 1957: 221, Fig. 3 (Port Alfred); 1961: 572, **No. 1137a*.**

D II+29-33; A 26-30; P 11-13. First D spine origin over centre or front ½ of eye; a row of large laterally-directed barbs along each lateral edge; shallow groove for receiving 1st D spine.

Ground colour greenish, brownish or dark yellowish brown; generally many series of narrow dark irregular lines along side; usually a blackish blotch surrounds gill opening, extending dorsally to behind eye; bright blue lines and spots on ventral flap. Soft D and A with longitudinal rows of irregular orange and blue lines; C orange to red with rows of small yellow spots on membranes, the rear margin with irregular rows of blue spots and lines. Attains 16 cm. Tropical Indo-West Pacific; juveniles reach Algoa Bay.

264.11 *Pervagor melanocephalus*: 5 cm juvenile, holotype of *P. scanleni* (Port Alfred).

Genus ***Pseudalutarius*** Bleeker, 1865

Only 1 known species.

264.12 *Pseudalutarius nasicornis*
(Temminck & Schlegel, 1850)

Rhino leatherjacket — Renoster-leerbaadjie

Alutera nasicornis Temminck & Schlegel, 1850: 293, Pl. 131, Fig. 2 (Japan). *Pseudalutarius nasicornis:* Smith, 1947: 818; **SFSA No. 1154*.**

D II+43-50; A 41-46; P 11. First D spine very slender, origin anterior to eye. V rudiment absent. Body slender in juveniles, deep in adults.

Ground colour pale brown to grey; 2 brown stripes on body, 1st from base of 1st D spine to rear of soft D, 2nd from mouth through eye to peduncle; adults with closely-set yellow spots on head and body. Soft D and A pale yellow; C dark brown. Attains 18 cm. Tropical/subtropical Indo-West Pacific; has been found at Port Alfred, East London and Bazaruto.

264.12 *Pseudalutarius nasicornis*: 4.5 cm (Natal).

Genus ***Stephanolepis*** Gill, 1861

Eight species; 1 in our area.

264.13 *Stephanolepis auratus*
(Castelnau, 1861)
PLATES 138 & 140

Porky — Otjie

Monacanthus auratus Castelnau, 1861: 77 (South Africa). *Stephanolepis rectifrons* Fraser-Brunner, 1940: 531, Fig. 6 (Delagoa Bay); Barnard, 1948: 400; Smith, **SFSA No. 1141*.** *Stephanolepis auratus:* Fraser-Brunner, 1940: 532; Barnard, 1948: 400; Smith, **SFSA No. 1140*.**

D II+28-34; A 30-34; P 13-14. First D spine origin over rear ½ of eye, with a row of moderate-sized, posteriorly directed barbs along each posterolateral edge; no groove for receiving 1st D spine.

Ground colour greenish grey, with scattered irregular dark blotches on side of body; broad dark band joins front margins of eyes across interorbital; a 2nd narrower band crosses interorbital at base of 1st D spine. Soft D, A and P pale; C with 2 dark curved cross bars. Attains 28 cm. Known only from Knysna to Zanzibar.

Genus ***Thamnaconus*** Smith, 1949

First D spine with a row of laterally-directed barbs along each lateral edge; its origin over centre or front ½ of eye; shallow groove for receiving D spine when depressed. Ten species; 3 in our area.

KEY TO SPECIES

1a Soft D rays 36-38; A rays 35-36; body uniform pale greyish brown to purplish brown ..... *T. modestoides*
1b Soft D rays 31-34; A rays 30-33; body spotted 2

2a Head and body covered with moderate-sized dark brown spots, those on body tending to form longitudinal rows along sides (upper 2 series generally represented by elongate blotches); anus contained in a large brown blotch; head length 2.9-3.1 in SL ..... *T. fajardoi*
2b Head and body covered with closely-set small brown spots; dark brown ring around anus; head length 3.2-3.4 in SL ..... *T. arenaceus*

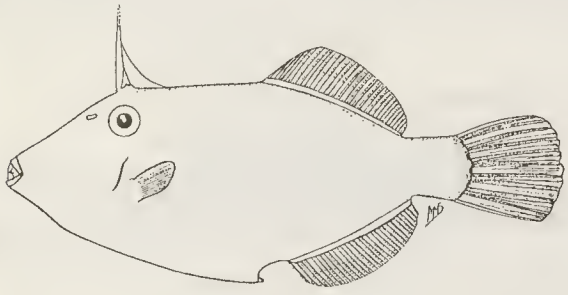
264.14 *Thamnaconus arenaceus*
(Barnard, 1927)

Sandy filefish — Sand-vylvis

Cantherhines arenaceus Barnard, 1927: 78 (South African seas, probably Natal). *Thamnaconus arenaceus:* Smith, **SFSA No. 1146*.**

D II+31-32; A 30-31; P 13. First D spine with a row of small laterally-directed barbs along each lateral edge.

Life colours unknown; after preservation, head and body brown, covered with closely-set darker spots; dark brown ring around anus; soft D, A and P pale; C dusky. Attains 23 cm. Known only from 3 specimens, 1 possibly from Natal and 2 from Madagascar.



264.14 *Thamnaconus arenaceus:* 22.5 cm (Natal).

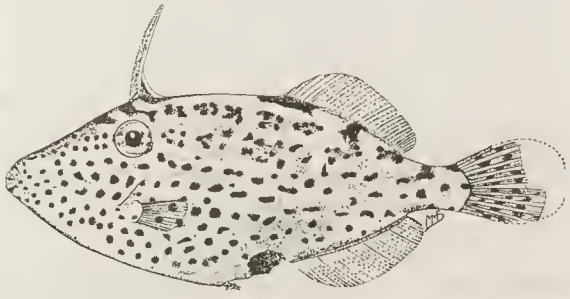
264.14 *Thamnaconus fajardoi*
Smith, 1953
PLATE 140

Spotted filefish — Gekolde vylvis

Thamnaconus fajardoi Smith, 1953: 19, Fig. 2 (southern part of Mozambique Channel); 1953: 522, **No. 1147a*.**

D II+32-34; A 31-33; P 12-13. First D spine with a row of moderate to large laterally-directed barbs along each lateral edge, and distal half of spine with 2 rows of slightly smaller spines along front of spine.

Ground colour pale brown, 2 dark bars across forehead, the 1st V-shaped, its apex pointing down the mid-line of snout, the other U-shaped. Attains 22 cm. Known from Mauritius, Madagascar and southern Mozambique channel at depths from 130 to 150 m.



264.15 *Thamnaconus fajardoi:* 15 cm holotype (Mozambique channel).

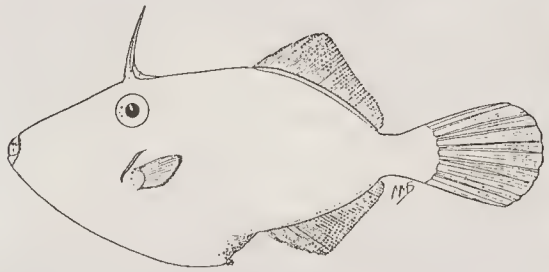
264.16 *Thamnaconus modestoides*
(Barnard, 1927)
PLATE 139

Modest filefish — Skaam vylvis

Cantherhines modestoides Barnard, 1927: 78 (Algoa Bay). *Thamnaconus modestoides:* Smith, **SFSA No. 1147*.** *Navodon modestus* (*non* Günther): Fowler, 1934: 510; Smith, **SFSA No. 1149** (not figure).

D II+36-38; A 35-36; (specimens from other Indian Ocean localities generally with fewer D & A rays); P 12-14. First D spine with a row of small to moderate laterally-directed barbs along each lateral edge.

Head and body plain greyish brown to purplish brown; spinous D membrane lemon yellow in males, greyish in females, membranes of other fins pale blue and rays brownish. Attains 30 cm. Indian Ocean south to Algoa Bay; also northwestern Australia and Japan. Prefers depths of 100 - 170 m.



264.16 *Thamnaconus modestoides:* 21.5 cm (Algoa Bay).

Family No. 265: TRIACANTHODIDAE

by J.C. Tyler

Spikefishes — **Spykervisse**

Body deep and laterally compressed; snout short to elongate and tubular. Scales small with upright spiny processes giving a rough or shagreen-like quality to the skin. Six dorsal fin spines, decreasing in size posteriorly, the first 2 well developed but posterior spines sometimes rudimentary and barely visible (especially in long-snouted genera). Dorsal fin rays 12-18. Anal fin without spines, 11-16 rays. Pelvic fin with a prominent spine and 1 or 2 smaller rays. Dorsal and pelvic spines with locking mechanisms, often erected at right angles to body and difficult to fold down. Caudal fin rounded to truncate, 12 rays. Mouth small, with relatively few conical to truncate teeth, sometimes inconspicuous or absent altogether in one jaw. Gill opening a short slit in front of pectoral fin base. Two small nostrils in a scaleless area in front of eye. Lateral line inconspicuous.

Moderate-sized fishes (less than 25 cm) found near the bottom in depths of 46 - 600 m or greater; one Indian Ocean species bathypelagic as juveniles and young adults before becoming benthic. Twenty species in 11 genera in all 3 major oceans; 12 species of 8 genera in western Indian Ocean; only 4 species in 4 genera recorded from our area.

Family revised by Tyler (1968); additional species recorded from western Indian Ocean by Tyler (1970; 1983), Hulley (1972), Benbow (1974) and Matsuura (1982). Pelvic width is distance between bases of the pelvic fin spines.

KEY TO GENERA

1a Snout equal to or shorter than eye diameter 2
1b Snout tubular, much longer than rest of head 7

2a Teeth conical, sharply pointed to bluntly rounded distally; lips neither especially large nor swollen and spongy 3
2b Teeth compressed, wider than thick, truncated distally; lips large, swollen, spongy ..... *Tydemania*

3a Jaws with a major outer series of teeth and 1-6 isolated inner teeth (a few *T. ethiops* lack inner teeth); pseudobranch lamellae 27-48, the ventralmost at a level well below P base ..... *Triacanthodes*
3b Jaws with 1 series of teeth (no inner teeth); pseudobranch lamellae 11-24, the ventralmost at a level above lower edge of P base 4

4a D spines decreasing in length gradually, the last spine small but easily seen 5
4b Posterior D spines much smaller than anterior spines; 4th spine protruding through skin and slightly longer than 5th and 6th, which either protrude slightly or are completely buried 6

5a Gill opening 13-15% SL (2 specimens), reaching to slightly below P base ..... *Mephisto*
5b Gill opening 5-8% SL, not reaching below P base ..... *Paratriacanthodes*

6a Pelvic width 4-6 in its length; snout about equal to postorbital distance (from eye to upper end of gill opening); 5th and 6th D spines difficult to see; profile of head either straight or slightly convex; 1st D spine reaches tip of 4th spine ..... *Atrophacanthus*
6b Pelvic width 1.9-2.6 in its length; snout longer than postorbital distance; 5th and 6th D spines easily seen; profile of head more or less concave before eyes; depressed 1st D spine reaches tip of 6th spine ..... *Bathyphylax*

7a Mouth about twice width of snout immediately behind it, twisted to right or left, except in some small specimens; lower jaw teeth compressed, much wider than thick, easily seen; upper jaw teeth 0-4, smaller and narrower than lower teeth; 3rd D spine 0.6-0.7 length of 2nd ..... *Macrorhamphosodes*
7b Mouth not much wider than snout immediately behind it and not twisted to one side; teeth conical, small and difficult to see; 3rd D spine less than ½ length of 2nd spine ..... *Halimochirurgus*

Genus ***Atrophacanthus*** Fraser-Brunner, 1950

One species, *A. japonicus* (Kamohara, 1941) known from Japan, Philippines, Celebes Sea and off Tanzania; possibly occurs in our area.

Genus ***Bathyphylax*** Myers, 1934

Two species: *B. bombifrons* Myers, 1934 (from Hong Kong) and *B. omen* Tyler, 1966; both species have been found off Kenya (Tyler, 1983) and may occur in our area. In *B. bombifrons* the dorsal snout profile is distinctly concave; in *B. omen* the dorsal snout profile is straight or slightly concave.

Genus ***Halimochirurgus*** Alcock, 1899

Snout greatly elongated and tubular; mouth supraterminal. Two species, both found off Kenya (Tyler, 1983) and possibly in our area.

KEY TO SPECIES

1a Mouth slightly wider than snout immediately behind it, its width subequal to least interorbital width; postorbital distance about 0.7 of eye diameter; gill opening extends to below P base, its length about 1.5 in eye diameter; pelvic width about 4 in its length ..... *H. centriscoides* Alcock, 1899 (Indonesia to east Africa)
1b Mouth of same width as snout immediately behind it, its width about ½ or less of least interorbital width; postorbital distance about ½ of eye diameter; gill opening not extending below P base, its length about 2.5-3 in eye diameter; pelvic width about 6 in its length ..... *H. alcocki* Weber, 1913 (Japan to east Africa)

Genus ***Macrorhamphosodes*** Fowler, 1934

Highly specialised spikefishes with 1st 3 D spines well developed, the last 3 barely visible; pelvis flat ventrally, its width about 5-6 in its length; snout long and tubular; mouth twisted to right or left, much wider than snout behind it. Two species: *M. platycheilus* is known from Kenya (Tyler, 1983) and is likely to be found in our area.

KEY TO SPECIES

1a Gill opening not extending below middle of P base, its length about 3.5-4 in eye diameter; 2 well-developed teeth in upper jaw of adults, 4 in young; lower jaw teeth 12-16, sharply pointed in young but rounded to slightly truncated in adults; P (including small uppermost element) 14-15; D 13-15 ..... *M. uradoi*
1b Gill opening extending below middle of P base, its length about 2-2.5 in eye diameter; no teeth in upper jaw of adults, a few barely protruding rudiments in young; lower jaw teeth more than 20 in all (young with 17-19); teeth slightly rounded distally in young, but decidedly truncate in adults; P 11-13; D 12-13 ..... *M. platycheilus* Fowler, 1934 (Philippines to Kenya)

265.1 *Macrorhamphosodes uradoi*
(Kamohara, 1933)

Trumpetsnout — Trompetbek

Halimochirus [*sic*] *uradoi* Kamohara, 1933: 392, Figs. 1-3 (Japan). *Macrorhamphosodes uradoi*: Tyler, 1968: 194*; 1983: 7, Hulley, 1972: 193*; Tyler, 1983: 7.

D VI (last 3 rudimentary), 13-15; A 13-15; P 14-15; V 1,1; GR 24-27; olfactory lamellae 12-14; pseudobranch lamellae 11-16. Head 1.8-2.0; tubular snout 2.5-2.8; eye 10-13; postorbital 16-20; mouth width 15-19; gill opening 44-56; body depth 4.7-5.3. Mouth twisted progressively with increasing size.

Pinkish red, paler below, darker red dorsally and stripe posteriorly from eye. Attains about 165 mm SL. Feeds on scales of fishes. Taken in bottom trawls at 50 - 450 m; 1 record from 400 - 450 m off Port Elizabeth; Kenya to Japan.

265.1 *Macrorhamphosodes uradoi*: 14.5 cm (Japan; after Tyler, 1968).

Genus ***Mephisto*** Tyler, 1966

Mouth terminal; snout short. One species, *M. fraserbrunneri* Tyler, 1966, known from only 2 specimens (1 from off Somalia and the other from the Andaman Sea).

Genus ***Paratriacanthodes*** Fowler, 1934

D spines decreasing gradually in length; pelvis flat ventrally, its width 3-5 in its length; teeth large, conical, 1 row in each jaw. Two species; *P. herrei* is known only from the Philippines.

KEY TO SPECIES

1a D and V spines with scale spinules only slightly and irregularly enlarged; pelvic width about 5 in its length, which is about equal to distance from snout tip to rear margin of eye; postorbital distance (from eye to upper end of gill opening) 3.4-3.6 in head; pseudobranch lamellae 21-24, ventralmost below middle of P base ..... *P. herrei* Myers, 1934

1b D and V spines with much enlarged scale spinules forming 3 series of 3-5 retrorse barbs; pelvic width about 3 in its length, which is subequal to or only slightly less than head; postorbital distance 3.8-4.0 in head; pseudobranch lamellae 12-15, ventralmost above level of middle of P base ..... *P. retrospinis*

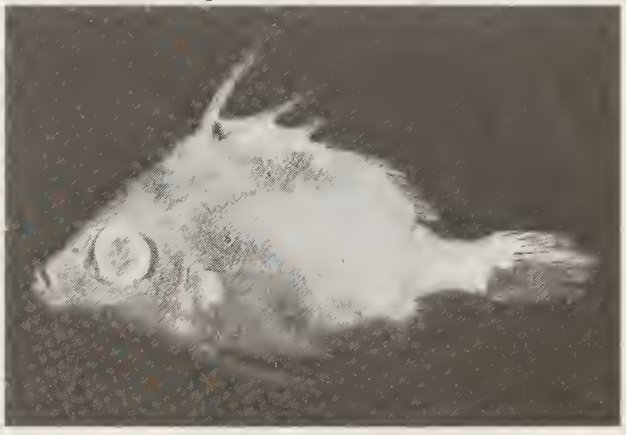
265.2 *Paratriacanthodes retrospinis*
Fowler, 1934

Sawspine spikefish — Saagstekel-spykervis

Paratriacanthodes retrospinis Fowler, 1934: 364, Fig. 114 (Formosa); Tyler, 1968: 145*; 1983: 1*.

D VI,15; A 13; P 13-14; V I,1; GR 19-21; olfactory lamellae 10-13; upper jaw teeth 13-17; lower jaw teeth 18-22. Head 2.4-2.9; snout 7.5-8.8; eye 5.1-6.6; postorbital 9.0-11.4; mouth width 11-13; gill opening 15-24; body depth 1.8-2.4.

Reddish pink, with 3 pale lines; ventral surface from lower jaw to anus silvery blue. Attains about 90 mm SL. Taken in bottom trawls in 100 - 454 m, from Japan and China to Mozambique and Natal.



265.2 *Paratriacanthodes retrospinis*: 8.5 cm (off Natal).

Genus ***Triacanthodes*** Bleeker, 1857

D spines decreasing gradually in length; pelvis flat ventrally, its width about 3-4 in its length; teeth large, conical, most in a single series in jaws, with 1-6 inner teeth. Three species, 1 in our area.

KEY TO SPECIES

1a Length of naked skin over olfactory organ 2.2-3.2 in eye diameter and always longer than distance between medial edges of the scaleless nasal areas ..... *T. indicus* Matsuura, 1982 (Saya de Malha Bank, western Indian Ocean)

1b Length of naked skin over olfactory organ 2.9-5.8 in eye diameter and equal to or slightly less than distance between medial edges of the scaleless nasal areas ..... *T. ethiops*

265.3 *Triacanthodes ethiops*
Alcock, 1894

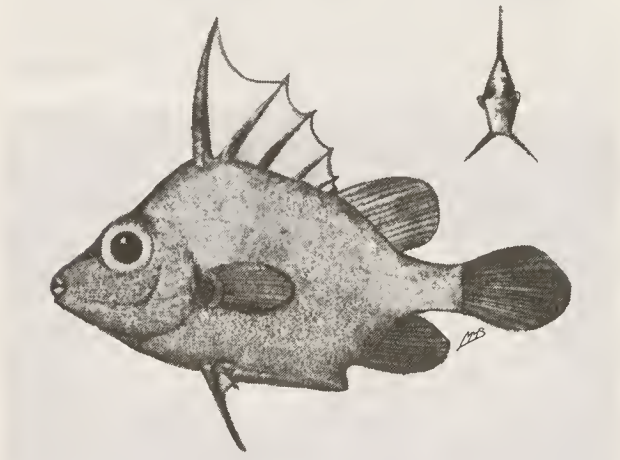
Shortsnout spikefish — Kortbek-spykervis

Triacanthodes ethiops Alcock, 1894: 137, Pl. 7 (Bay of Bengal); Smith, **SFSA No. 1136***; Tyler, 1968: 124*; Benbow, 1974: 764*.

D VI,15-16; A 12-13; P 13-14; V I,1-2; GR 16-19; pseudobranch lamellae 27-45; outer teeth in upper jaw 9-21, inner teeth 0-3; outer teeth in

lower jaw 14-28, inner teeth 0-2. Head 2.3-3.0; snout 5.9-7.6; eye 5.0-6.4; postorbital 8.8-12.8; mouth width 11-14; gill opening 7.6-12.5; body depth 1.6-2.5.

Generally reddish, paler below; with 3 yellowish principal lines and 2 reddish-yellow supplemental lines (upper between D base and uppermost principal line; lower between uppermost and middle principal lines at about mid-body posteriorly onto C peduncle). Attains about 85 mm SL. Taken in bottom trawls in 50 - 125 m; Japan to South Africa.



265.3 *Triacanthodes ethiops*: 7 cm (Natal).

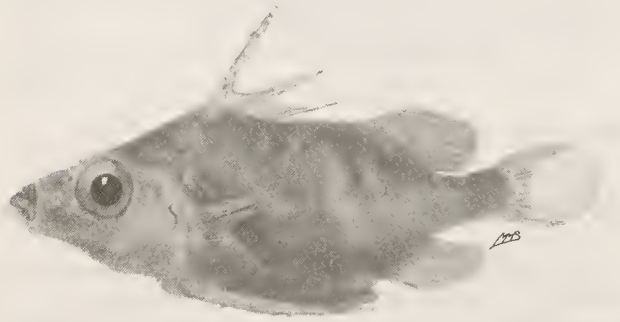
Genus *Tydemania* Weber, 1913

First 3 D spines well developed, the last 3 rudimentary and barely, if at all, visible; pelvis flat ventrally, its width 4 in its length; gill opening reaching ventrally to lower ½ of P base; teeth in 1 row in both jaws. Monotypic.

265.4 *Tydemania navigatoris* Weber, 1913

Fleshy-lipped spikefish — Grootlip-spykervis

Tydemania navigatoris Weber, 1913: 571, Pl. 7, Fig. 4 (Madura Sea of Indonesia); Smith, 1958: 321*; 1961: 572, **No. 1136**a; Tyler, 1968: 184*; 1983: 6*; Benbow, 1974: 765*.



265.4 *Tydemania navigatoris*: 12.5 cm SL (off Natal).

D VI,13-15; A 12-14; P 12-14; V I,1; GR 17-23; olfactory lamellae 11-14; pseudobranch lamellae 11-18; upper jaw teeth 30-40; lower jaw teeth 32-43. Head 2.2-2.9; snout 6.8-8.6; eye 5.7-7.0; postorbital 9.3-13.9; mouth width 8.0-10.5; gill opening 13-24; body depth 2.6-3.2.

Generally reddish, darker dorsally; some specimens (especially from Japan) with a blue stripe from eye over gill opening and P base to about halfway back on body. Attains 12 cm SL. Feeds on scales of fishes (Mok, 1978; Tyler, 1983). Taken in bottom trawls in 50 - 607 m. Japan to east coast of Africa; several records from South Africa.

Family No. 266: OSTRACIIDAE

by M.M. Smith

Boxfishes — **Koffervisse**

Body enclosed in a shell or carapace with openings for the small terminal mouth, anus, eyes, gill slits, nostrils, fins and flexible caudal peduncle. The hard carapace consists of mostly hexagonal scale plates firmly joined to each other and is responsible for the name "boxfishes". Lips fleshy, teeth moderate, conical or incisiform, generally 6-16 in each jaw; upper jaw not protractile. No fin spines; most fin rays branched; pelvic fins absent; lateral line inconspicuous; branchiostegal rays usually 2+4 but can be 1+4 or 2+3 in Aracaninae. Total vertebrae 9+9 or 10+8 = 18 (9+10 in *A. quadricornis*).

Slow benthic tropical and subtropical fishes attaining up to 60 cm in length; swimming round rocky and coral reefs, on open sand and grass beds down to 90 m. Caught in traps and considered a delicacy in the Caribbean, but not eaten here because of their close relationship with the poisonous Tetraodontidae. Some are known to discharge a poisonous substance, ostracitoxin, that kills fishes in confined quarters but is less toxic to the boxfish itself. In many species the dried-out carapaces are used as ornaments, the "box" retaining its shape; thus many of these quaint boxfishes have been known from the earliest times. Fourteen genera in 2 subfamilies with about 37 species; both subfamilies and 6 genera occur in our area. *Rhynchostracion* Fraser-Brunner, 1935 (with 2 species) may be found in our area and is included in the following key.

KEY TO GENERA

1a Isolated bony plates on C peduncle; C with 9 branched rays ..... (Subfamily ARACANINAE) 2
1b C with 8 branched rays ..... (Subfamily OSTRACIINAE) 3

2a High crest on back; 4 separate plates behind D & A on C peduncle ..... *Strophiurichthys*
2b Back flat; numerous plates on C peduncle behind D & A, the anteriormost joined and articulate with carapace ..... *Kentrocapros*

3a Carapace 4-angled with no ridge on dorsal midline 4
3b Carapace with a ridge or spine on dorsal midline 5

4a Snout normal, not projecting; back gently convex; lateral and pelvic ridges rounded ..... *Ostracion*

Ostracion: body shape.

4b Snout bulbous, projects beyond mouth; back flat or slightly concave; lateral and pelvic ridges sharp ..... *Rhynchostracion*

5a Carapace 5-angled in adults ..... *Lactoria*

Lactoria: body shape.

5b Carapace 3-angled in adults (5-angled in small juveniles) 6

6a Large spine projects forward from each eye ..... *Acanthostracion*
6b No large spines project forward before eyes ..... *Tetrosomus*

Tetrosomus: body shape.

Genus ***Acanthostracion*** Bleeker, 1865

An Atlantic genus with 4 species; 1 has been found at Algoa Bay.

266.1 *Acanthostracion quadricornis*
(Linnaeus, 1758)
PLATE 141

Scrawled cowfish — Bekrapte koeivis

Ostracion quadricornis Linnaeus, 1758: 331 ("India", i.e. West Indies). *Acanthostracion tricornis*: Smith, **SFSA No. 1173***. *Acanthostracion quadricornis*: Tyler, 1965: 2*.

D 10; A 10; P 11; C 10. Carapace with raised crest on back, ventral surface flat, isolated scale plates on C peduncle.

Sometimes some of the dark markings including the parallel bands on cheek are bright blue. Attains 45 cm. Tropical Atlantic; found once at Algoa Bay.

Genus ***Kentrocapros*** Kaup, 1855

Three species (Matsuura & Yamakawa, 1982), 1 in our area.

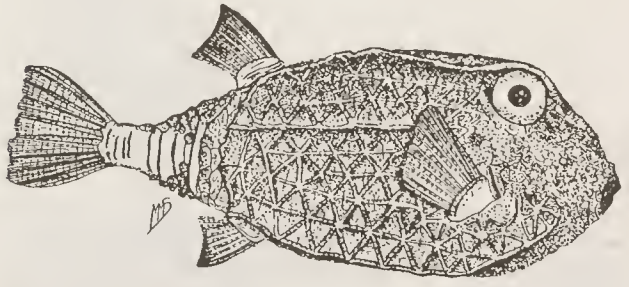
266.2 *Kentrocapros rosapinto*
(Smith, 1949)

Basketfish — Mandjievis

Aracanostracion rosapinto Smith, 1949: 355, Fig. 1 (Delagoa Bay); 1953; **SFSA No. 1172a***. *Kentrocapros rosapinto:* Matsuura & Yamakawa, 1982: 35*.

D 10-11; A 10-11; P 12-13; C 11. Carapace flat between top 2 ridges and between bottom 2 ridges; a slight but distinct horizontal ridge along midlateral part of body. Ridges sharp but without spines; 2 full plates obliquely between upper and midlateral ridges, 4 between midlateral and lower ridges; gill opening almost vertical; lips thickly papillose; single row of 8 thick blunt incisiform teeth in each jaw.

Body brownish grey with numerous dark brown round spots on dorsal part of carapace and C peduncle; a broad silver band joins mate over snout in front of nostrils and reaching mouth, passes below eye, above lateral ridge to C base; a second silver band from corner of mouth to P base. Fins yellow, C with dark posterior margin; lips dark brown, teeth reddish brown. Female differs in body colour; yellowish grey, dark spots on lateral part of carapace above lower P base and no dark margin to C (Matsuura & Yamakawa, 1982). The holotype, 143 mm, from "Delagoa Bay" in the old Lourenço Marques Museum; also known from the Mascarene Ridge between Mauritius and the Seychelles.



266.2 *Kentrocapros rosapinto:* 14.5 cm holotype (S. Mozambique).

Genus ***Lactoria*** Jordan & Fowler, 1903

Three species, all in our area.

KEY TO SPECIES

1a No spine on back; "horns" long and C large ..... *L. cornuta*
1b Spine on back; "horns" short and C normal 2

2a Ridge on back feeble ..... *L. diaphana*
2b Ridge on back strong ..... *L. fornasini*

266.3 *Lactoria cornuta*
(Linnaeus, 1758)
PLATE 141

Longhorn cowfish — Langhoring-koeivis

Ostracion cornutus Linnaeus, 1758: 331 (India). *Lactoria cornutus*: Smith, **SFSA No. 1178***; Sanches, 1963: 185*. *Lactoria cornuta*: Smith & Smith, 1966: 147*.

D 8-9; A 8-9; P 10-11; C 9-10. Easily recognised by the long frontal "horns" and large fan-like tail.

A beautiful fish with cryptic colouring varying from green and olive to orange with blue spots. Attains about 46 cm. Indo-West Pacific, frequently thrown ashore westwards to beyond Mossel Bay.

266.4 *Lactoria diaphana*
(Bloch & Schneider, 1801)
PLATE 141

Spiny cowfish — Stekel-koeivis

Ostracion diaphanus Bloch & Schneider, 1801: 501 (no type locality). *Lactoria diaphana*: Smith, **SFSA No. 1179***; Smith & Smith, 1966: 147*.

D 9; A 9; P 10-11; C 10. Small spine on back and short spines before eyes; belly rounded and ventral ridges considerably extended to give carapace the wide-bottomed shape. Teeth in this species increase in number from 10-12 in upper and 6-7 in lower jaw of specimens less than 30 mm, to 13-16 in upper and 7-9 in lower jaws of large adults.

Attains 25 cm. Common in Indo-West Pacific south to the Cape; adults frequently thrown ashore and semi-transparent young often enter estuaries and when caught in throw nets cause much interest.

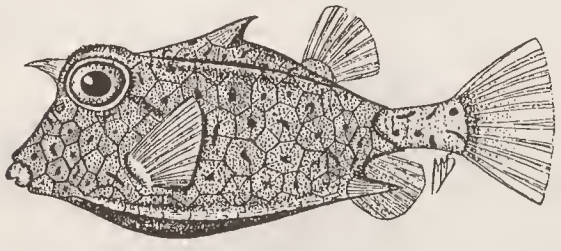
266.5 *Lactoria fornasini*
(Bianconi, 1846)
PLATES 140 & 141

Backspine cowfish — Rugstekel-koeivis

Ostracion fornasini Bianconi, 1846: 115 (Mozambique). *Lactoria fuscomaculata* von Bonde, 1923: 38, Pl. 9, Fig. 1 (Natal; labelled "*fuscolineata*" on plate). *Lactoria fornasini*: Smith, **SFSA No. 1180***; Sanches, 1963: 186*.

D 9; A 9; P 10-11; C 10; characterised by the strong spine on dorsal ridge.

Cryptic colouring. Attains 23 cm or more. Coral and weedy areas of tropical Indo-West Pacific, quite common along tropical east African coast, occasional specimens reach Algoa Bay.



266.5 *Lactoria fornasini:* 12 cm (Inhaca Id.).

Genus ***Ostracion*** Linnaeus, 1758

Characterised by the rectangular carapace, a typical "box"; ridges and back gently rounded; no spines on carapace. About 7 species, 2 in our area.

KEY TO SPECIES

1a Length of anterior (mouth) opening of carapace 0.9-1.2 times horizontal eye diameter; adults with white spots on carapace, C and peduncle ..... *O. meleagris*

1b Length of anterior opening of carapace 1.3-2.0 times horizontal eye diameter; adults with dark-edged pale blue or white spots on carapace and dark spots on C and peduncle ..... *O. cubicus*

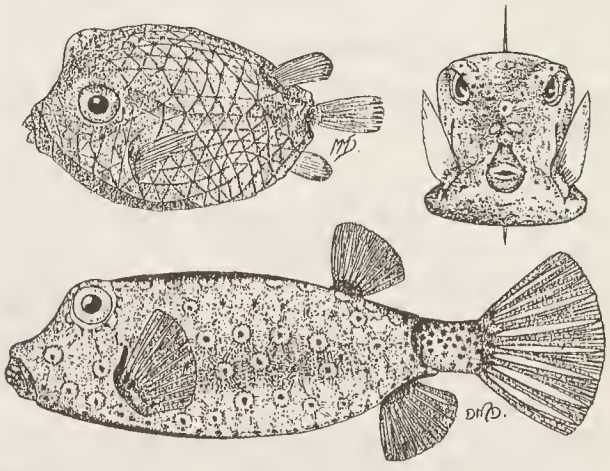
266.6 *Ostracion cubicus*
Linnaeus, 1758
PLATE 141

Boxy — Koffertjie

Ostracion cubicus Linnaeus, 1758: 332 (India); Smith, 1980: 186. *Ostracion tuberculatus* Smith, **SFSA No. 1177***; Smith & Smith, 1966: 147*.

D 8-9; A 9; P 10-11; C 10-12.

A beautiful well-known fish displaying sexual dichromatism: adult males become brilliant yellow with blue dorsal surface, while females are basically olive. Juveniles are bright yellow with large round black spots; with growth, yellow changes to olivaceous and light dark-edged spots appear on carapace. Attains 45 cm. Indo-West Pacific and Red Sea; often thrown ashore along our coast as far west as Knysna. Fresh from the water has an aromatic odour.



266.6 *Ostracion cubicus* top: 3 cm (East London); bottom: 23 cm (E. Cape).

266.7 *Ostracion meleagris*
Shaw, 1796
PLATE 141

Whitespotted boxfish — Witspikkel-koffervis

Ostracion meleagris Shaw, *in* Shaw & Nodder, 1796: Pl. 253 (South Pacific); Smith, 1980: 186. *Ostracion lentiginosus*: Smith, **SFSA No.**

1176*. *Ostracion sebae:* Smith, 1961: 573, **No. 1177a;** Smith & Smith, 1963: 59*.

D 9; A 9; P 10-11; C 10. Sexual dichromatism exists: large males were named *O. sebae* by Bleeker (1851).

Juveniles and females brown or green with white spots; large males with orange bands and spots on side of body. Attains 25 cm. Indo-Pacific, from Africa to Mexico, with juveniles reaching at least to Algoa Bay.

Genus ***Strophiurichthys*** Fraser-Brunner, 1935

Caudal peduncle naked laterally, 2 separate plates on dorsal surface behind D and 2 separate plates on ventral surface behind A. Fraser-Brunner (1941) is uncertain whether *S. robustus* is a distinct species or merely indicates sexual dimorphism in *S. inermis*. The concave profile of the snout, as opposed to the convex profile of *S. inermis*, indicates that of the 2 nominal species, the one from South Africa falls into *S. robustus*. The sex of the specimen from Algoa Bay cannot be determined.

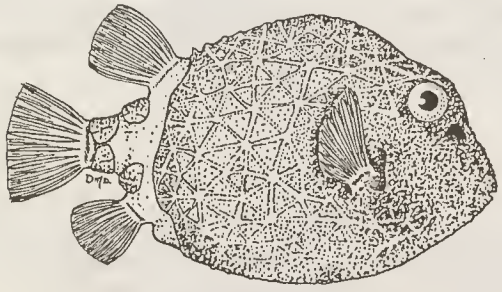
266.8 *Strophiurichthys robustus*
Fraser-Brunner, 1941

Chubby basketfish — Pokkel-mandjievis

Strophiurichthys robustus Fraser-Brunner, 1941: 310, Fig. 2B (Australia); Smith, **SFSA No. 1172***.

D 10; A 10; P 12; C 11; fused plates rather granular.

Live colour unknown, preserved yellowish. Attains 22 cm. Australia, Solomon Ids. and one specimen washed up in Algoa Bay.



266.8 *Strophurichthys robustus:* 10 cm (Algoa Bay).

Genus ***Tetrosomus*** Swainson, 1839

Two species known, both in our area.

KEY TO SPECIES

1a Strong spine on back that diminishes with growth ..... *T. gibbosus*
1b No strong spine on back, at most 1 or 2 small recumbent spines ..... *T. concatenatus*

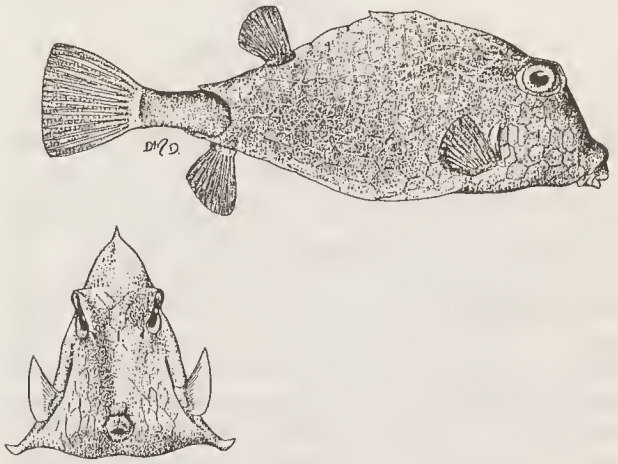
266.9 *Tetrosomus concatenatus*
(Bloch, 1786)
PLATE 141

Triangular boxfish — Driehoek-koffervis

Ostracion concatenatus Bloch, 1786: 101, Pl. 131 (Guamajacuape). *Tetrosomus concatenatus*: Smith, **SFSA No. 1174***; Sanches, 1963: 184*; Smith & Smith, 1966: 146*.

D 9; A 9-10; P 10-11; C 10. Body triangular in cross- section; spines on the 3 ridges diminish with age.

Males illustrated; often with vivid blue lines and spots that fade rapidly. Attains 30 cm. Down to 60 m in Indo-West Pacific; in our area the commonest boxfish, frequently thrown ashore from the Cape eastwards.



266.9 *Tetrosomus concatenatus:* 26 cm (Knysna).

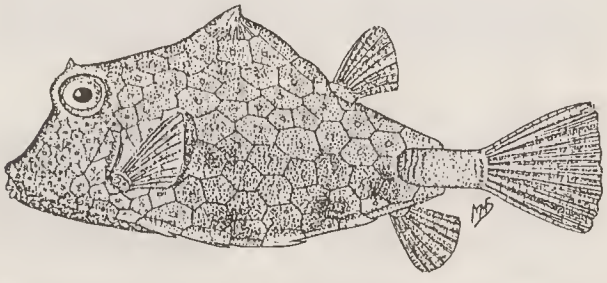
266.10 *Tetrosomus gibbosus*
(Linnaeus, 1758)

Hunchback boxfish — Boggel-koffervis

Ostracion gibbosus Linnaeus, 1758: 332 (India). *Tetrosomus gibbosus*: Smith, **SFSA No. 1175***.

D 9; A 9-10; P 10-11; C 10; the strong spine on the back as well as those on ventral ridges diminish with growth.

Attains 30 cm. Red Sea and tropical Indo-West Pacific south to Durban.



266.10 *Tetrosomus gibbosus:* 22.5 cm (off Durban).

Family No. 267: TRIODONTIDAE

by M.M. Smith

Threetooth puffer **Drietand-blaasop**

Body compressed ventrally, with a huge distensible belly flap between lower jaw and anus; body, head and belly flap covered with small, spiny scales. Teeth fused; upper jaw with median suture, lower jaw without suture, hence the name "threetooth" or *Triodon*. No fin spines; pelvic fins absent; specimens from the western Pacific have a rudimentary spinous dorsal fin set in a groove well in front of the soft-rayed fin.

A single species.

267.1 *Triodon macropterus*

Lesson, 1830

PLATE 142

Threetooth puffer Drietand-blaasop

Triodon macropterus Lesson, 1829: Pl. 4; 1830: 103 (to accompany 1829 illustration; Mauritius); Tyler, 1967: 89*; Smith, 1975: 84. *Triodon bursarius:* Smith, 1953: 522, **No. 1189a*.**

D 10-12; A 9-10; P 14-16; C 12 principal, with 6-9 procurrent rays above and below. Vertebrae 9+11.

Body yellowish brown; belly flap white, with yellow area around the black blotch, which is about midway between lower end of P base and anus. Attains about 54 cm; tropical Indo-Pacific down to 300 m; 1 specimen obtained by depth charge from about 55 m off Inhambane, Mozambique. Rare.

Family No. 268: TETRAODONTIDAE

by M.M. Smith & P.C. Heemstra

Blaasops **Blaasoppe**

Blaasops (or puffers) are so called because they can inflate their body by swallowing water (or air) to form an almost spherical, generally spiny ball to deter predators. The posterior position of the dorsal and anal fins, absence of pelvic fins and ribs, and tough, elastic skin with or without scattered small spinules are all features that permit the unencumbered inflation of the body. Teeth fused into a beak-like dental plate with a median suture giving two "teeth" in each jaw (hence the name *Tetraodon*, meaning four-teeth). Caudal fin usually with 11 rays of which 8 are branched. No fin spines.

Teeth of *Canthigaster natalensis*.

Tetraodontids are circumglobal in tropical and temperate waters; most species are marine, but several enter estuaries and some live only in freshwater. It is most peculiar that fishes can apparently eat blaasops without fatal consequences, but the same species may be poisonous to humans and other mammals. And a rotting blaasop has been reported to kill flies by the hundreds. The skin, liver and particularly the ovaries of most (perhaps all) species of tetraodontids contain a potent alkaloid poison called tetrodotoxin. If the blaasop is fresh and the skin and viscera are carefully removed, the flesh *may* be eaten without ill effect; but, as with eating wild mushrooms, one must know what one is doing, because mistakes in identification of the species or in preparation of the fish may be fatal. In Japan, blaasops (called "fugu") are a gourmet item, and only restaurants with specially trained and licensed cooks are permitted to sell fugu. Nevertheless, a number of deaths from fugu poisoning occur in Japan each year. (In northern Mozambique, the Macuas eat the flesh of blaasops if it is skinned while alive and contains no "eggs". However, Abdula, a Macua sailor who assisted us (J.L.B. & M.M. Smith) in northern Mozambique, said that he never ate blaasops, because despite all the precautions, people still died from eating these fish! - Note by M.M. Smith.)

The taxonomy of this family is in dire need of revision, as several of the genera are poorly defined and many of the species are difficult to distinguish. In recent works, the number of valid genera assigned to this family ranges from 10 to 25. There are about 110-120 species of tetraodontids; 29 species occur in our area. The key to genera and diagnoses of the genera used here may not work for extralimital species.

KEY TO GENERA

1a Snout short, 1.8-3.1 in head length; nasal organ various, but not with a single, inconspicuous nostril on each side of snout 2

1b Snout long, 1.3-1.8 in head; a single, inconspicuous nostril on each side of snout ..... *Canthigaster*

2a Nasal organs covered by a small sac with 2 nostrils 3

2b Nasal organs not covered by a small sac with 2 nostrils 8

3a D 8-10; A 6-9 4

3b D 11-15; A 10-13 7

4a No LL or raised skin ridge along ventrolateral part of C peduncle; mouth below level of upper end of P base 5

4b Ventrolateral part of C peduncle with a LL running along a low skin ridge; mouth at or above level of upper end of P base 6

5a No spinules on head or body ..... *Sphoeroides*

Nostril of *S. pachygaster*

5b Spinules all over head and body except for C peduncle ..... *Tylerius*

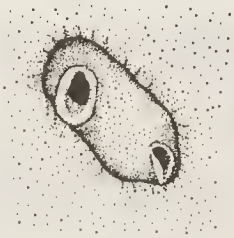
6a Spinules on back, belly and head minute, very numerous, hidden by tiny, scale-like, imbricating lappets; belly covered with imbricating lappets (no pleats); lappets extend along both LL's on peduncle; P 14-16 (not counting tiny nubbin at upper end of fin base) ..... *Amblyrhynchotes*

Nostril of *A. honckenii.*

6b Spinules less numerous, well separated on back and belly; lappets on belly inconspicuous, the skin with numerous longitudinal pleats; no lappets on peduncle; P 13 or 14 (not counting nubbin at upper end of P base) ..... *Torquigener*

7a Interorbital space longer than snout; C peduncle depth subequal to its length ..... *Takifugu*

7b Interorbital space shorter than snout; C peduncle depth ½ or less of peduncle length ..... *Lagocephalus*



Nostril of *L. scleratus.*

8a Nasal organs a disc-shaped, shallow depression on each side of snout; no LL ..... *Pelagocephalus*

Nostril of *P. marki.*

8b Nasal organs not a disc-shaped, shallow depression; LL present 9

9a Nasal organs in the form of a depression with slightly raised margin expanded before and behind into a pair of elongate flaps, or cup shaped with front and rear edges produced into broadly rounded flaps; A 8-9 ..... *Chelonodon*

Nostril of *C. laticeps.*

9b Nasal organs a bifid tentacle, the opposing surface of each tentacle with minute pits; A 9-12 ..... *Arothron*

Nostril of *A. immaculatus.*

Genus ***Amblyrhynchotes*** Duméril, 1855

Mouth at or above a horizontal line through upper end of P base; chin prominent; nasal organ covered by a small sac with 2 nostrils; back and belly with at least a few spinules; gill opening reaching to below middle P rays. Monotypic.

268.1 *Amblyrhynchotes honckenii*

(Bloch, 1795)

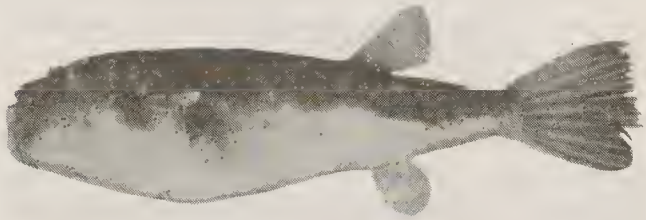
PLATE 142

Evileye blaasop — Boosoog-blaasop

Tetrodon Honckenii Bloch, 1795: 133, Pl. 143 (Tranquebar, India). *Sphaeroides marleyi* Fowler, 1929: 263, Fig. 6 (off Tugela River in about 400 m). *Amblyrhynchotes honckenii:* Smith, **SFSA No. 1198*;** Smith & Smith, 1966: 38*; Tyler, 1980: 293*, 301*, 328*; van der Elst, 1981: 343* (and illustration labelled *Chelonodon patoca* on p. 344).

D 9-10; A 8; P 14-16; C peduncle short, 3.6-4.6 in SL; bony interorbital width 4.2-7.7 in HL and 1.4-2.4 in mouth width. About 42 spinules (each covered by a scale-like lappet) across belly between P bases. Cartilaginous spur on lower edge of gill opening more or less hidden by a patch of long, skin-covered spinules.

Dorsal surface blackish brown, with large yellowish white spots; lateral surface yellow; ventral parts white; P, D and C



268.1 *Amblyrhynchotes honckenii:* 9 cm (Natal).

dusky with yellow tinge; A of breeding female yellow, A in males white. Attains 30 cm. Tropical Indo-West Pacific from South Africa to China; our most common species from the Cape to Natal in tidepools, estuaries and in the sea to depths of 400 m. ("A pest to anglers, tears most baits rapidly, and even cuts lines, apparently quite casually. Highly poisonous, not touched by fishes or sea birds. Eaten by cats with rapidly fatal consequences, is sometimes employed to end nocturnal disturbances. Hands should be washed after handling this fish." - J.L.B. Smith, SFSA.)

Genus *Arothron* Müller, 1841

Body heavy, broad; C peduncle depth about equal to its length; C rounded; no lower LL or skin ridge on peduncle. Nasal organ a bifurcate tentacle. An Indo-Pacific genus with about 10 species, 7 species in our area.

KEY TO SPECIES

1a Margins of C black; no marks on body except dark blotch at P base ..... *A. immaculatus*
1b Margins of C not black, body with various markings 2

2a Anus in black area 3
2b Anus not in black area 6

3a Rounded black area surrounds gill opening and P base; subparallel fine lines along belly even in adults ..... *A. inconditus*
3b P base not surrounded by black area 4

4a Body with dark spots 5
4b Body with fine lines on back and a dark reticulated pattern below P ..... *A. mappa*

5a Upper part of body spotted, ventral part in adults uniform, in juveniles with wide bands ..... *A. stellatus*
5b Whole body with irregularly spaced dark blotches ..... *A. nigropunctatus*

6a Dark body covered with small white spots, no stripes or bars ..... *A. meleagris*
6b White spots on head, back and sides, 1 or 2 yellow rings and several yellow spots round P; 2-5 bars across sides, always a short dark bar below eye and another below P ..... *A. hispidus*

268.2 *Arothron hispidus*
Linnaeus, 1758
PLATE 142

Whitespotted blaasop — Witspikkel-blaasop

Tetraodon hispidus Linnaeus, 1758: 333 (India). *Arothron hispidus:* Smith, SFSA No. 1207*; Sanches, 1963: 182*; Shen, Lim & Ting, 1975: 166*.

D 10; A 10; P 17-19.

Dark bars on side of head and below P and light spots are characteristic and remain on preservation. Juveniles from the Pacific have longitudinal dark stripes on the belly, but these are lacking on juveniles from our area. Attains about 50 cm. Tropical Indo-West Pacific, south to Knysna; juveniles plentiful in weedy areas of estuaries.

268.2 *Arothron hispidus:* 24 cm (Mafia Id.).

268.3 *Arothron immaculatus*
(Bloch & Schneider, 1801)
PLATE 142

Blackedged blaasop — Swartrand-blaasop

Tetrodon immaculatus Bloch & Schneider, 1801: 507 (no locality; on Lacepède, 1798: 486, Pl. 24, Fig. 1). *Arothron immaculatus:* Smith, SFSA No. 1203*; Sanches, 1963: 181*; Shen, Lim & Ting, 1975: 157*; Tyler, 1980: 294*.

D 9-10; A 9-10; P 16-17.

Black edge of C and blotch at P base are characteristic and remain on preservation. Attains 30 cm. Indo-West Pacific, south to Port Alfred; especially plentiful in weedy areas of our estuaries.

268.3 *Arothron immaculatus:* 10.5 cm SL (Transkei).

268.4 *Arothron inconditus*
Smith, 1958

Bellystriped blaasop — Pensstreep-blaasop

Arothron inconditus Smith, 1958: 159, Pl. 2, Figs. D & E (Algoa Bay); 1961: 573, No. 1207a*.

D 10-12; A 10-12; P 18-19.

Colour drab, dark; belly pale, with dark lines from above A to chin (20 dark lines on juveniles of 6 cm to over 50 on adults of 40 cm); anus, P base and gill opening in rounded black areas, and a black bar each side of angle of mouth

along lower lip; fins dusky except rear edge of C narrowly light in juveniles. Attains at least 40 cm. A large heavy blaasop, not uncommon along our south coast from Knysna to East London.

268.4 *Arothron inconditus*: 31 cm holotype (Algoa Bay).

268.5 *Arothron mappa*
(Lesson, 1827)
PLATE 142

Map blaasop — Kaart-blaasop

Tetrodon mappa Lesson, 1827: 102, Pl. 5 (Doreh Bay, New Guinea). *Arothron mappa*: Smith, 1958: 158*; 1961: 537, **No. 1206a;** Shen, Lim & Ting, 1975: 170*.

D 11-12; A 11; P 19.

Body heavy but beautifully coloured; black area round anus and black reticulations below P remain on preservation. Attains 55 cm. Indo-West Pacific, south to Natal.

268.6 *Arothron meleagris*
(Bloch & Schneider, 1801)

Guineafowl blaasop — Tarentaal-blaasop

Tetrodon meleagris Bloch & Schneider 1801: 507 (Asia). *Arothron meleagris*: Smith, 1958: 158; Smith, 1980: 186.

D 10-11; A 11; P 16-18.

Whole fish dark, covered with numerous small white spots; anus not in dark ring. Attains 35 cm. Indo-Pacific, south to Durban.

268.6 *Arothron meleagris*: 30 cm (Seychelles).

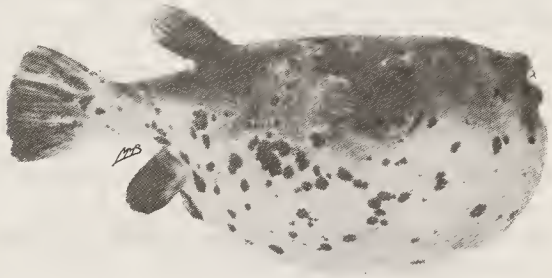
268.7 *Arothron nigropunctatus*
(Bloch & Schneider, 1801)
PLATE 143

Blackspotted blaasop — Swartspikkel-blaasop

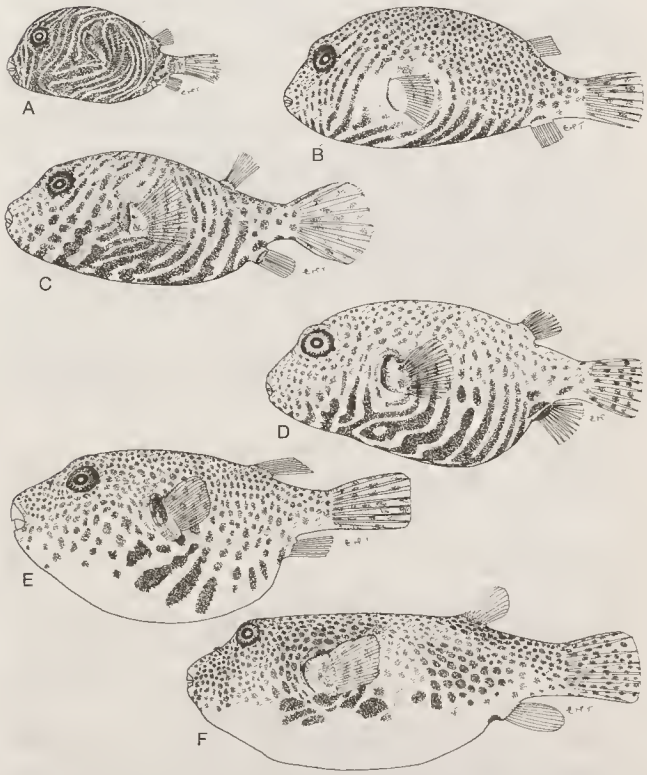
Tetrodon nigro-punctatus Bloch & Schneider, 1801: 507 (Tranquebar, India). *Arothron nigropunctatus*: Smith, **SFSA No. 1204***; 1958: 160; 1961: 573, **No. 1204;** Shen, Lim & Ting, 1975: 159*; Tyler, 1980: 339*. *Arothron citrinellus*: Smith, 1958: 160; 1961: 573, **No. 1204a.**

D 10-11; A 10-12; P 18-19.

Large black spots on body remain on preservation; the yellow variety, or xanthic form, originally known as *Arothron citrinellus* (Günther, 1870), is especially beautiful and easily recognised under water. Attains 30 cm. Indo-West Pacific south to Algoa Bay.



268.7 *Arothron nigropunctatus*: 25 cm (N. Mozambique).



268.8 *Arothron stellatus*: A. 2.5 cm (E. of Port Alfred); B. 6.5 cm (Inhaca Id.); C. 7 cm (Port Alfred); D. 7 cm (Inhaca Id.); E. 8.5 cm (S. Mozambique); F. 17 cm (Inhaca Id.).

268.8 *Arothron stellatus*
(Bloch & Schneider, 1801)
PLATE 142

Star blaasop — Ster-blaasop

Tetrodon lagocephalus Var. *stellatus* Bloch & Schneider, 1801: 503 (Mauritius). *Arothron stellatus:* Smith, **SFSA No. 1205*;** Shen, Lim & Ting, 1975: 161*; Tyler, 1980: 304*, 316*, 332*, 339*. *Arothron aerostaticus:* Smith, **SFSA No. 1206*;** 1958: 158.

D 10-12; A 10-11; P 17-19. The juveniles are firm, almost rubbery, but in adults the body is flabby and heavy.

Considerable changes in colour patterns occur in this species: not only do the juveniles have the belly with dark stripes, which become spots in adults, but spots on the fins of adults can be present or absent. Markings remain on preservation. Attains at least 90 cm. Indo-West Pacific, occasionally reaches Knysna.

Genus ***Canthigaster*** Swainson, 1839

Body and head somewhat compressed; single inconspicuous nostril; LL usually not apparent; C truncate or slightly rounded; head and body with scattered tiny prickles evident when body inflated. These puffers can raise up a ridge of skin along the midline of the back and belly.

Allen and Randall (1977) recognise 22 species from the Indian and Pacific oceans: 2 endemic to Red Sea, 9 in Pacific, and of the 11 species known from the Indian Ocean, *C. investigatoris* (2 specimens from Andaman Ids.) and *C. tyleri* (Indian Ocean islands) have not yet been found here. Although the classification of this genus depends mainly on colour, and illustrations are given of all species, Allen and Randall's key is adapted to the 9 species from our area. *C. natalensis* (Günther, 1870) was recognised as a valid species by Allen and Randall (1977), but it is here regarded as a synonym of *C. amboinensis*.

KEY TO SPECIES

1a D 11-12; A 11 ..... *C. amboinensis*
1b D 8-10; A 8-10 2

2a C with spots or vertical lines (entire, wavy or broken) ..... *C. solandri*
2b C without spots or vertical lines 3

3a Upper portion of head and body with 2-4 dark bars, wider than pale interspaces 4
3b Upper portion of head and body without bars 5

4a 1st 2 body bars continue below middle of sides; bar on head largely behind interorbital; D 9 (rarely 10) ..... *C. valentini*
4b 1st 2 body bars end at middle of side; bar on head confined largely to interorbital; D 9-10 ..... *C. coronata*

5a Side of body with 1 or 2 dark longitudinal bands (sometimes fragmented) 6
5b Side of body without longitudinal bands 7

6a Upper back more or less uniform brown; 1 or 2 longitudinal bands reach snout; A 9 (see also 8b) ..... *C. smithae*
6b Upper back with vermiculated pattern; longitudinal bands join round front of gill slit ..... *C. rivulata*

7a Body with uniform pattern of rounded white, bluish, brown or grey spots, largest up to half pupil size, usually more than 12 from D origin to A origin; back generally same colour as sides; dark spot or ocellus (sometimes only partially developed) frequently present at D base ..... *C. janthinopterus*
7b Body without uniform pattern of rounded spots; back generally darker; D 9-10; A 8-9 8

8a P 15-16; less than 30 small brown dots on side of C peduncle; dark spot or ocellus present at D base ..... *C. bennetti*
8b P 16-17; no spots on side of C peduncle; no blotch at base of D ..... *C. smithae*

268.9 *Canthigaster amboinensis*
(Bleeker, 1865)
PLATES 135 & 140

Spotted toby — Gespikkelde tobie

Psilonotus amboinensis Bleeker, 1865 : 180 (Ambon). *Tetrodon amboinensis* Var. *natalensis* Günther, 1870: 303 (Natal). *Canthigaster amboinensis:* Smith, **SFSA No. 1211;** Allen & Randall, 1977: 499*; Tyler, 1980: 311*. *Canthigaster natalensis:* Allen & Randall, 1977: 500*.

D 11-12; A 11; P 16-17.

Colour in alcohol: brown, generally with numerous pale spots with dark centres and some dark spots between the others; lines on head and spots on cheeks dark or white; D, A & P pale with dark bases; C brown usually with pale or dark spots on base. Attains 15 cm. Lower reaches of surge zone; one of the faster swimming species of the genus; eats mostly small invertebrates. Tropical Indo-Pacific to eastern Pacific and in our area south to Durban.

268.10 *Canthigaster bennetti*
(Bleeker, 1854)
PLATE 143

Exquisite toby — Mooi tobie

Tropidichthys Bennetti Bleeker, 1854: 504 (Amboina). *Tropidichthys oxylophius* Smith, 1931: 159, Pl. 16 (Port Alfred). *Canthigaster bennetti:* Smith, 1961: 573, **No. 1210a;** Allen & Randall, 1977: 488*.

D 9-10; A 8-9; P 15-16.

Colour in alcohol: brownish above, paler below, brown and white spots on head, back and sides; ocellus at base of D sometimes indistinct; lines from eye brown, also several broken vertical lines just behind mouth; faint brown stripe from chin to anus; upper C peduncle with one or more indistinct stripes (somtimes broken). C pale, sometimes brownish basally. Attains 10 cm. In shallow sandy areas down to 10 m; eats mainly algae but also sponges and other invertebrates. Tropical Indo-West Pacific south to Port Alfred.

268.11 *Canthigaster coronata*
(Vaillant & Sauvage, 1875)
PLATE 140

Saddle toby — Saal-tobie

Tetradon (Anosmius) coronatus Vaillant & Sauvage, 1875: 286 (Hawaiian Ids.). *Canthigaster coronatus:* Allen & Randall, 1977: 486*; Smith, 1980: 186.

D 9-10; A 9-10; P 16-17.

Colour in alcohol: pale tan with dark brown bars, pale part of head and sides with numerous brown (or light) spots; lines from eye dark; dark upper and lower margins of C can be brownish. Attains 13 cm. Found in depths of 6 - 100 m. Eats mainly invertebrates, especially molluscs. Tropical Indo-West Pacific including Hawaii and the Red Sea, south to Sodwana Bay.

268.12 *Canthigaster janthinoptera*
(Bleeker, 1855)
PLATE 140

Honeycomb toby — Heuningkoek-tobie

Tropidichthys janthinopterus Bleeker, 1855: 429 (Amboina). *Canthigaster janthinopterus:* Smith, 1961: 573, **No. 1209a***; Allen & Randall, 1977: 495*.

D 9-10; A 9-10; P 16-18.

Colour in alcohol: brownish, spots white; dark ocellus at D base sometimes present; C tan to brownish; D, A and P translucent with rays thinly outlined dark. Attains 9 cm. Indo-West Pacific south to Transkei.

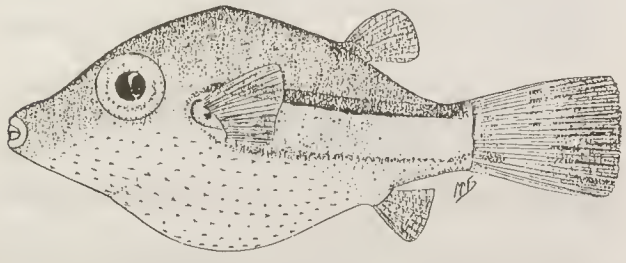
268.13 *Canthigaster rivulata*
(Schlegel, 1850)

Doubleline toby — Dubbellyn-tobie

Tetraodon rivulatus Schlegel, in Temminck & Schlegel, 1850: 285, Pl. 124, Fig. 3 (Nagasaki Bay, Japan). *Canthigaster caudofasciatus:* Smith, **SFSA No. 1209***. *Canthigaster rivulata:* Allen & Randall, 1977: 492*.

D 9-10; A 9-10; P 16-18.

Colour in alcohol: brown, paler below; 2 longitudinal dark bands along each side join in front of gill slit; lower band faint or absent; ventral ½ of body with small dark spots; C with dark stripes; dark blotch at D base. Attains about 20 cm. On reefs down to 100 m in Hawaii. Indo-West Pacific, south to Natal.



268.13 *Canthigaster rivulata.* 3 cm (E. Cape).

268.14 *Canthigaster smithae*
Allen & Randall, 1977
PLATE 140

Bicolored toby — Tweekleur-tobie

Canthigaster rostratus (*non* Bloch): Smith, 1965: 4*. *Canthigaster smithae* Allen & Randall, 1977: 489, Fig. 5C (Mauritius); Smith, 1980: 186.

D 9-10; A 9; P 16-18.

Colour in alcohol: dark brown dorsally, white below; C peduncle and sides behind P covered with dark dots; dark lines around eye resemble eyelashes. Dark stripe sometimes present on midventral line of belly; D, A, P and C translucent with dark-edged rays; upper and lower edge of C dark. Attains 13 cm. Southwestern Indian Ocean, Agalega Id., Mauritius to Durban. Rare.

268.15 *Canthigaster solandri*
(Richardson, 1844)
PLATE 143

False-eye toby — Valsoog-tobie

Tetraodon solandri Richardson, 1844: 125, Pl. 57, Figs. 4-6 (Polynesia). *Canthigaster margaritatus* (*non* Rüppell): Smith, **SFSA No. 1210***; Sanches, 1963: 183*. *Canthigaster solandri:* Allen & Randall, 1977: 481*; Smith, 1980: 186.

D 8-10; A 8-10; P 16-17.

Colour in alcohol: dark reddish brown dorsally with numerous pale greyish spots, uniformly tan ventrally; darkish ocellus generally visible at base of D; 8-10 dark lines radiate from eye, sometimes fine brown speckling below eye; C brown with pale spots, outer rows may coalesce to form wavy lines. Attains 11 cm. Common; prefers shallow rocky bottoms, coral reefs, wharf pilings etc. down to 16 m. Hawaii, Indo-West Pacific south to Port Elizabeth.

268.16 *Canthigaster valentini*
(Bleeker, 1853)
PLATE 143

Model toby — Model-tobie

Tetraodon Valentini Bleeker, 1853: 130 (Amboina). *Canthigaster valentini:* Smith, **SFSA No. 1208***; Allen & Randall, 1977: 484*.

D 9-10; A 9; P 16-17.

Markings remain in alcohol. Attains 11 cm. Common around coral reefs in 1 - 20 m. (In the field at Zanzibar it was some time before I realised that the less common filefish, *Paraluteres prionurus,* that mimicked this toby so well, was

swimming around with *C. valentini*. It was only the presence of the spine, very seldom shown, and the longer D and A that made me realise a filefish was also present. This mimicry of the toxic toby by the more defenceless *Paraluteres prionurus* is probably to protect it from predators. – M.M. Smith.) Indo-West Pacific, south to Durban.

Genus ***Chelonodon*** Müller, 1839

Gill opening not reaching below middle of P base; mouth below a horizontal line through upper end of gill opening; C truncate, with rounded corners. Upper LL joins lower behind A, and lower LL continues forward above A; no lateral cutaneous fold along peduncle. *Chelonodon patoca* (Hamilton-Buchanan, 1822), with whole back and belly spiny, was recorded by Smith (**SFSA No. 1201***), but it apparently does not occur west of India (Smith, 1958: 156) and is therefore removed from our fauna list. Four species; 2 in our area.

KEY TO SPECIES

1a No spines on back; nasal organ cup-like, with front and rear margins produced into flaps ..... *C. pleurospilus*
1b Spines on front of back; nasal organ a depression with slightly raised margin expanded before and behind into a pair of elongate, triangular flaps ..... *C. laticeps*

268.17 *Chelonodon laticeps*
Smith, 1948
PLATE 143

Bluespotted blaasop — Blouspikkel-blaasop

Chelonodon laticeps Smith, 1948: 344, Figs. 3 (Xora mouth); **SFSA No. 1202***; 1958: 156; Hill, 1966: 23. *Chelonodon patoca* (? *non* Hamilton-Buchanan): Smith, **SFSA No. 1201** (not illustration).

D 9-10; A 8-9; P 15-17; vertebrae 9+11. Body rather short; D and A pointed; spinules in regular lines along belly, those on back from interorbital to above P, rest of fish smooth. *C. patoca* is illustrated by Day (1878: Pl. 182, Fig. 4) with spinules extending from the eyes to the D; in none of our 11 specimens of *C. laticeps* do the spinules extend even ½ the distance from eyes to D.

Large bluish spots (can be whitish in larger specimens) fade to white on preservation, but 4 vague darker bars, first across eye and last on C peduncle tend to remain. Attains about 20 cm. In quiet water among weed from 6°S to Xora River mouth.

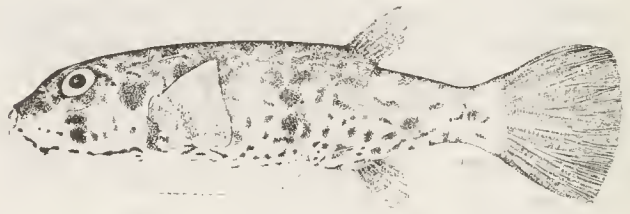
268.18 *Chelonodon pleurospilus*
(Regan, 1919)
PLATE 143

Blaasop beauty — Fraai blaasop

Tetrodon pleurospilus Regan, 1919: 203 (Durban). *Sphaeroides pleurospilus:* Smith, **SFSA No. 1191***. *Chelonodontops pulchellus* Smith, 1958: 156, Plate 2, Figs. A & B (Xora River mouth); 1961: 573, **No. 1202a***.

D 8-9; A 8; P 15-16; vertebrae 9+10. Spinules on belly from below eye almost to anus, not in regular lines.

Colour in alcohol: dark brown dorsally, light tan ventrally, green lines completely disappear into dark brown back; silvery areas along flank bluish, brown bars still visible on flank below P; all fin rays tan, distal margin of C membrane dusky. Lateral spots more numerous and prominent in adults. Attains about 20 cm. Xora mouth to Durban. Rare; we have seen only Regan and Smith's types, plus 2 other intermediate-sized specimens.



268.18 *Chelonodon pleurospilus:* 15 cm holotype (Durban).

Genus ***Lagocephalus*** Swainson, 1839

Body elongate; D and A pointed, the minute ray at the origin of these fins is usually hidden by skin and thus not included in the counts given here; C emarginate or truncate. Lower LL not apparent, but on well-preserved specimens there is a low ridge of skin along the ventrolateral part of the peduncle. Pelagic puffers occurring in all major oceans. This genus needs revision; it seems that there are at least 7 species, with 5 in our area.

KEY TO SPECIES

1a No spinules on dorsal surface of head and body 2
1b Spinules present on dorsal surface of body and head 3

2a D 12-13; distance from D origin to C base 1.8-2.3 times in distance from front of upper jaw to D origin; fins pale, except D and C dusky distally ..... *L. inermis*
2b D 13-15; distance from D origin to C base 2.2-3.0 in that from D origin to front of upper jaw; fins dark, except lower ⅓ of P white ..... *L. lagocephalus*

3a Spinules on dorsal surface of body extend to or beyond D origin 4
3b Spinules on dorsal surface extend only about halfway from interorbital region to D origin ..... *L. guentheri*

4a Dorsal surface of head and body greenish, with black spots; body elongate, its greatest depth (uninflated) 4.5-4.9 in SL ..... *L. scleratus*
4b Dorsal surface without black spots; body depth 2.9-3.4 in SL ..... *L. lunaris*

268.19 *Lagocephalus ?guentheri*
Ribeiro, 1915
PLATE 143

Blackback blaasop — Swartrug-blaasop

?*Tetrodon lunaris* Var. B Günther, 1870: 275 (Brazil). *Lagocephalus güntheri* Ribeiro, 1915: 5 (on Günther, 1870). *Gastrophysus spadiceus*

(*non* Richardson): Smith, **SFSA No. 1196***. *Lagocephalus gloveri* Abe & Tabeta, 1983: 2, Pls. 1-3 (Iiō City, Japan); Abe et al., 1984: 3.

D 12-14; A 12-14; P 16-18; vertebrae 18 (2 fish) or 19 (11). Black peritoneum of juveniles often shows through white skin of belly; peritoneum of adults grey. Spinule patch on dorsum V-shaped posteriorly, ending well short of D origin.

Colour of adults from offshore: greenish black dorsally, flanks greyish silver; belly, A and underside of peduncle white; D and C dusky yellow; tips of C lobes white; P yellowish brown, tip of upper rays dusky. Colour of adults from inshore sandy areas: pale grey dorsally, with dark blotch at base of D, a pair of dark bands across dorsum just behind eyes and another halfway to D; dark blotch on top of peduncle at C base; D pale grey, A white; C dusky, darker distally, the corners white.

Attains at least 41 cm. Known in our area from off Tugela River to Algoa Bay. If our synonymy is correct, this species also occurs off Brazil and Japan. Similar to *L. spadiceus* (Richardson, 1845), but in *spadiceus* the rear margin of C is supposed to be entirely white and the patch of spinules on dorsum narrows posteriorly to a thin mesial band that extends almost to D origin.

268.20 *Lagocephalus inermis*
(Schlegel, 1850)
PLATE 143

Smooth blaasop — Gladde blaasop

Tetraodon inermis Schlegel, *in* Temminck & Schlegel, 1850: 278, Pl. 122, Fig. 2 (Japan). *Lagocephalus inermis:* Smith, **SFSA No. 1192***; Tyler, 1980: 292*, 326*.

D 12-13; A 10-12; P 16-17; minute, embedded spinules on belly from below eye almost to anus, otherwise body and head smooth; C slightly concave.

Greenish or dark grey above, silvery white below; gill opening black internally; peritoneum pale grey. Attains 56 cm. Indo-Pacific, south to Algoa Bay. *L. inermis* is very similar to the Atlantic species *L. laevigatus* Linnaeus, which reaches southern Angola. *L. laevigatus* has D 12-15, A 11-14 and lower P rays blackish. These 2 taxa are considered subspecies by some authors.

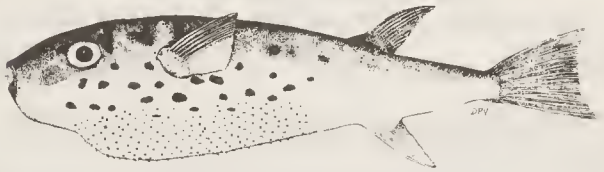
268.21 *Lagocephalus lagocephalus*
(Linnaeus, 1758)
PLATE 143

Oceanic blaasop — Opesee-blaasop

Tetraodon lagocephalus Linnaeus, 1758: 332 (India and Jamaica). *Lagocephalus lagocephalus:* Smith, **SFSA No. 1193***; Smith & Smith, 1966: 39*; Shipp, 1974: 24*; Tyler, 1980: 292*, 324*.

D 13-15; A 11-13; P 13-16; body smooth except for well-developed spinules on belly from chin to anus. In adults lower C lobe is longer than upper.

Adults dark green, brownish grey, or blue dorsally, white below. Juveniles to about 18 cm have about 9 uniform bars on back from eye to D; dark spots on front and middle of belly and on side near P base in fish less than 33 cm. One of the largest species, attains at least 60 cm. Circumglobal in warm and temperate seas, Walvis Bay to Beira, primarily pelagic but occasionally entering estuaries. Suspected responsible for fatal poisoning of almost a whole family at Port Elizabeth.



268.21 *Lagocephalus lagocephalus:* 15 cm SL (E. Cape).

268.22 *Lagocephalus lunaris*
(Bloch & Schneider, 1801)
PLATE 144

Moontail blaasop — Maanstert-blaasop

Tetrodon lunaris Bloch & Schneider, 1801: 505 (Malabar, India). *Gastrophysus lunaris:* Smith, **SFSA No. 1195***. *Lagocephalus lunaris:* Tyler, 1980: 266*, 326*.

D 11-13; A 10-12; P 16-18; snout, sides and C peduncle smooth, spinules on back from nostrils to D.

Attains 30 cm. Indo-West Pacific south to Knysna.

268.23 *Lagocephalus scleratus*
(Forster, 1788)
PLATE 144

Silverstripe blaasop — Silwerstreep-blaasop

Tetrodon sceleratus Forster, *in* Gmelin, 1788: 1444 (American and Pacific oceans). ?*Tetrodon Blochii* Castelnau, 1861: 75 (Kalk Bay). *Gastrophysus sceleratus:* Smith, **SFSA No. 1194***. *Lagocephalus scleratus:* Tyler, 1980: 266*, 326*.

D 10-12; A 8-11; P 15-18; body and C peduncle elongate, depressed. Spinules on back extend past D almost to C.

Dorsal surface greenish with dark brown or black spots; silver band along sides from mouth to C; belly white; silver blotch in front of eye; P base and inside of gill opening black. A beautiful large fish (see illustration for live colours) attaining at least 85 cm and 7 kg. Indo-West Pacific, occasional specimens occur between the Cape and Natal. A poisonous fish: in 1774 Captain Cook was reported to have eaten some of this fish in Australia and became seriously ill, narrowly escaping death.

Genus ***Pelagocephalus*** Tyler & Paxton, 1979

Nasal organ a large, disc-shaped, shallow depression, the floor with irregular corrugated folds of loose skin, the rim

with narrow inner border of transparent skin. Two species, *P. coheni* Tyler & Paxton, 1979 from Norfolk Id. in the Pacific differs from ours in having a LL, smaller nasal organs (diameter of nasal organ contained twice in distance between them), body depth (uninflated) 5-6 in SL, and dermal spines only on belly.

268.24 *Pelagocephalus marki*
Heemstra & Smith, 1981
PLATE 144

Rippled blaasop — Rimpel-blaasop

Pelagocephalus marki Heemstra & Smith, 1981: 911, Figs. 1-3 (Port Alfred).

D 9; A 9; P 14; body depth (uninflated) 2.6-3.0 in SL; vertebrae 8+9 = 17; diameter of nasal organ 1.5-1.7 in distance between them and 2.9-4.0 in eye diameter; no LL; spinules all over except snout and C peduncle; gill opening a crescent before upper 7-10 P rays.

Emerald green reticulations on back and C peduncle giving appearance of whole back pale luminous green fading into black laterally; ventral surface bright silver. Colour in alcohol: dark dorsally, with vermiculated pale lines, paler on sides and lower head, belly whitish or grey; scattered dark specks on top and sides of head and body; margins of nostril and orbit white; upper half of mouth opening also with pale border; C dusky, darker distally; other fins pale, transparent. Peritoneum dark grey. Attains 12 cm. Port Alfred to Knysna; reported from New Zealand (Hardy, 1982). Probably a pelagic species.

Genus ***Sphoeroides*** Anonymous, 1798

Only one LL; no raised skin fold along ventrolateral part of C peduncle; nasal organ covered by a small sac with 2 nostrils; C truncate; A origin at or behind vertical from last D ray. Vertebrae 17-20. Numerous Atlantic species, a few Indo-Pacific, only 1 in our area.

268.25 *Sphoeroides pachygaster*
(Müller & Troschel, 1848)
PLATE 144

Blunthead blaasop — Stompkop-blaasop

Tetrodon pachygaster Müller & Troschel, *in* Schomburgk, 1848: 677 (Barbados). *Spheroides dubius* von Bonde, 1923: 40, Pl. 2, Fig. 3 (Natal); Winterbottom, 1974: 8. *Sphaeroides cutaneus:* Smith, **SFSA No. 1190***. *Sphoeroides pachygaster:* Shipp, 1974: 44*; Tyler, 1980: 291*, 300*, 323*.

D 8-9; A 8-9; P 14-17; skin of ventral surface of head and body wrinkled.

Uniform brownish, white ventrally; sometimes a few dark spots on flanks. Peritoneum white. Attains 26 cm. Circumglobal, a deep-water species from the Cape to Beira down to 200 m. Feeds mainly on squid.

Genus ***Takifugu*** Abe, 1949

Two LL, lower along the ventrolateral part of peduncle on a low skin ridge; A origin below front ½ of D; C truncated; nasal organs covered by a small sac with 2 nostrils. Monotypic.

268.26 *Takifugu oblongus*
(Bloch, 1786)
PLATE 144

Lattice blaasop — Ruitjies-blaasop

Tetrodon oblongus Bloch, 1786: 6, Pl. 146, Fig. 1 (Coromandel, India). *Torquigener oblongus:* Smith, **SFSA No. 1197***. *Fugu oblongus:* Tyler, 1980: 303*, 315*, 331*.

D 12-14; A 10-12; P 14-16; belly, top of head, and front part of back with spinules.

Brownish above with pale spots, yellowish white below; narrow dark bars on sides. Attains about 40 cm. Indo-West Pacific south to Natal, rare.

Genus ***Torquigener*** Whitley, 1930

At least 16 species; 2 species that occur in our area are here tentatively assigned to this genus.

KEY TO SPECIES

1a C peduncle length 3.5-3.7 in SL; bony interorbital width 9-11 in head length; mouth width/interorbital = 2.8-3.3 ..... *T.* sp.

1b C peduncle length 4.6-5.4 in SL; bony interorbital width 5-7 in head; mouth width/interorbital = 1.1-1.8 ..... *T. hypselogeneion*

268.27 *Torquigener hypselogeneion*
(Bleeker, 1852)
PLATE 144

Dwarf blaasop — Dwerg-blaasop

Tetraodon hypselogeneion Bleeker, 1852: 24 (Ambon, Indonesia). *Amblyrhynchotes hypselogeneion:* Smith, **SFSA No. 1199***. *Torquigener hypselogeneion:* Hardy, 1983: 65*.

D 8-9; A 7-8; P 13-14; spinules on belly recessed, 14-17 between P bases. Lower edge of gill opening with a cartilaginous spur overlaid by 2 or 3 short spinules.

268.27 *Torquigener hypselogenion:* 6.5 cm SL (Knysna).

Dorsal surface dark brown with pale greenish spots, separated from white ventral surface by a pale yellow zone. Attains 10 cm. Indo-West Pacific from Knysna to Samoa. Not common in our area.

268.28 *Torquigener* sp.

Slender blaasop — Slank blaasop

D 8-9; A 7; P 14; spinules across belly between P bases 9-11. Lower edge of gill opening with a cartilaginous spur covered by several long, skin-covered spinules.

Colour in alcohol: dorsal surface greyish brown, with small pale spots and much smaller pale dots; white stripe along posterior part of upper LL; belly and fins white. Attains 11+ cm. Known in our area from only 2 specimens collected off Durban from a sand dredger.

268.28 *Torquigener* sp.: 9 cm SL (Natal).

Genus ***Tylerius*** Hardy, 1984

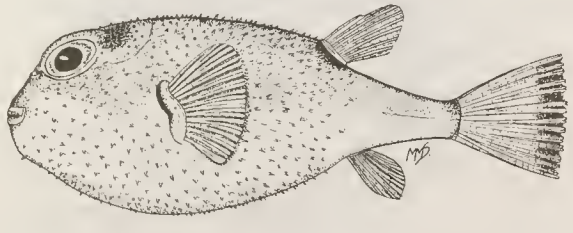
Monotypic.

268.29 *Tylerius spinosissimus* (Regan, 1908)

Spiny blaasop — Stekel-blaasop

Spheroides spinosissimus Regan, 1908: 253, Pl. 31, Fig. 5 (Saya de Malha Bank). *Spheroides unifasciatus* von Bonde, 1923: 39, Pl. 2, Fig. 1 (off Umhloti River, Natal; 57 fms). *Amblyrhynchotes spinosissimus:* Smith, **SFSA No. 1191*;** Hardy, 1981: 313*.

D 8-9; A 6-7; P 14-15; C longer than distance from A origin to C base; body width greater than its depth; spinules all over head and body except for C peduncle; lips papillose.



268.29 *Tylerius spinosissimus:* 7.5 cm (East London).

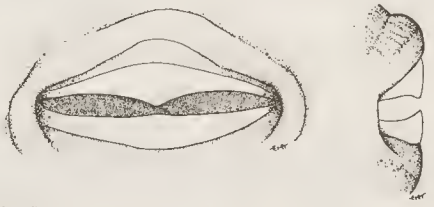
Grey; dark blotch above and behind eye, another at base of D; fins pale; rear margin of C black; black specks all over belly. Attains 12 cm. Indo-West Pacific, south to East London; rare in our area.

Family No. 269: DIODONTIDAE

by J.M. Leis

Burrfishes and porcupinefishes — **Klitsvisse en penvisse**

Body globular and inflatable. Scales modified into massive spines with large subdermal bases. Gill opening a small vertical slit immediately before pectoral fin base. Dorsal and anal fins rounded and set far back on body; no fin spines. Pelvic fins absent. Teeth fused into a single beak-like plate in each jaw without a median suture. Lateral line inconspicuous. Vertebrae 18-22.



Teeth of *Diodon liturosus*

Moderate-sized fishes (some species attain 1 m) occurring worldwide in temperate and tropical waters. Juveniles usually pelagic, coloured differently from adults and often thrown ashore during storms; 2 species known in our area only from pelagic stages. Benthic adults usually associated with reefs or shelf waters to 100 m; feed on hard-shelled invertebrates. Reputed to be poisonous, but some species safely eaten in Pacific. Identification of juveniles less than 5 cm is difficult because all species have similar colour patterns at this size, and spines tend to be small and all of similar size. Mobility and position of spines are the best characters to use in small specimens. About 6 genera with a total of 19 species; 8 species in 4 genera in our area.

KEY TO GENERA

1a Spines usually longer than eye diameter and slender, basically round in section; spines on head erectile 3
1b Spines shorter than eye, triangular to flattened in section; spines on head fixed in an erect position 2

2a A small spine on top of C peduncle; spines short, some reduced to subdermal bases only; usually 10 C rays; fins spotted in adults; nostril of adults an open, pitted cup (juveniles with nostril like *Cyclichthys*) ..... *Chilomycterus*
2b No spines wholly on C peduncle; spines moderate in length; usually 9 C rays; fins never spotted; nasal organ always a short tube with 2 openings ..... *Cyclichthys*

3a All spines (except a few around gill opening, D base, and on C peduncle) erectile ..... *Diodon*
3b Most spines on head and belly erectile, those on back and sides fixed ..... *Lophodiodon*
(*Dicotylichthys punctulatus* Kaup, 1855 has been reported from southern Africa (Smith, **SFSA No. 1185**) but is apparently an Australian endemic. This species will key here if it is indeed present in South Africa; it can be distinguished from *Lophodiodon calori* by its lack of 2-4 forward-pointing spines between the nostrils.)

Genus ***Chilomycterus*** (Bibron, ms.) Brisout de Barneville, 1846

Monotypic.

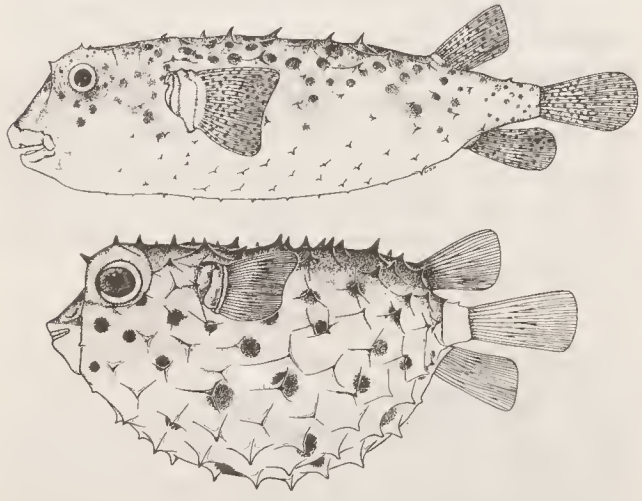
269.1 *Chilomycterus reticulatus* (Linnaeus, 1758)

Spotfin burrfish — Kolvin-klitsvis

Diodon reticulatus Linnaeus, 1758: 334 (India). *Diodon tigrinus* Cuvier, 1818: 127, Pl. 6, Fig. 2 (locality not given). *Chilomycterus reticulatus:* Poll, 1959: 352.

D 12-14; A 11-14; P 19-22; 8-10 spines from snout to D base. No fleshy tentacles.

Pelagic stage blue dorsally with pupil-size dark spots descending onto belly; benthic adults grey to brown with a black gular band and small black spots on upper surfaces and fins. Attains 55 cm. Young oceanic in surface waters until about 20 cm; adults trawled in less than 100 m. Only juveniles reported in our area from Cape to Salt Vlei, but apt to be found on all coasts. Worldwide in warm temperate waters.



269.1 *Chilomycterus reticulatus:* top: 26 cm adult; bottom: 7 cm juvenile.

Genus ***Cyclichthys*** Kaup, 1855

Cyclichthys is distinguished from *Chilomycterus* by several osteological characters (Tyler, 1980), number of C rays and vertebrae, nostril structure, and some spine characters. The type-species, *C. orbicularis*, differs in a number of characters from other species currently placed in the genus, and the other species may eventually be placed in other genera.

Cyclichthys antennatus (Cuvier, 1816), a western Atlantic species, has been reported from South Africa (Smith, **SFSA No. 1187**), but specimens identified as such have proved to be *C. spilostylus* or *C. orbicularis*. *Cyclichthys antennatus* almost certainly does not occur in southern Africa, but the name may have been applied to the closely related *C. spinosus mauretanicus* (Le Danois, 1954) if the latter has ventured in to our area.

Eight species; 2, possibly 3 in our area.

KEY TO SPECIES

1a Some spines on top of head with 4 subdermal roots; colour pattern with unclustered spots smaller than eye and no large blotches ..... *C. spilostylus*
1b All spines with 3 subdermal roots; colour pattern with large blotches or clusters of spots on back and sides 2

2a A small movable spine below and behind corner of mouth, and a longer one in P axil; teeth thin; no streaks on sides ..... *C. orbicularis*
2b No movable spines; teeth thick and strong; thin, black, wavy diagonal streaks on sides of adults ..... *C. spinosus mauretanicus*
(An eastern Atlantic species not reliably reported south of 5°S, but may occur in our area)

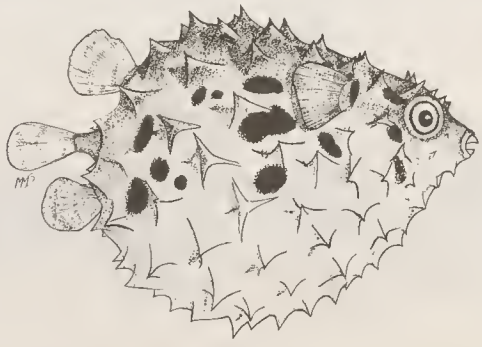
269.2 *Cyclichthys orbicularis* (Bloch, 1785)

Birdbeak burrfish — Voëlbek-klitsvis

Diodon orbicularis Bloch, 1785: 73, Pl. 127 (Moluccas). *Chilomycterus parcomaculatus* von Bonde, 1922: 38, Pl. 9 Fig. 2 (Natal). *Cyclichthys orbicularis:* Smith, **SFSA No. 1189*.**

D 11-13; A 10-12; P 18-21. Spines slightly recurved, their base with 3 roots; 8 spines from snout to D base; no C peduncle spine. No fleshy tentacles.

Pelagic stage covered with pupil to eye-size black spots. Benthic individuals brown to grey, with blotches or clusters



269.2 *Cyclichthys orbicularis:* 15 cm (off Cape Town).

of black spots on back and sides. Attains 14 cm. Continental shelf from Knysna to South China Sea, Philippines and Australia.

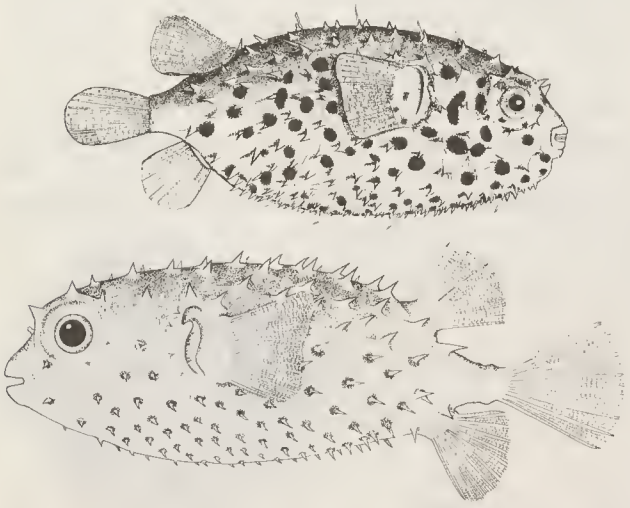
269.3 *Cyclichthys spilostylus*
(Leis & Randall, 1982)

Yellow-spotted burrfish — Geelspikkel-klitsvis

Chilomycterus spilostylus Leis & Randall, 1982: 363, Figs. 1, 2 (Red Sea). *Cyclichthys echinatus* (*non* Linnaeus): Smith, **SFSA No. 1188*.**

D 11-13; A 10-12; P 20-22. Spines short, fixed, some on top of head with 4 roots; 11-12 spines from snout to D base; none on C peduncle. Pelagic stage (to 15 cm) with a fleshy tentacle from each spine and eye-size dark spots scattered over body.

Fins unspotted. Benthic individuals with no fleshy tentacles and black pupil-size spots on sides and belly associated with spine bases. Attains 28 cm. Only pelagic juveniles reported in our area from Cape to Port Alfred and northward. Known from reefs, trawls and beach wash-ups from South Africa to South China Sea, Philippines and Australia.



269.3 *Cyclichthys spilostylus:* top: 12.5 cm juvenile (S. Mozambique), bottom: 17 cm.

Genus ***Diodon*** Linnaeus, 1758

Nostrils a flattened tube with 2 pores. Five species; 4 in our area. Recently revised by Leis (1978).

KEY TO SPECIES

1a One or more small spines wholly on dorsal surface of C peduncle; adults with spotted fins (A with or without a few spots) and no large dark blotches on body; A reaches to near midpoint of peduncle 2
1b No spines wholly on C peduncle; fins immaculate; adults with large dorsal and lateral dark blotches on body and head; A reaches nearly to C 3

2a P rays 19-22; D and A rays 16-18; D and A of adults pointed; 10-14 spines from lower jaw to anus; head width in adults 3.3-4.0 in SL ..... *D. eydouxii*
2b P 22-25 (rarely 21); D 14-17; A 14-16; D and A of adults rounded; 14-19 spines from lower jaw to anus; head width of adults 2.4-3.3 in SL ..... *D. hystrix*

3a Length of spines on forehead 10-25 in SL, much shorter than P axil spines; 17-22 spines from lower jaw to anus; small downward-pointing spine below front edge of eye; dark blotches of adults with pale border; no interorbital blotch ..... *D. liturosus*
3b Spines on forehead 3.6-7.7 in SL, slightly shorter to much longer than P axil spines; 12-15 spines from lower jaw to anus; small downward-pointing spine below front edge of eye in Atlantic specimens only; dark blotches lack pale border; interorbital blotch present ..... *D. holocanthus*

269.4 *Diodon eydouxii*
Brisout de Barneville, 1846

Pelagic porcupinefish — Opesee-penvis

Diodon eydouxii Brisout de Barneville, 1846: 142 (eastern Pacific); Leis, 1978: 542*. *Diodon bertolettii* Lema, Lucena, Saenger & Oliveria, 1979: 35, Figs. 18 & 19 (Brazil).

D 16-18; A 16-18; P 19-22. Spines long, those in P axil usually longest; 1 or more small spines on dorsum of C peduncle; 13-17 spines from snout to D base. No tentacles.

Back and sides blue, covered with small elongate black spots which extend onto fins; dark gular band present; belly silvery white. Attains 27 cm. Known from Algoa Bay, but likely throughout our area. A wholly pelagic, circumtropical species.

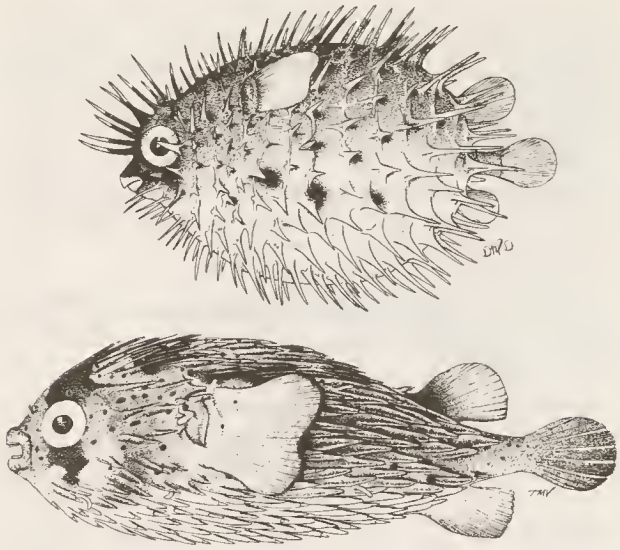
269.5 *Diodon holocanthus*
Linnaeus, 1758

Balloon porcupinefish — Ballon-penvis

Diodon holocanthus Linnaeus, 1758: 335 (India); Leis, 1978: 555*. *Diodon holacanthus:* Smith, **SFSA No. 1183.** *Diodon maculifer* Kaup, 1855: 229 (South Africa); Smith, **SFSA No. 1181*.** *Diodon paraholocanthus* Kotthaus, 1979: 39, Fig. 492 (Somalia).

D 13-15; A 13-15; P 20-24. Spines very long, those on forehead usually longest, none on C peduncle; 12-16 spines from snout to D base. In some benthic individuals a series of short fleshy tentacles on back, chin, over eyes and on lower side.

Pelagic stage (6-9 cm) with pupil-size spots, particularly prominent on belly. Benthic individuals with a series of dark blotches across back, and smaller spots scattered between the blotches; fins remain unspotted. Attains 29 cm. Found on reefs and trawled from shallow water to 100 m. From Cape to Knysna and northward; may be expected on Atlantic coast. Circumtropical.



269.5 *Diodon holocanthus:* top: 12.5 cm; bottom: 13 cm (E. Cape).

269.6 *Diodon hystrix*
Linnaeus, 1758

Porcupinefish — Penvis

Diodon hystrix Linnaeus, 1758: 335 (India); Smith, **SFSA No. 1182*;** Smith & Smith, 1966: 39*; Leis, 1978: 545*.

D 14-17; A 14-16; P 21-25. Spines long, those in P axil longest. One or more small spines on dorsum of C peduncle; 15-19 spines from snout to D base. No tentacles. Pelagic stage (to 20 cm) resembles *D. eydouxii*, but has rounded D and A.

Benthic stage grey to brown with back, sides and fins covered with small black spots; dark gular band present. Attains 60 cm or more. Tsitsikamma Coastal National Park to Umtata River; probably all along our coasts. Circumtropical mostly on reefs.

269.6 *Diodon hystrix:* 37.5 cm (Seychelles).

269.7 *Diodon liturosus*
Shaw, 1804

Shortspine porcupinefish — Kortstekel-penvis

Diodon liturosus Shaw, 1804: 436 (Indian Seas); Leis, 1978: 552*. *Diodon holocanthus* (*non* Linnaeus): Kotthaus, 1979: 38*.

D 14-16; A 14-16; P 21-25. Spines short, those on forehead much shorter than P axil spines, none wholly on C peduncle; a short downward-pointing spine below front of eye; 16-21 spines from snout to D base. Tentacles similar to *D. holocanthus*.

Pelagic stage (to 9 cm) with spots as *D. holocanthus*. Benthic individuals with light-edged dark blotches across back and sides; small black spots on sides associated with spine bases; dark gular band present; fins unspotted. Attains 50 cm. Primarily on reefs; Algoa Bay to Japan, French Polynesia and Australia.

269.7 *Diodon liturosus:* 44 cm (N. Mozambique).

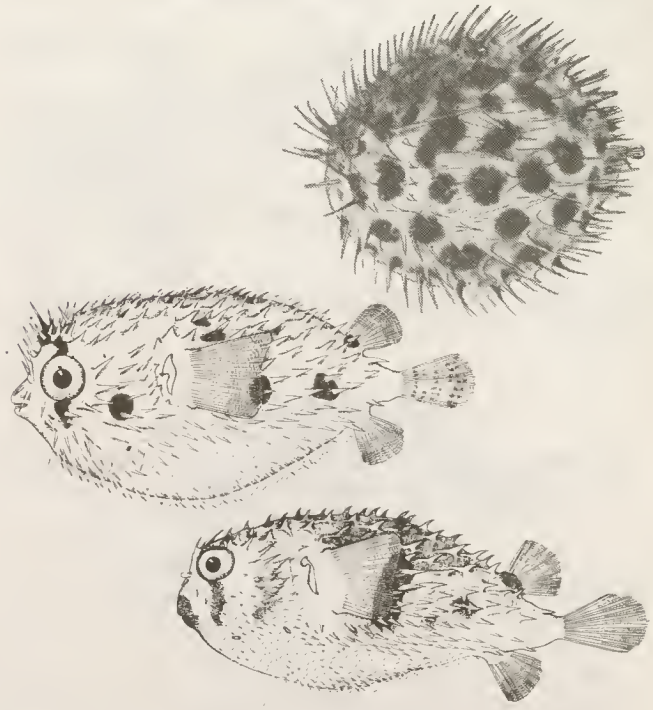
Genus ***Lophodiodon*** Fraser-Brunner, 1943

One species.

269.8 *Lophodiodon calori*
(Bianconi, 1855)
PLATE 144

Fourbar porcupinefish — Vierbalk-penvis

Diodon calori Bianconi, 1855: 223, Pl. 3 (Mozambique). *Lophodiodon*



269.8 *Lophodiodon calori:* top: 4.5 cm juvenile, holotype of *L. nigropunctatus* (Port Alfred); middle: 7 cm; bottom: 16 cm SL.

calori: Smith, **SFSA No. 1184***. *Lophodiodon nigropunctatus* Smith, 1957: 221, Fig. 4 (Port Alfred); Smith, 1961: 573, **No. 1184a.**

D 10-12; A 10-11; P 21-23. Spines short; erectile ones with 2 subdermal roots, fixed ones with 3. No spines on C peduncle, but those at D base extend to near C base; about 16 spines from snout to D base, first 6 or so erectile; 2-4 forward-pointing spines between and in front of nostrils. A short tentacle over each eye.

A short pelagic stage, with pupil-size (and smaller) spots covering body. Benthic individuals with 4 dark bars on flanks plus a blotch over each P base and at D base; fins unspotted. Large individuals may have a gular band. Attains 20 cm. Continental shelf from the Cape to South China Sea and Australia.

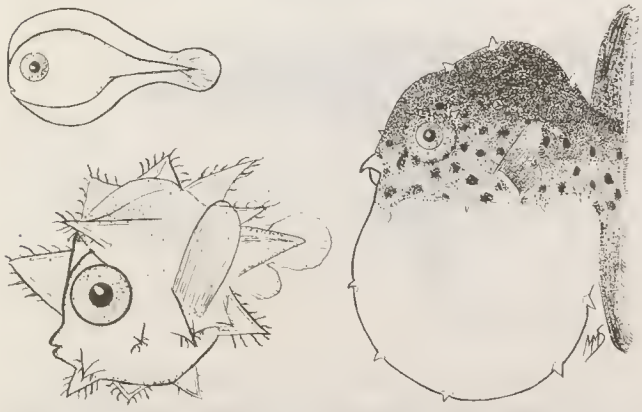
Family No. 270: MOLIDAE

by P.C. Heemstra

Ocean sunfishes **Opesee-sonvisse**

Body orbicular or elongate-oval, compressed, truncate posteriorly, as if the rear end were chopped off. Caudal fin resorbed during metamorphosis and replaced by a rudder-like structure called a "clavus". Dorsal and anal fins very high, with short base; in swimming, these fins are flapped synchronously from side to side and can propel these fishes at a surprisingly good speed. Mouth very small; teeth fused in each jaw, forming a parrot-like beak. Gills 4, a slit behind the last; gill openings reduced to a small hole at base of pectoral fins. Gasbladder absent in adults. Postlarval stages (less than 5 mm) with prominent spines on body and a normal caudal fin; these peculiar postlarval forms were originally described as distinct species, not related to the adults.

Sunfishes are found in the open ocean, often drifting at the surface as if basking in the sun. Three genera are generally recognised, with a total of 4 or 5 species.



Development of Molidae: top left: 0.2 cm; bottom left: 0.3 cm (after Schmidt, 1921); right: 2.5 cm (Durban).

KEY TO GENERA

1a Body elongate-oval; depth 2.1-4.0 in length to clavus; "skin" smooth, thin, composed of small hard fused hexagonal plates; body obliquely truncate posteriorly ..... *Ranzania*

1b Body orbicular; depth 0.8-1.8 in length to clavus; skin thick and tough, with small rough denticles; body vertically truncate posteriorly 2

2a Clavus distinctly pointed, more or less produced (caudal projection prolonged, filamentous in undamaged juveniles); margin of clavus not studded with bony ossicles ..... *Masturus*

2b Rear end of clavus not pointed; bony ossicles present on edge of clavus ..... *Mola*

Genus ***Masturus*** Gill, 1884

Monotypic.

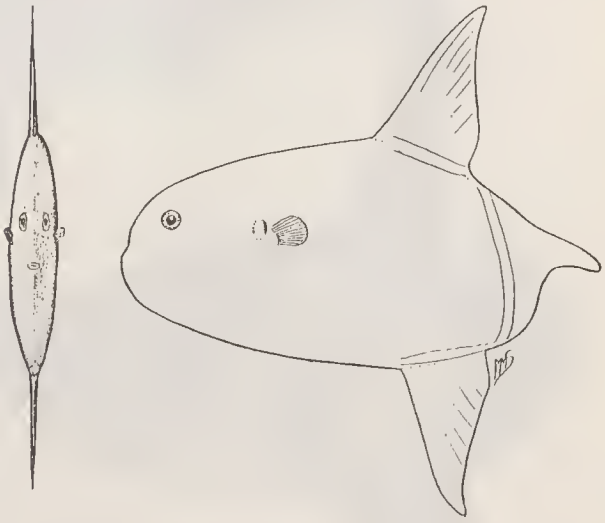
270.1 *Masturus lanceolatus*
(Lienard, 1840)

Sharptail sunfish Skerpstert-sonvis

Orthagoriscus lanceolatus Lienard, 1840: 291 (Mauritius); 1841: Pl. 4. *Masturus lanceolatus:* Fraser-Brunner, 1951: 107*; King, 1951*. *Mola lancéolata:* Smith, **SFSA No. 1214*.**

D + A + clavus = 60-62. Caudal projection elongate, filamentous in undamaged juveniles.

Attains 3 m and about 2 000 kg. Warm-temperate waters of all oceans; reeorded from the Cape to East London; rare.



270.1 *Masturus lanceolatus*: ca. 175 cm (Algoa Bay).

Genus ***Mola*** Koelreuter, 1770

Apparently only 2 species, both in our area.

KEY TO SPECIES

1a Clavus supported by about 16 rays, 12 of which (in adults) bear ossicles; ossicles broader than spaces between them and forming margin of clavus; no band of reduced denticles from D to A ..... *M. ramsayi*

1b Clavus supported by 12 or 13 rays, 8 or 9 of which (in adults) bear ossicles; ossicles small, widely separated by skin which (in large adults) extends beyond them to form distinct lobes; band of reduced denticles, smoother to the touch, at base of clavus from from D to A ..... *M. mola*

270.2 *Mola mola*
(Linnaeus, 1758)
PLATE 144

Ocean sunfish — Opesee-sonvis

Tetraodon mola Linnaeus, 1758: 334 (Mediterranean). *Aledon capensis* Castelnau, 1861: 76 (Cape of Good Hope). *Mola mola:* Fraser-Brunner, 1951: 113*, Smith, **SFSA No. 1213** (in part, figure appears to be *M. ramsayi*); Smith & Smith, 1966: 149*.

Feeds on pelagic coelenterates (jellyfish), salps, and when it is in shallow water, on some benthic animals as well. Attains at least 3 m and 2 000 kg. Found in all oceans, but not polar seas. *Mola* is the Latin word for millstone.

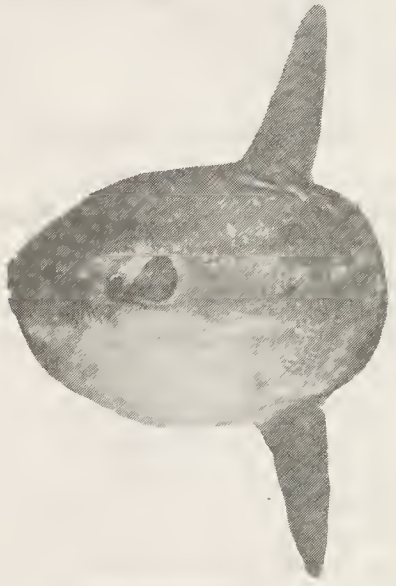
270.2 *Mola mola:* 136 cm (off Port Alfred).

270.3 *Mola ramsayi*
(Giglioli, 1883)

Southern sunfish — Suidelike sonvis

Orthagoriscus ramsayi Giglioli, 1883: 315 (New South Wales, Australia). *Mola mola:* Barnard, 1935: 645* (in part); Smith, **SFSA No. 1213*** (in part, figure). *Mola ramsayi:* Fraser-Brunner, 1951: 110*.

A giant fish attaining 3 m and more than 2 000 kg. This species is known only from New Zealand, Australia, and South Africa. Three small juveniles in our collection from near East London to Port St. Johns.



270.3 *Mola ramsayi:* (after Scott, Glover & Southcott, 1974).

Genus ***Ranzania*** Nardo, 1840

Monotypic.

270.4 *Ranzania laevis*
(Pennant, 1776)
PLATE 144

Trunkfish — Rompvis

Ostracion laevis Pennant, 1776: 129, Pl. 19 (Cornwall, England). *Ranzania typus:* Smith, **SFSA No. 1212***. *Ranzania laevis:* Fraser-Brunner, 1951: 95; Robinson, 1975*. *Ranzania truncata:* Smith & Smith, 1966: 150*.

D 18; A 20; P 13. Lips produced in front of teeth, forming an oval mouth with the long axis vertical.

This is the pygmy of the family, not exceeding 80 cm in length. Feeds on planktonic crustaceans. Reported in all oceans; from the Cape to Transkei; one caught in the Kowie River on fish bait.

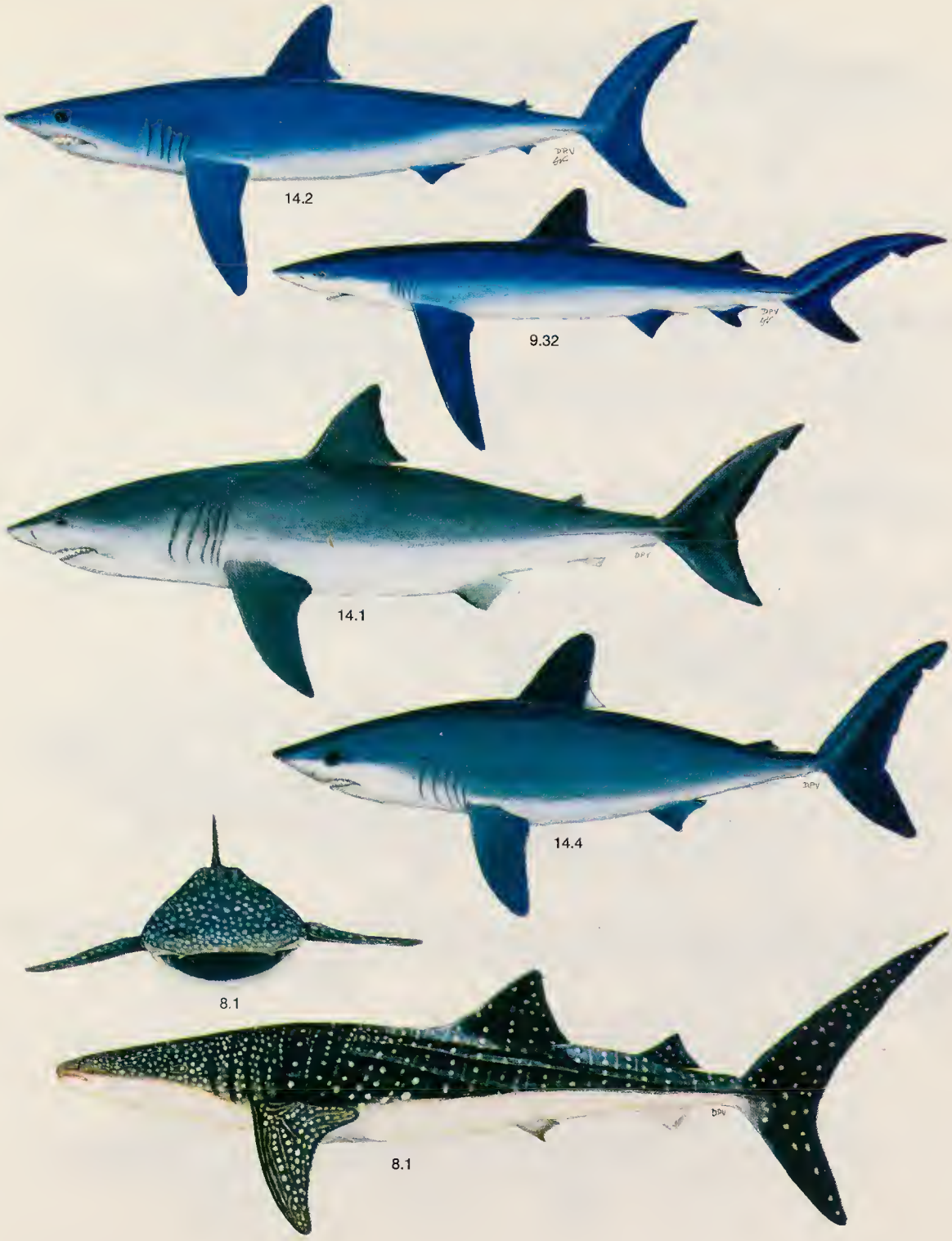


PLATE 1

8.1 *Rhincodon typus:* ca. 12 m (off South Africa). **9.32** *Prionace glauca:* 279 cm mature male (Natal). **14.1** *Carcharodon carcharias:* 300 cm (off South Africa). **14.2** *Isurus oxyrinchus:* 245 cm female (off South Africa). **14.4** *Lamna nasus:* 94 cm (False Bay).

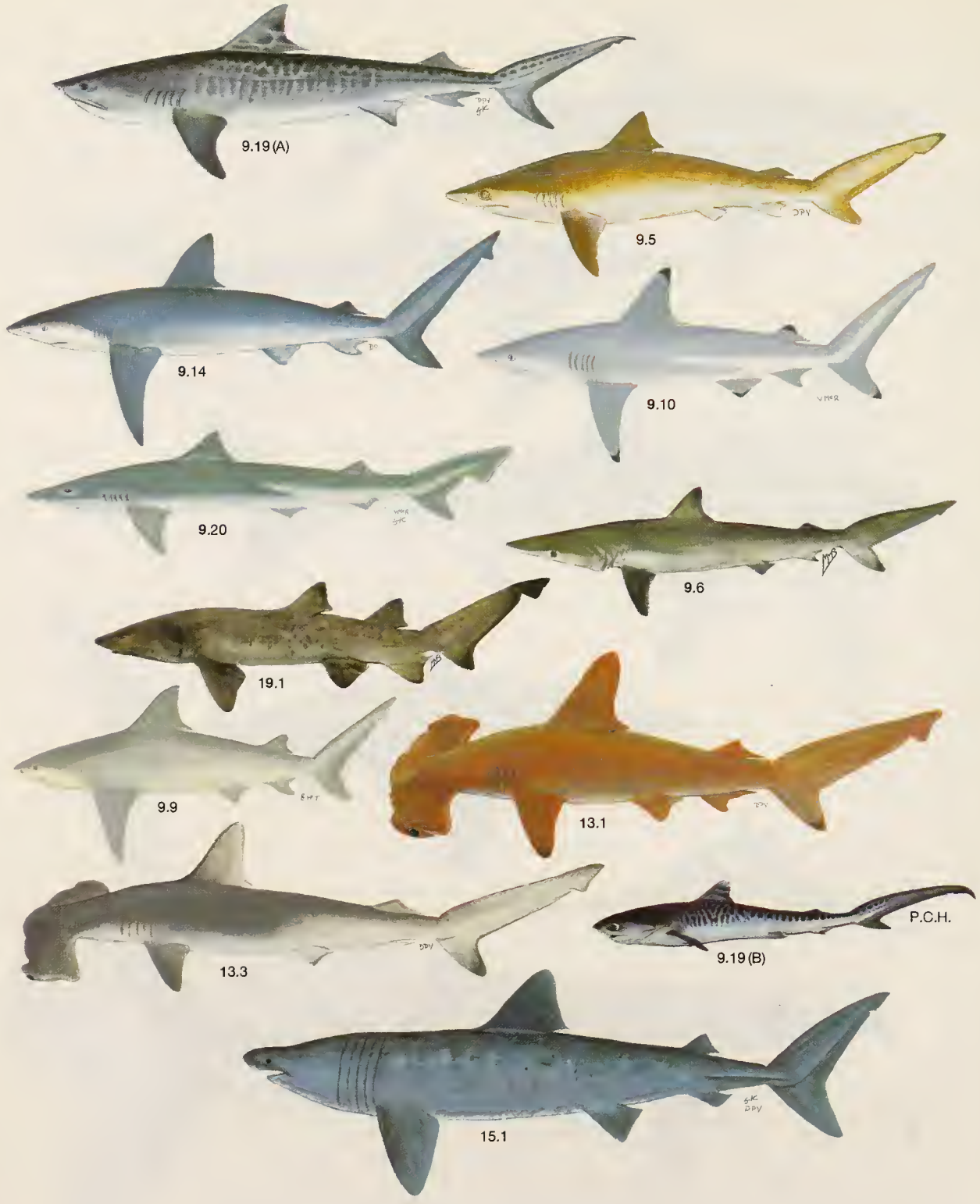


PLATE 2

9.5 *Carcharhinus brachyurus:* 72 cm male (off Port Alfred). **9.6** *Carcharhinus brevipinna:* 90 cm holotype of *C. johnsoni* (Algoa Bay). **9.9** *Carcharhinus leucas:* 166 cm male (off Natal). **9.10** *Carcharhinus limbatus:* 58 cm female (off Durban). **9.14** *Carcharhinus obscurus:* 70 cm female (off Natal). **9.19** *Galeocerdo cuvier:* (A) 273 cm male (off Thailand); (B) prenatal pup. **9.20** *Galeorhinus galeus:* 68 cm female (W. of Knysna). **13.1** *Sphyrna lewini:* 50 cm (Natal). **13.3** *Sphyrna zygaena:* 73 cm (off Port Alfred). **15.1** *Cetorhinus maximus:* ca. 750 cm (Atlantic). **19.1** *Eugomphodus taurus:* 135 cm (Algoa Bay).

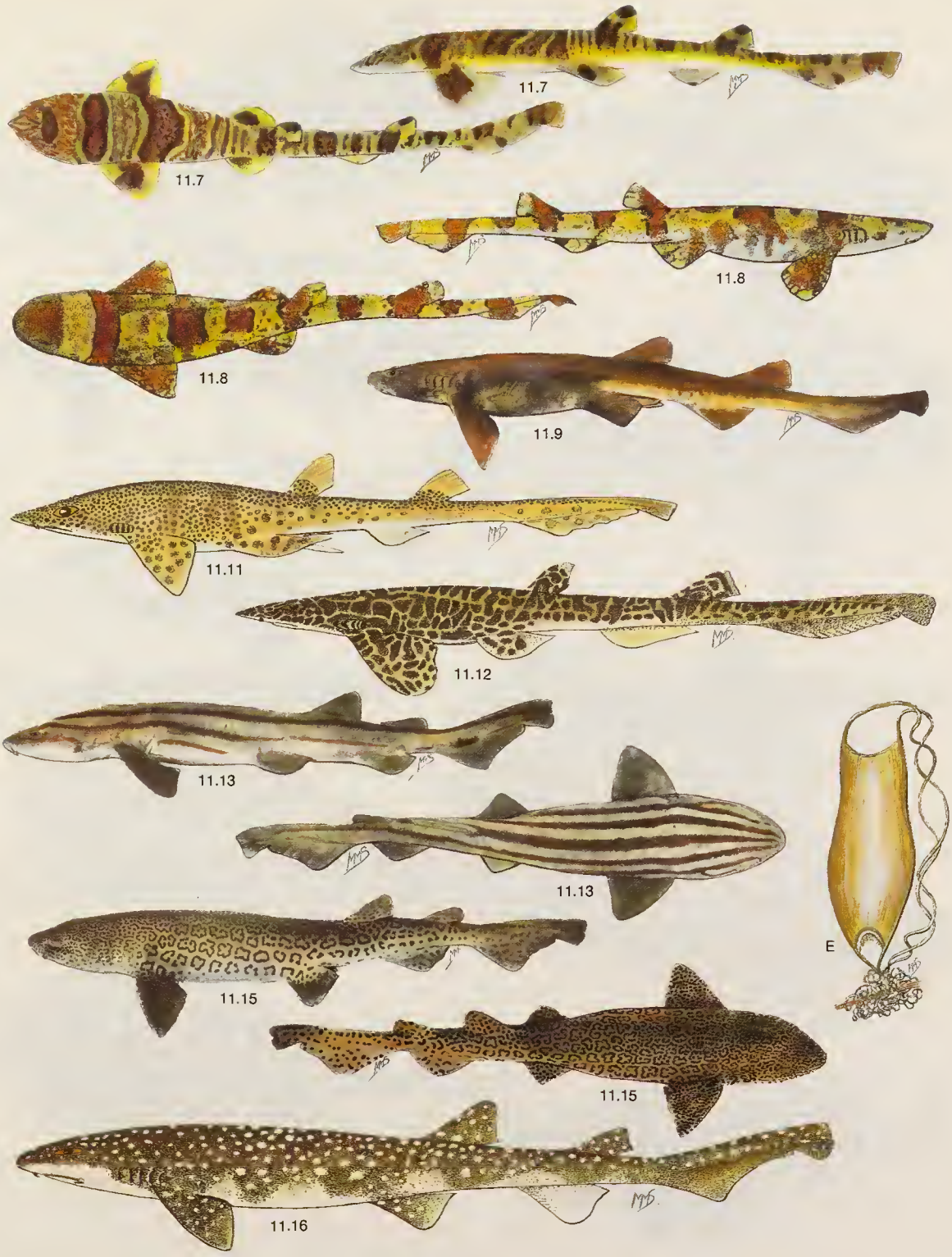


PLATE 3

11.7 *Halaelurus natalensis:* 45 cm, dorsal and lateral views (Algoa Bay). **11.8** *Haploblepharus edwardsii:* 50 cm, dorsal and lateral views (Algoa Bay). **11.9** *Haploblepharus fuscus:* 60 cm (Port Alfred). **11.11** *Holohalaelurus punctatus:* 30 cm (off Natal). **11.12** *Holohalaelurus regani:* 35 cm (off Natal). **11.13** *Poroderma africanum:* 60 cm, dorsal and lateral views (Knysna). **11.15** *Poroderma pantherinum:* 68 cm, dorsal and lateral views (off Port Alfred). **11.16** *Scyliorhinus capensis:* 70 cm (off East London). **E** = typical scyliorhinid egg-case.

PLATE 4

4.1 *Heterodontus ramalheira:* 58.5 cm holotype, dorsal and lateral views (S. Mozambique). **7.4** *Stegostoma fasciatum:* 150 cm (Kenya); 50 cm juvenile above (Algoa Bay). **9.28** *Mustelus palumbes:* 99 cm (Knysna). **20.1** *Pliotrema warreni:* 98 cm, lateral and ventral views (Algoa Bay). **22.2** *Pristis pectinata:* ca. 300 cm (Natal). **27.2** *Rhinobatos annulatus:* (A) 90 cm female; (B) 100 cm male (both Knysna). **27.3** *Rhinobatos blochii:* ca. 75 cm (Natal). **27.7** *Rhynchobatos djiddensis:* 97 cm (W. of Port Elizabeth).

PLATE 5

21.1 *Squatina africana:* 49 cm (Algoa Bay). **23.1** *Torpedo fuscomaculata:* 45 cm wide (A) male and (B) female (both from off Algoa Bay). **23.3** *Torpedo sinuspersici:* 34 cm wide male (Natal). **28.2** *Myliobatis aquila:* (A) 23 cm wide, ventral view, 26.5 cm wide, dorsal view; (B) 95 cm wide adult (all from Knysna). **29.1** *Manta birostris:* 440 cm wide (W. of Port Alfred). **30.7** *Gymnura natalensis:* 185 cm wide (Knysna). **34.1** *Callorhinchus capensis:* 60 cm (off Knysna).

PLATE 6

25.3 *Cruriraja parcomaculata:* 55 cm wide (Algoa Bay). **25.8** *Raja clavata:* (A) 58 cm wide female; (B) 60 cm wide male (Knysna); (C) 55 cm wide (Algoa Bay). **25.14** *Raja miraletus:* (A) 50 cm wide male; (B) 59 cm wide female (off Algoa Bay). **25.15** *Raja pullopunctata:* 22.5 cm wide female (Algoa Bay). **30.2** *Dasyatis kuhlii:* 36 cm wide adult female (Natal). **30.3** *Dasyatis pastinaca:* 55 cm wide (Knysna). **30.13** *Taeniura lymma:* 17 cm wide (Natal).

PLATE 7

39.1 *Anguilla bengalensis labiata:* 133 cm (Natal; after Jubb, 1967). **39.4** *Anguilla mossambica:* 29 cm (Natal). **40.7** *Conger cinereus cinereus:* (A) 120 cm adult; (B) 22 cm juvenile (both S. Mozambique). **41.3** *Echidna nebulosa:* 33 cm (N. Mozambique). **41.8** *Gymnothorax elegans:* 52.5 cm (S. Mozambique). **41.12** *Gymnothorax flavimarginatus:* 30 cm holotype of *Lycodontus lemayi* (S. Mozambique). **41.32** *Uropterygius tigrinus:* 45 cm (Natal). **42.20** *Ophichthus polyophthalmus:* 50 cm (S. Mozambique). **42.22** *Ophisurus serpens:* (A) 92 cm (W. of Port Alfred); (B) 68 cm (Knysna).

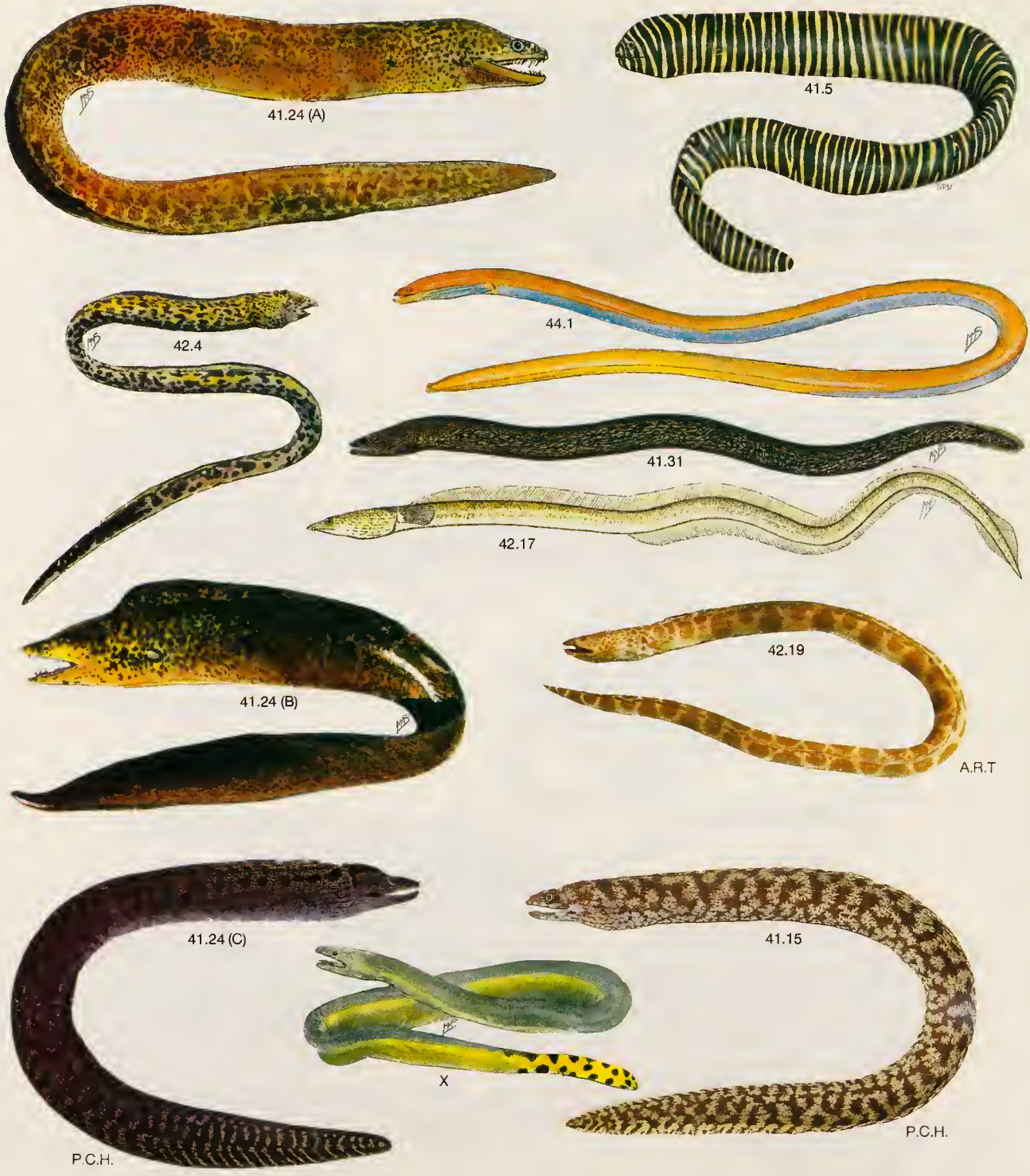


PLATE 8

41.5 *Echidna zebra:* 70 cm (Kenya). **41.15** *Gymnothorax margaritophorus:* 34 cm (Natal). **41.24** *Gymnothorax undulatus:* (A) 35 cm (Transkei); (B) 53 cm (Transkei); (C) 25 cm (Natal). **41.31** *Uropterygius micropterus:* 40 cm (Natal). **42.4** *Callechelys marmorata:* 46.5 cm (S. Mozambique). **42.17** *Ophichthus apicalis:* 35 cm (Natal). **42.19** *Ophichthus erabo:* (Natal). **44.1** *Moringua ferruginea:* 25 cm juvenile (S. Mozambique). **X** Sea snake, *Pelamis platurus:* 60 cm (Port Alfred).

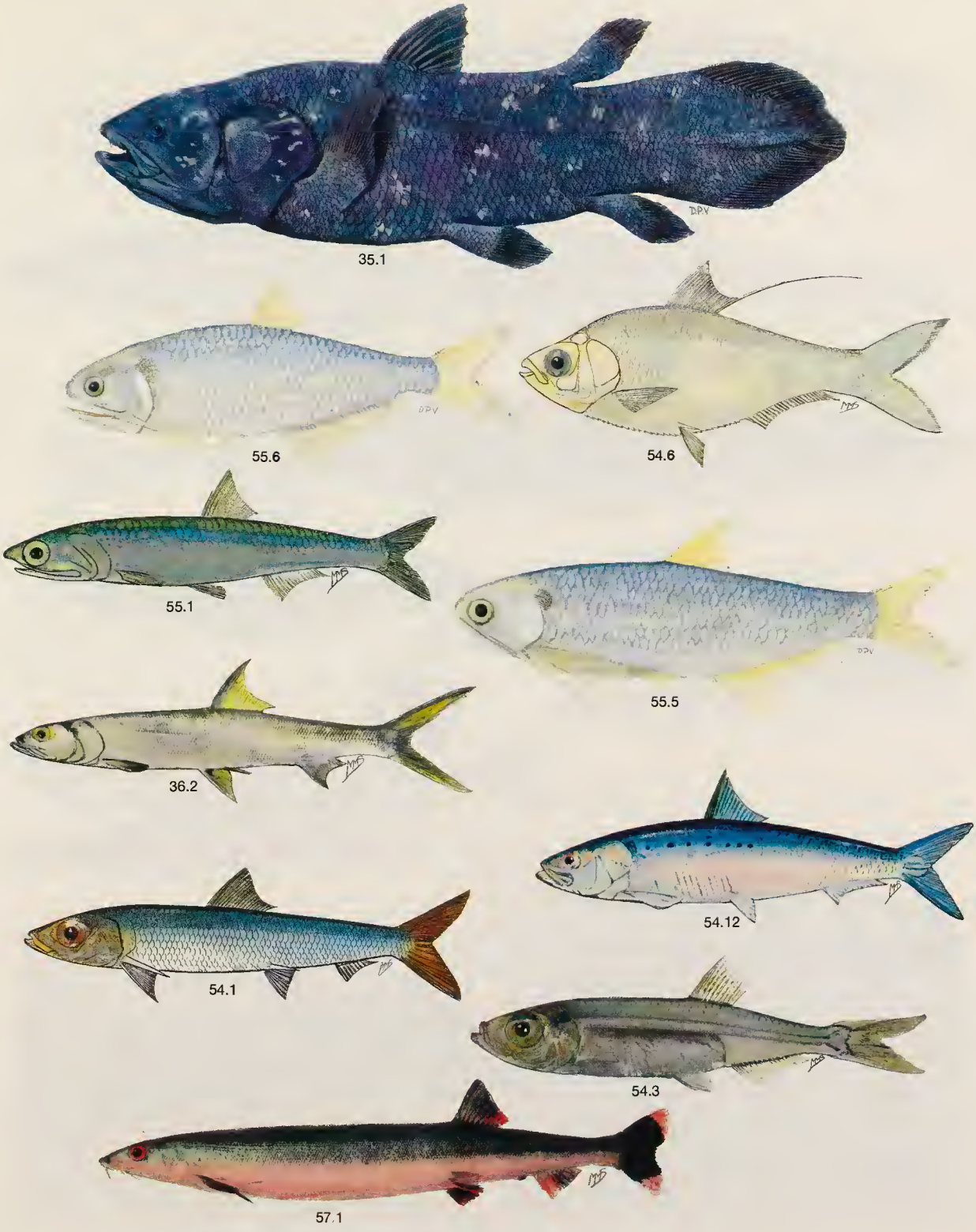


PLATE 9

35.1 *Latimeria chalumnae*. 155 cm male (Comores). **36.2** *Elops machnata*. 75 cm (Algoa Bay). **54.1** *Etrumeus teres*: 7 cm (Knysna). **54.3** *Gilchristella aestuarias*: 4.5 cm (Tsitsikama). **54.6** *Nematalosa nasus*: 8 cm (Natal). **54.12** *Sardinops ocellatus*: 23 cm (Lambert's Bay). **55.1** *Engraulis japonicus*: 12.5 cm (Lambert's Bay). **55.5** *Thryssa setirostris*: 11.5 cm (Madagascar). **55.6** *Thryssa vitrirostris*: 14 cm (Natal). **57.1** *Gonorhynchus gonorhynchus*: 48 cm (off Algoa Bay).

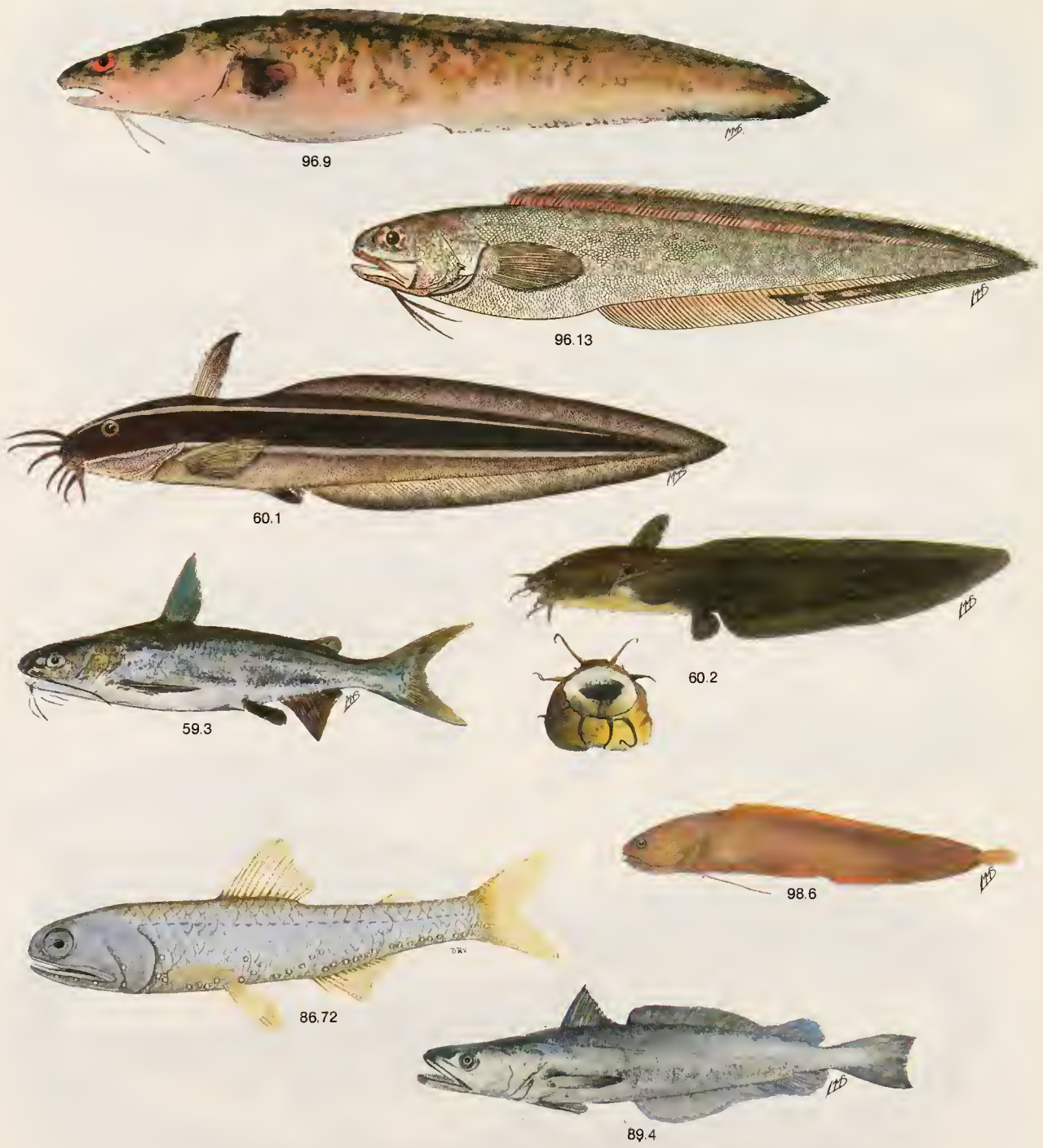
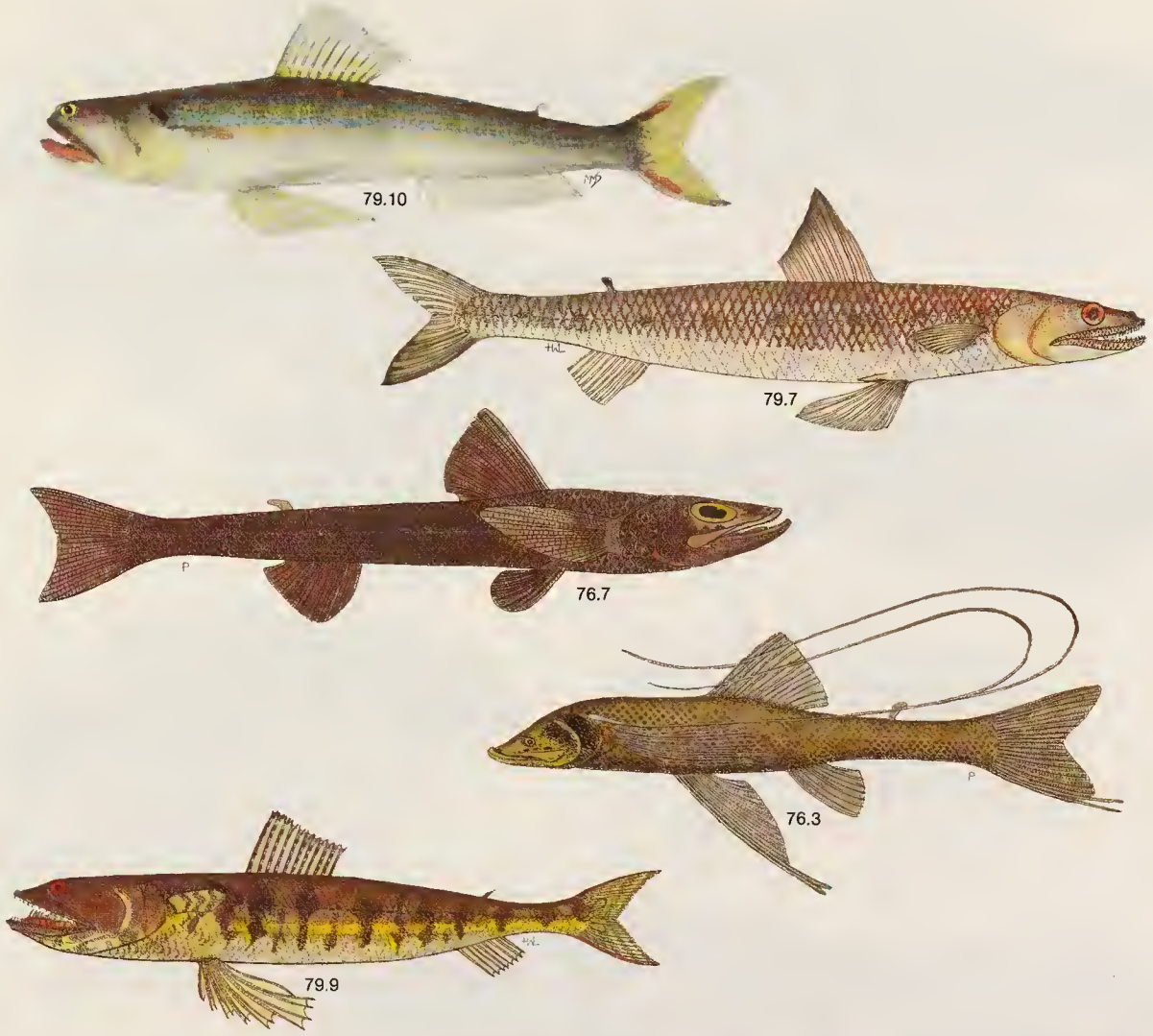
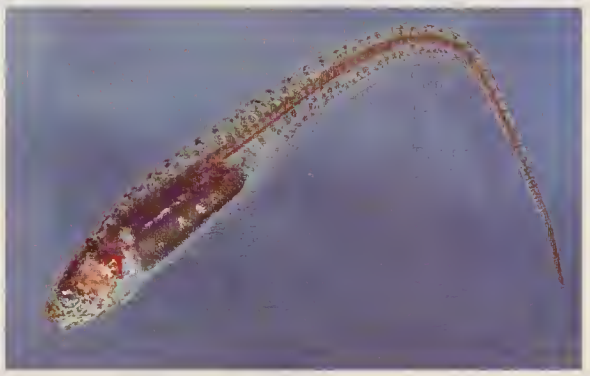


PLATE 10

59.3 *Galeichthys feliceps:* 40 cm (Port Alfred). **60.1** *Plotosus lineatus:* 22.5 cm (Transkei). **60.2** *Plotosus nkunga:* 53 cm (Transkei); front view of mouth below. **86.72** *Lampanyctodes hectoris:* 3.5 cm (off Algoa Bay). **89.4** *Merluccius capensis:* 68 cm (off Algoa Bay). **96.9** *Genypterus capensis:* 120 cm (off Algoa Bay). **96.13** *Hoplobrotula gnathopus:* 35 cm (Natal). **98.6** *Dermatopsoides talboti:* 4 cm holotype (Algoa Bay).



79.5 R.E.S.



97.3 P.C.H.

PLATE 11

76.3 *Bathypterois filiferus:* 20 cm (off South Africa). **76.7** *Bathysauropsis gracilis:* 30 cm (off South Africa). **79.5** *Synodus engelmani:* 10.5 cm SL (Natal). **79.7** *Synodus indicus:* 31 cm (Algoa Bay). **79.9** *Synodus variegatus:* 25 cm (S. Mozambique). **79.10** *Trachinocephalus myops:* 20 cm (Knysna). **97.3** *Carapus mourlani:* 15 cm (Natal).

PLATE 12

100.1 *Austrobatrachus foedus:* 18.5 cm (Kei Mouth). **100.2** *Batrichthys albofasciatus:* 12 cm (E. of Port Elizabeth). **100.3** *Batrichthys apiatus:* (A) 8 cm; (B) 7.5 cm (both near East London). **100.4** *Batrichthys felinus:* 17.5 cm (False Bay). **100.5** *Chatrabus hendersoni:* 19 cm holotype (Algoa Bay). **100.6** *Chatrabus melanurus:* 15 cm (Port Alfred).

PLATE 13

102.1 *Antennarius coccineus:* (A) 10 cm (Natal); (B) 4.4 cm SL (Kenya); (C) 8 cm SL (Natal). **102.2** *Antennarius commersoni:* 18 cm (Transkei). **102.4** *Antennarius hispidus:* 12 cm (S. Mozambique). **102.6** *Antennarius pictus:* (A) 10 cm (S. Mozambique); (B) 12 cm (Natal). **102.7** *Antennarius striatus:* 15 cm (E. of Port Alfred). **102.8** *Antennarius tuberosus.* (after Günther, 1876). **102.9** *Histrio histrio:* 13 cm (East London).

PLATE 14

110.1 *Apletodon pellegrini:* (A) 3 cm dorsal view; (B) 2.5 cm female ventral view; (C) 3.5 cm ventral view of live male (all Knysna). **110.2** *Chorisochismus dentex:* (A) 18 cm (Transkei); (B) 6 cm dorsal view (E. of Port Alfred); (C) 6.5 cm ventral view (E. of East London). **110.3** *Diplecogaster megalops:* 2.5 cm SL (Tsitsikama). **110.4** *Eckloniaichthys scylliorhiniceps:* 2 cm (W. of Port Alfred). **110.6** *Lepadichthys coccinotaenia:* (A) 2.5 cm SL and (B) 2 cm SL (both Natal). **110.7** *Lepadichthys lineatus:* 3.5 cm (Natal).

PLATE 15

101.4 *Lophius upsicephalus:* 90 cm wide (off Algoa Bay). **103.2** *Chaunax pictus:* 13 cm SL (Natal). **104.2** *Halieutea fitzsimonsi:* 17 cm (Port Elizabeth). **104.7** *Malthopsis mitrigera:* 4.5 cm SL, dorsal and ventral views (off Transkei). **117.1** *Lampris guttatus:* 95 cm (off Cape Town). **117.2** *Lampris immaculatus:* ca. 110 cm (Cape; painted after Gilchrist). **123.1** *Stylephorus chordatus:* head of 50 cm specimen (off Transkei).

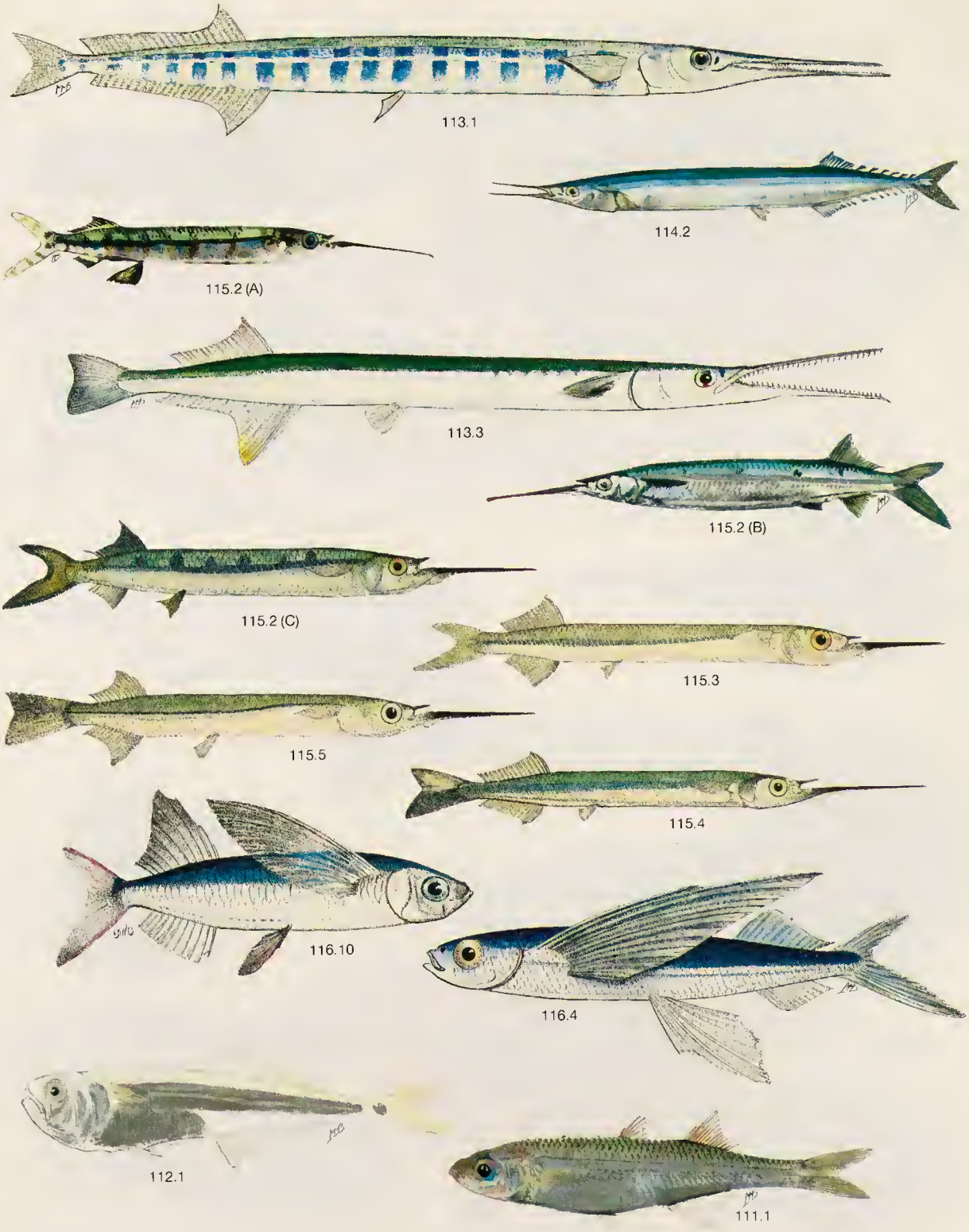
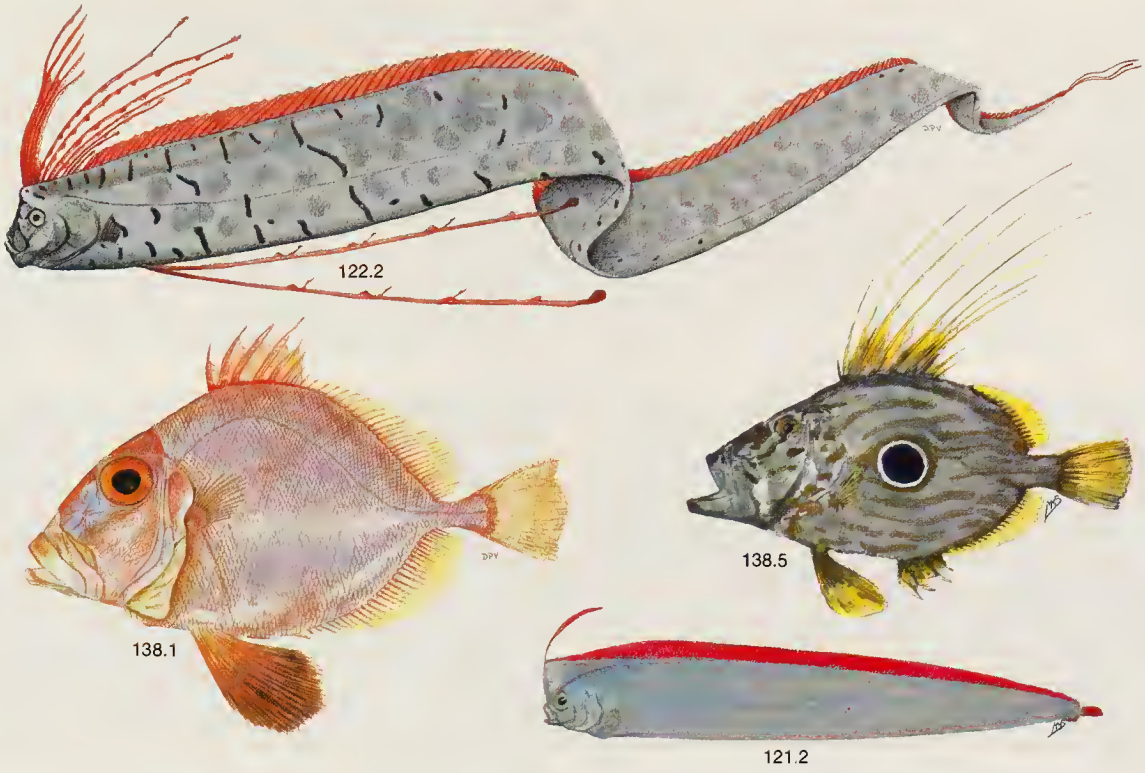


PLATE 16

111.1 *Atherina breviceps:* 17 cm (Knysna). **112.1** *Iso natalensis:* 6.5 cm (Port Alfred). **113.1** *Ablennes hians:* 40 cm (Natal). **113.3** *Strongylura leiura:* 65 cm (S. Mozambique). **114.2** *Scomberesox saurus scomberoides:* 45 cm (W. of Port Alfred). **115.2** *Hemiramphus far:* (A) 12.5 cm juvenile; (B) 55 cm; (C) 50 cm (all Knysna). **115.3** *Hyporhamphus affinis:* 29.5 cm (S. Mozambique). **115.4** *Hyporhamphus capensis:* 19.5 cm type of *H. knysnaensis* (Knysna). **115.5** *Hyporhamphus improvisus:* 22 cm type (S. Mozambique). **116.4** *Cheilopogon pinnatibarbatus altipinnis:* 30 cm adult (S. Mozambique). **116.10** *Parexocoetus mento:* 25 cm (S. Mozambique).



119.1 S.X.K.

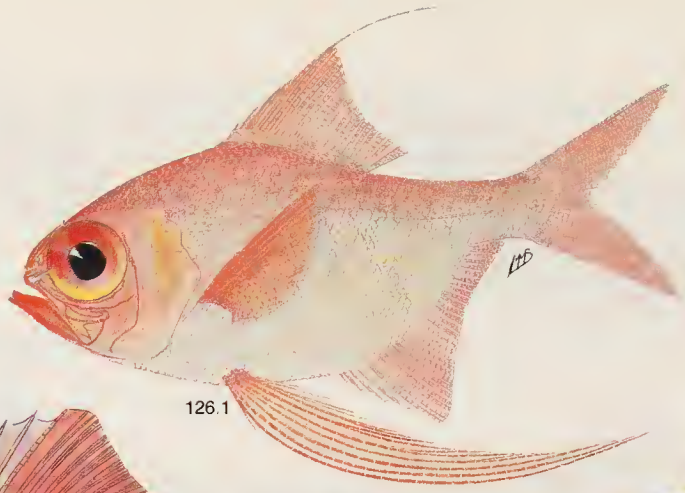
119.4 (A) S.X.K.

119.4 (B) P.C.H.

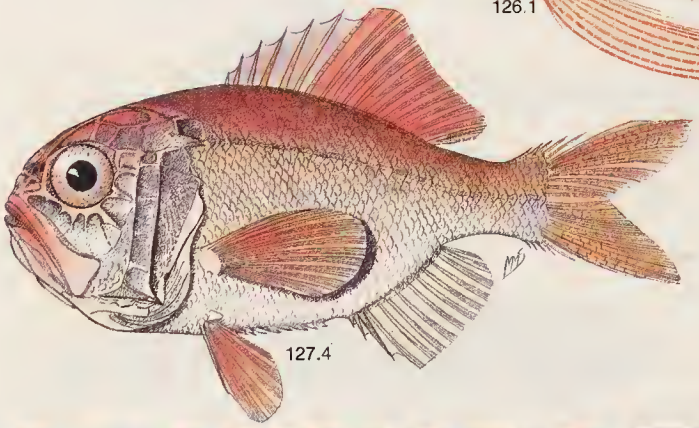
119.4 (C) P.C.H.

PLATE 17

119.1 *Desmodema polystictum:* 9 cm SL prejuvenile (False Bay). **119.4** *Zu cristatus:* (A) 25 cm SL prejuvenile (off Natal), (B) & (C) 95 cm SL adult (Kenya). **121.2** *Lophotus lacepede:* 120 cm (W. of Knysna). **122.2** *Regalecus glesne:* 370 cm (E. Cape). **138.1** *Cyttopsis roseus:* 18 cm SL (off Natal). **138.5** *Zeus faber:* 33 cm (off Algoa Bay).



126.1



127.4

128.1

137.1 J.G.

126.3 (A) P.C.H.

127.5 P.C.H.

126.3 (B) P.C.H.

PLATE 18

126.1 *Beryx decadactylus*: 27 cm (off Algoa Bay). **126.3** *Centroberyx spinosus*: (A) 4 cm (Tsitsikama); (B) 16.5 cm SL (Natal). **127.4** *Hoplostethus mediterraneus*: 20 cm (Algoa Bay). **127.5** *Hoplostethus melanopterus*: 11.5 cm SL (off Transkei). **128.1** *Monocentris japonicus*: 10 cm (Knysna). **137.1** *Barbourisia rufa*: 11.5 cm (NW Australia).

132.7 A.E. & R.W.

132.25 P.C.H.

132.1 J.E.R.

132.4 A.E. & R.W.

132.10 J.E.R.

132.5 J.E.R.

132.6 J.E.R.

132.8 J.E.R.

PLATE 19

132.1 *Neoniphon argenteus*: 13 cm SL (Marshall Ids.). **132.4** *Neoniphon sammara*: 5 cm SL (Chagos Ids.). **132.5** *Sargocentron caudimaculatum*: 17.5 cm (Red Sea). **132.6** *Sargocentron diadema*: 11 cm SL (Réunion). **132.7** *Sargocentron inaequalis*: 7 cm SL holotype (Chagos Ids.). **132.8** *Sargocentron ittodai*: 12.5 cm SL (Réunion). **132.10** *Sargocentron melanospilos*: 10.5 cm SL (New Caledonia). **132.25** *Myripristis melanosticta*: 21 cm SL (off Natal).

132.12 J.E.R.

132.13 A.E. & R.W.

132.14 J.E.R.

132.15 J.E.R.

132.16 P.C.H.

132.17 A.E. & R.W.

132.18 A.E. & R.W.

132.19 A.E. & R.W.

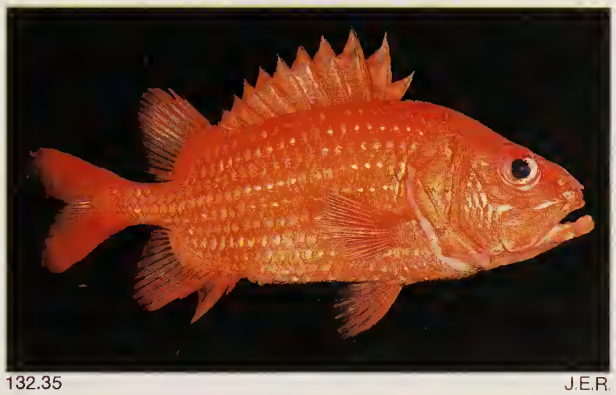
PLATE 20

132.12 *Sargocentron praslin:* 13.5 cm SL neotype (Solomon Ids.). **132.13** *S. punctåtissimum:* 9.5 cm SL (Chagos Ids.). **132.14** *S. rubrum:* 11.5 cm SL (Sudan). **132.15** *S. seychellense:* 14 cm SL (Seychelles). **132.16** *S. spiniferum:* 34 cm SL (Natal). **132.17** *S. tiere:* 22 cm SL (Chagos Ids.). **132.18** *S. tiereoides:* 11 cm SL (Chagos Ids.). **132.19** *S. violaceum:* 13 cm SL (Chagos Ids.).

132.28 J.E.R.

132.31 J.E.R.

132.34 R.E.S.



132.35 J.E.R.

PLATE 21

132.3 *Neoniphon opercularis:* 23 cm (N. Mozambique). **132.12** *Sargocentron praslin:* 16 cm (Seychelles). **132.15** *Sargocentron seychellense:* 12 cm (N. Mozambique). **132.19** *Sargocentron violaceum:* 25 cm (N. Mozambique). **132.20** *Myripristis adusta:* 21 cm (Inhaca Id.). **132.28** *Myripristis seychellensis:* 20 cm (Seychelles). **132.31** *Ostichthys archiepiscopus:* 21 cm (Oahu). **132.34** *Plectrypops lima:* 10 cm (Natal). **132.35** *Pristilepis oligolepis:* 29 cm (Easter Id.).

PLATE 22

132.21 *Myripristis berndti:* 16 cm SL (Durban). **132.22** *M. chryseres:* 19 cm SL (off Natal). **132.23** *M. hexagona:* 13 cm SL (Inhaca Id.). **132.24** *M. kuntee:* 18 cm (Seychelles). **132.26** *M. murdjan:* 16 cm (Mozambique). **132.27** *M. pralinia:* 9.5 cm SL (Grand Comore Id.). **132.29** *M. violacea:* 13 cm SL (N. Mozambique). **132.30** *M. vittata:* 12 cm SL (Mauritius).

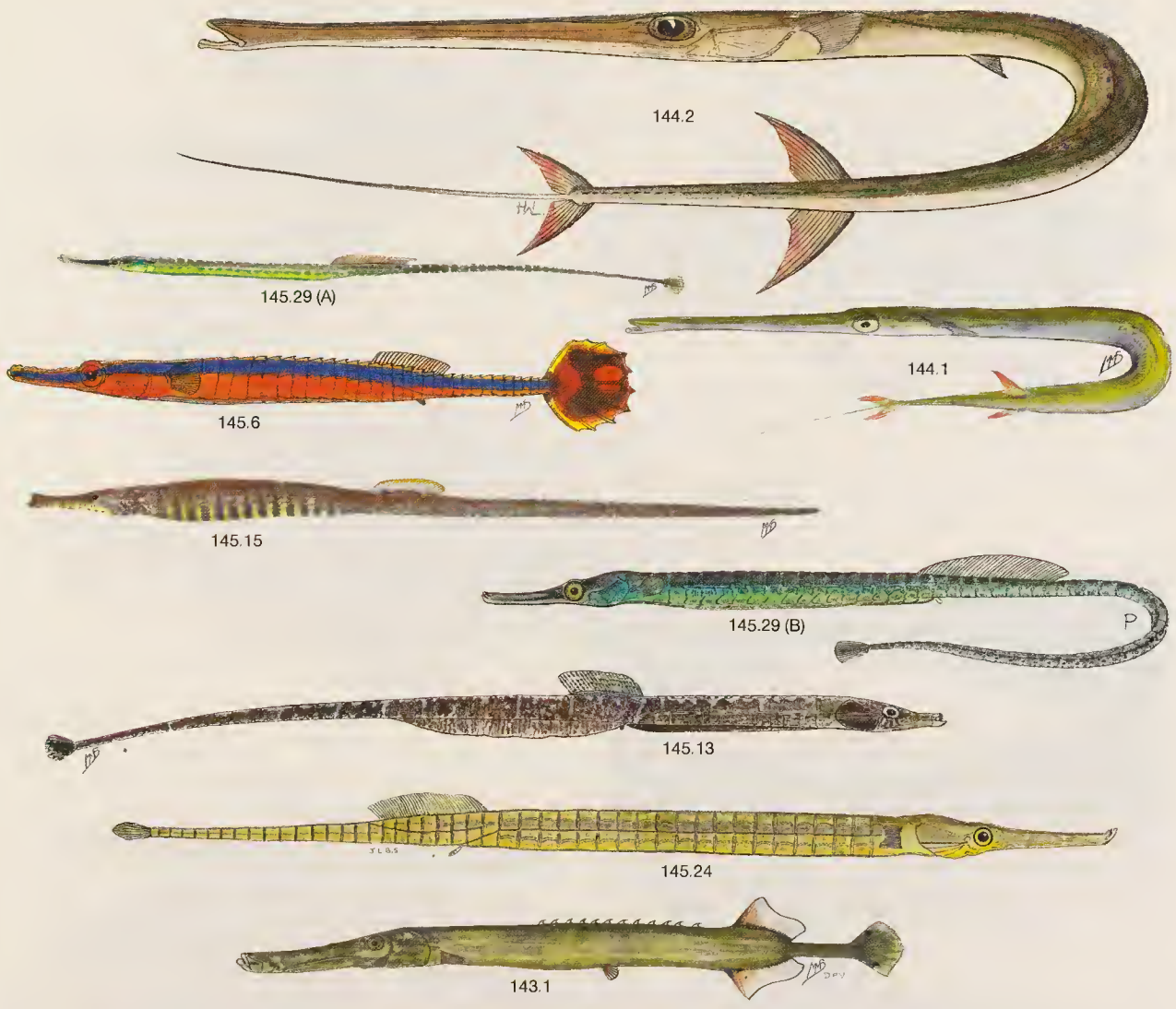


PLATE 23

143.1 *Aulostomus chinensis:* 40 cm (Kenya). **144.1** *Fistularia commersonii:* 48 cm (Knysna). **144.2** *Fistularia petimba:* 46 cm (Durban). **145.6** *Doryrhamphus excisus excisus:* 16 cm SL (off Durban). **145.7** *Doryrhamphus dactyliophorus:* 16 cm SL (off Durban). **145.8** *Doryrhamphus multiannulatus:* 12 cm SL (Mauritius). **145.13** *Hippichthys cyanospilos:* 10 cm (Inhaca Id.). **145.15** *Hippichthys spicifer:* 14.5 cm (Inhaca Id.). **145.24** *Microphis brachyurus:* 16 cm (Natal). **145.29** *Syngnathus acus:* (A) 19 cm (Knysna); (B) 27 cm (East London).

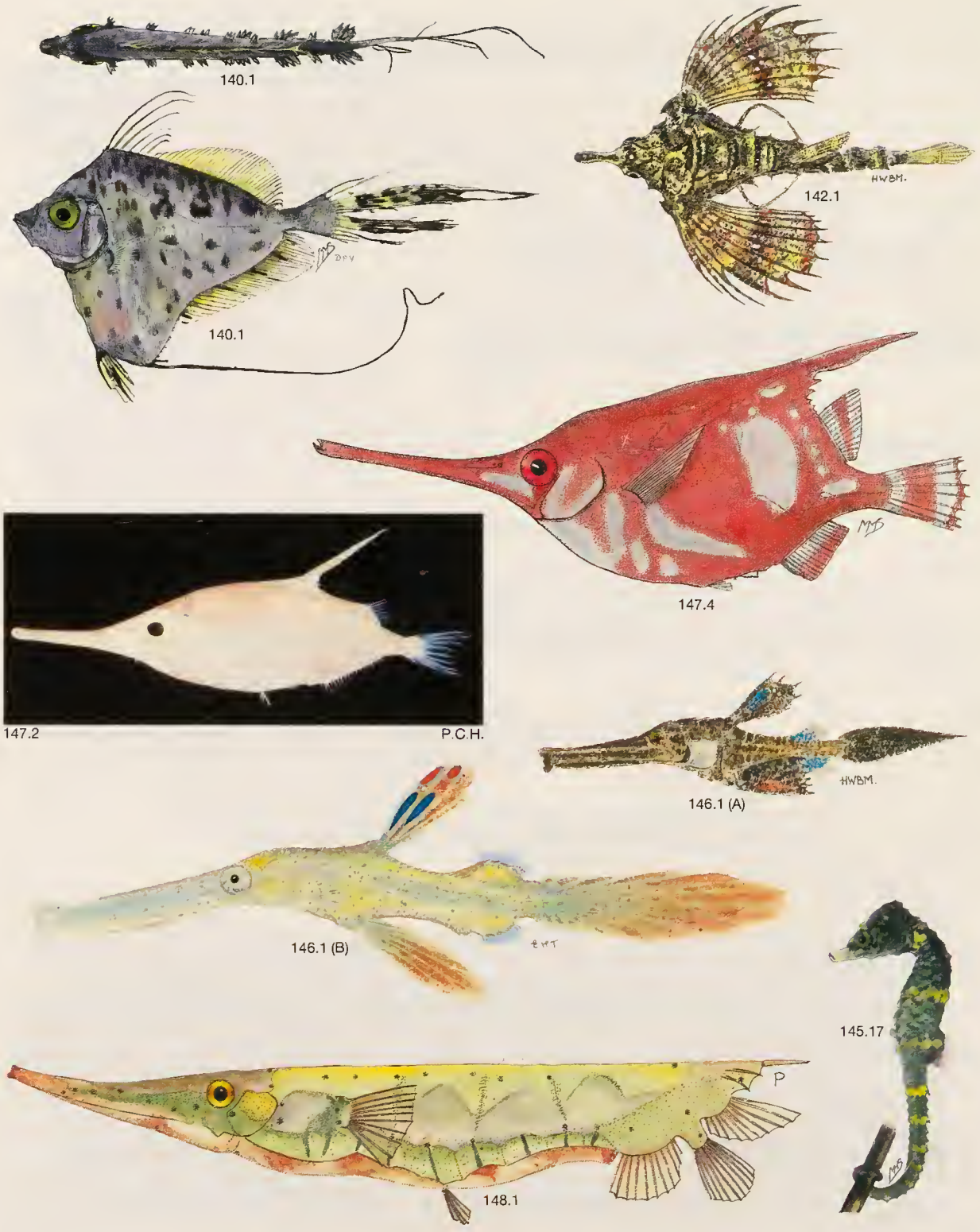


PLATE 24

140.1 *Grammicolepis brachiusculus:* 10 cm, dorsal and lateral views (East London). **142.1** *Eurypegasus draconis:* 7.5 cm (Natal). **145.17** *Hippocampus capensis:* 8 cm (Knysna). **146.1** *Solenostomus cyanopterus:* (A) 5 cm SL (Réunion); (B) 7.5 cm (off Natal). **147.2** *Macrorhamphosus scolopax:* 10 cm (off Durban). **147.4** *Notopogon macrosolen:* 22 cm (off Cape west coast). **148.1** *Aeoliscus punctulatus:* 12.5 cm (Inhaca Id.).

PLATE 25

149.4 *Dendrochirus brachypterus:* 9.5 cm (Inhaca Id.). **149.7** *Pterois antennata:* 18 cm (N. Mozambique). **149.8** *Pterois miles:* (A) 10 cm juvenile, dorsal and lateral views (Transkei); (B) 19 cm SL adult (Inhaca Id.). **149.9** *Pterois mombasae:* 11 cm SL (Durban Bay). **149.10** *Pterois radiata:* 10 cm SL (off Sodwana Bay). **149.36** *Scorpaenopsis venosa:* 20 cm (Inhaca Id.).

PLATE 26

149.16 *Parascorpaena mossambica:* (A) 12 cm, from weed (Transkei); (B) 8 cm, from sand (Inhaca Id.). **149.28** *Scorpaenodes parvipinnis:* 3 cm (Mafia Id., Tanzania). **149.29** *Scorpaenodes varipinnis:* 4 cm (N. Mozambique). **149.32** *Scorpaenopsis gibbosa:* (A) 9 cm SL (Transkei); (B) 13 cm (Natal); (C) 8 cm (Inhaca Id.). **149.37** *Sebastapistes cyanostigma:* 8 cm (S. Mozambique).

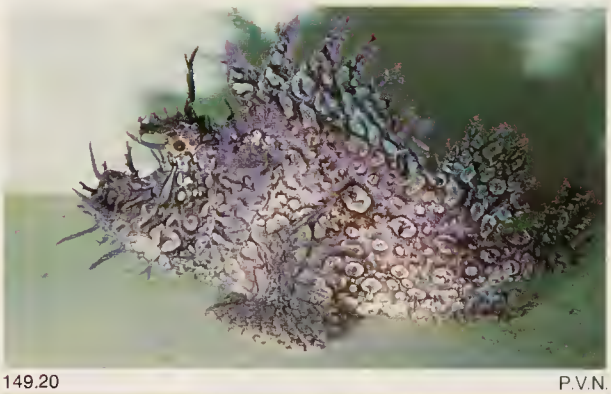
PLATE 27

149.2 *Choridactylus natalensis:* 10 cm SL (Durban). **149.21** *Scorpaena scrofa:* 20 cm (off South Africa). **149.42** *Helicolenus dactylopterus:* 25 cm (off East London). **149.43** *Sebastes capensis:* 30 cm (Lambert's Bay). **149.46** *Synanceia verrucosa:* ca. 15 cm (N. Mozambique). **150.2** *Coccotropsis gymnoderma:* 3 cm SL (off Tsitsikama). **153.1** *Caracanthus madagascariensis:* 5 cm (N. Mozambique). **153.2** *Caracanthus unipinna:* 4 cm (off Natal).

149.28 R.E.S.

149.21 P.C.H.

149.38 J.E.R.

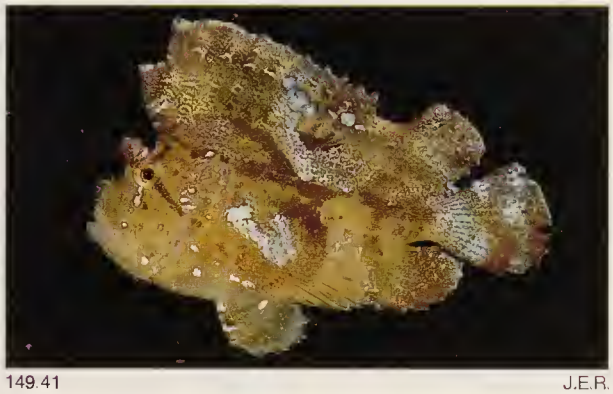


149.20 P.V.N.

149.31 J.E.R.

149.24 J.E.R.

149.23 J.E.R.



149.41 J.E.R.

PLATE 28

149.20 *Rhinopias frondosa:* 22 cm (Natal). **149.21** *Scorpaena scrofa:* 5 cm SL (Natal). **149.23** *Scorpaenodes guamensis:* 9 cm (Natal). **149.24** *Scorpaenodes hirsutus:* 5 cm SL (Mauritius). **149.28** *Scorpaenodes parvipinnis:* 8.5 cm SL (Natal). **149.31** *Scorpaenopsis diabolus:* 14 cm SL (Natal). **149.38** *Sebastapistes mauritiana:* 5.5 cm SL (Mauritius). **149.41** *Taenianotus triacanthus:* 5.5 cm SL (Mauritius).

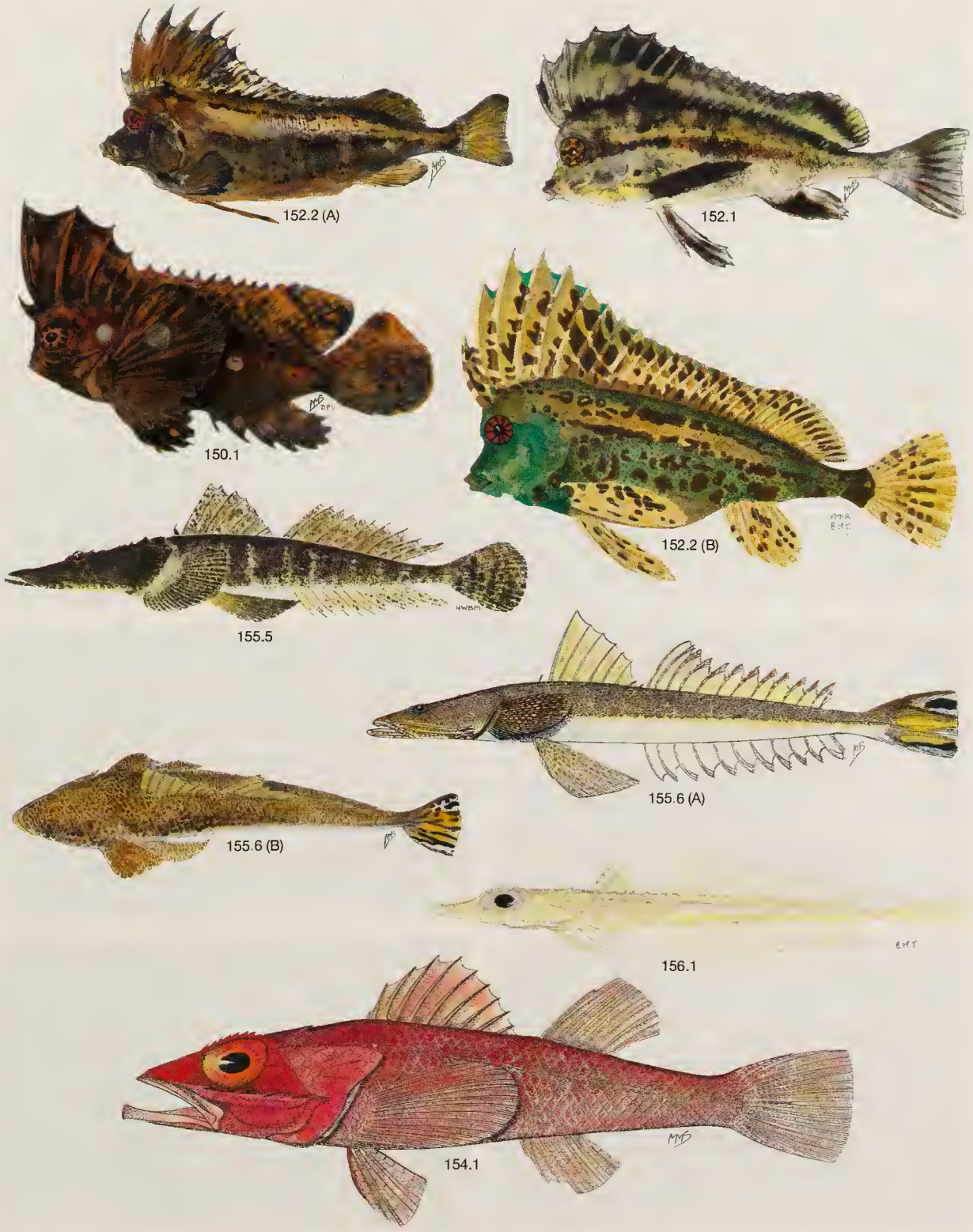
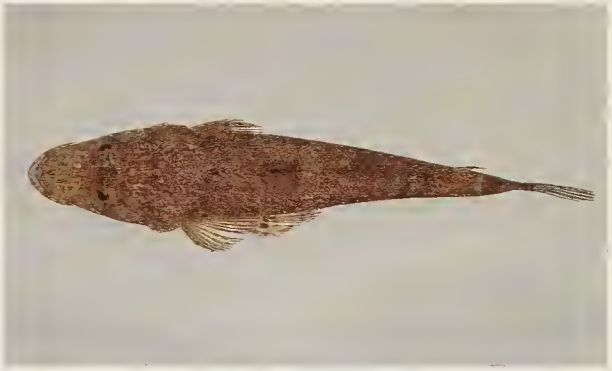


PLATE 29

150.1 *Ablabys binotatus:* 12 cm (Inhaca Id.). **152.1** *Congiopodus spinifer:* 15 cm (Algoa Bay). **152.2** *Congiopodus torvus:* (A) 50 cm (off Delagoa Bay), (B) 20.5 cm SL (East Cape). **154.1** *Parabembras robinsoni:* 20 cm (off South Africa). **155.5** *Papilloculiceps longiceps:* 30 cm (Natal). **155.6** *Platycephalus indicus:* (A) 38 cm; (B) 58 cm (both Knysna). **156.1** *Hoplichthys acanthopleurus:* 10.5 cm SL (off Durban).

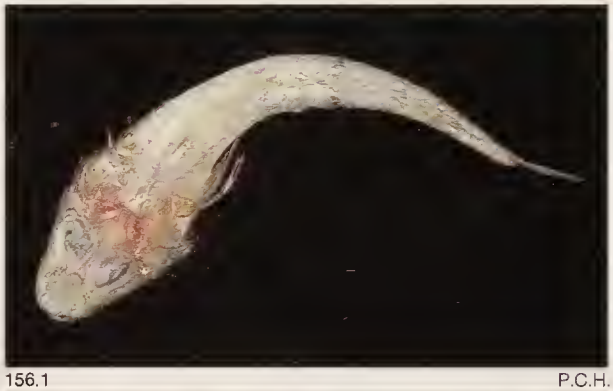
155.10 P.C.H.



155.10 R.E.S.

155.7 J.E.R.

158.1 P.C.H.



156.1 P.C.H.

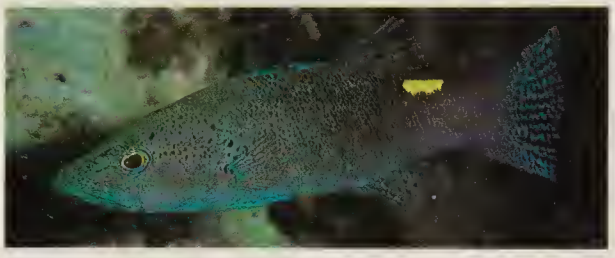
157.3 P.C.H.

155.8 R.E.S.

155.4 J.E.R.

PLATE 30

155.4 *Onigocia oligolepis:* 7.5 cm SL. **155.7** *Sorsogona prionota:* 20.5 cm (Red Sea). **155.8** *Thysanophrys arenicola:* 19 cm (Natal). **155.10** *Thysanophrys chiltonae:* 16 cm SL, dorsal and lateral views (Natal). **156.1** *Hoplichthys acanthopleurus:* 10.5 cm SL (Durban). **157.3** *Chelidonichthys quecketti:* 20 cm SL (off Port Alfred). **158.1** *Peristedion weberi:* 16 cm SL (off Transkei).



167.2 (A) J.E.R.

167.2 (B) J.E.R.

PLATE 31

157.1 *Chelidonichthys capensis:* 60 cm (Port Alfred) and inside of pectoral fin. **157.2** *Chelidonichthys kumu:* 30 cm (off Knysna). **157.3** *Chelidonichthys quecketti:* 30 cm (off Durban). **157.7** *Trigloporus lastoviza africanus:* 23 cm (off Port Alfred). **159.1** *Dactyloptena orientalis:* 13 cm (Inhaca Id.). **159.2** *Dactyloptena peterseni:* 35 cm (Algoa Bay). **162.1** *Antigonia rubescens:* 7.5 cm SL (Kenya). **167.2** *Belonoperca chabanaudi:* (A) 12 cm (Maldives); (B) 3.5 cm SL juvenile (Natal).

PLATE 32

164.1 *Kuhlia mugil:* 5 cm (Tsitsikama). **165.1** *Polyprion americanus:* (A) 11 cm juvenile (Walvis Bay); (B) 60 cm adult (Algoa Bay). **166.1** *Acanthistius sebastoides:* 18 cm (Knysna, in 100-200 m). **166.3** *Anthias bimaculatus:* (A) 12 cm holotype; (B) 10.5 cm female paratype; (C) 11 cm male (all N. Mozambique). **166.9** *Anthias squamipinnis:* (A) 12 cm male (Kenya); (B) 11.5 cm female (Kenya); (C) 2 cm juvenile (Transkei).

166.4 (A) P.C.H.

166.4 (B) P.C.H.

166.5 (A) J.E.R.

166.5 (B) R.E.S.

166.8 (A) J.E.R.

166.8 (B) J.E.R.

166.10 A.R.T.

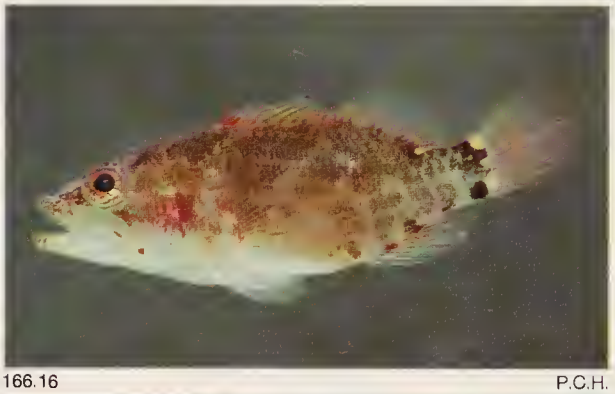
166.15 G.R.A.

PLATE 33

166.4 *Anthias connelli:* (A) 10 cm SL male, (B) 6 cm SL female paratype (both Durban). **166.5** *Anthias cooperi:* (A) (Mauritius); (B) 5.5 cm SL female (Natal). **166.8** *Anthias pulcherrimus:* (A) 5 cm female; (B) 7.5 cm SL male (both Mauritius). **166.10** *Holanthias borbonius:* 15 cm SL (Durban). **166.15** *Nemanthias carberryi:* 13 cm (Durban).

166.11 (A) P.C.H.

166.11 (B) P.C.H.



166.16 P.C.H.

166.17 P.C.H.

166.19 J.E.R.

166.20 J.E.R.

166.21 R.W.

166.73 J.E.R.

PLATE 34

166.11 *Holanthias caudicinctus:* (A) 9 cm SL holotype; (B) 6 cm SL female (both Kenya). **166.16** *Plectranthias longimanus:* 2 cm SL (Natal). **166.17** *Plectranthias morgansi:* 5 cm SL (Kenya). **166.19** *Aethaloperca rogaa:* 27.5 cm SL (Red Sea). **166.20** *Anyperodon leucogrammicus:* 30 cm (Maldives). **166.21** *Cephalopholis argus:* 24 cm SL (Chagos Archipelago). **166.73** *Plectropomus pũnctatus:* 44 cm SL (Seychelles).

PLATE 35

166.6 *Anthias evansi*: 11.5 cm holotype (Kenya). **166.10** *Holanthias borbonius:* 12.5 cm (Comoro Ids.). **166.12** *Holanthias natalensis:* 51 cm (S. Mozambique). **166.13** *Luzonichthys addisi:* 7 cm holotype (Aldabra Id.). **166.14** *Luzonichthys microlepis:* 6.5 cm holotype (Aldabra Id.). **166.15** *Nemanthias carberryi*: (A) 3 cm SL juvenile (South Africa); (B) 10 cm holotype (Kenya).

PLATE 36

166.20 *Anyperodon leucogrammicus:* 30 cm (Kenya). **166.22** *Cephalopholis aurantia:* 19 cm SL (S. Mozambique). **166.23** *Cephalopholis boenack:* 25.5 cm (Inhaca). **166.25** *Cephalopholis leopardus:* 13.5 cm (N. Mozambique). **166.32** *Dermatolepis striolatus:* 31 cm SL (Kenya). **166.34** *Epinephelus andersoni:* (A) 5 cm juvenile (Transkei); (B) 50 cm (Algoa Bay). **166.35** *Epinephelus areolatus:* 23 cm (N. Mozambique). **166.40** *Epinephelus faveatus:* 20.5 cm (Inhaca Id.). **166.43** *Epinephelus guaza:* 21.5 cm (Tsitsikama). **166.45** *Epinephelus lanceolatus:* 8 cm juvenile (Transkei).

166.22 J.E.R.

166.23 J.E.R.

166.24 J.E.R.

166.27 J.E.R.

166.26 (A) J.E.R.

166.26 (B) R.E.S

166.29 (A) J.E.R.

166.29 (B) J.E.R.

PLATE 37

166.22 *Cephalopholis aurantia:* 23.5 cm SL (Mauritius). **166.23** *C. boenack:* 11.5 cm SL (Palau Id.). **166.24** *C. formosa:* 13.5 cm SL (Sri Lanka). **166.26** *C. miniata:* (A) 16.5 cm SL (Red Sea); (B) 10.5 cm SL (Natal). **166.27** *C. nigripinnis:* 14 cm SL (Mauritius). **166.29** *C. sonnerati:* (A) 33 cm SL; (B) 12 cm SL (both Mauritius).

166.28 A.E. & R.W.

166.30 J.E.R.

166.31 J.E.R.

166.33 J.E.R.

166.34 J.E.R.

166.37 P.C.H.

166.36 (A) J.E.R.

166.36 (B) J.E.R.

PLATE 38

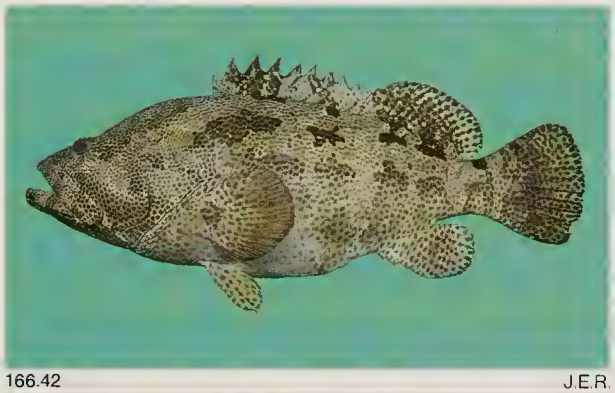
166.28 *Cephalopholis sexmaculata:* 28.5 cm SL (Chagos). **166.30** *Cephalopholis spiloparaea:* 13 cm SL (Mauritius). **166.31** *Cromileptes altivelis:* 9 cm SL (Australia). **166.33** *Epinephelus albomarginatus:* 22.5 cm (Durban). **166.34** *Epinephelus andersoni:* 37 cm SL (Natal). **166.36** *Epinephelus caeruleopunctatus:* (A) 33 cm SL (Persian Gulf); (B) 15.5 cm (Kenya). **166.37** *Epinephelus chabaudi:* 40 cm (Transkei).

166.38 J.E.R.

166.39 J.E.R.

166.40 J.E.R.

166.41 P.C.H.



166.42 J.E.R.

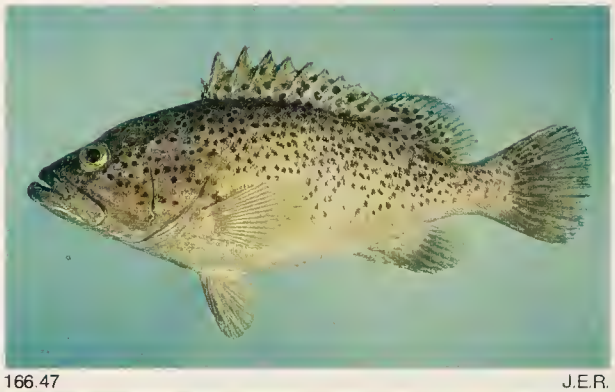
166.43 J.E.R.

166.44 J.E.R.

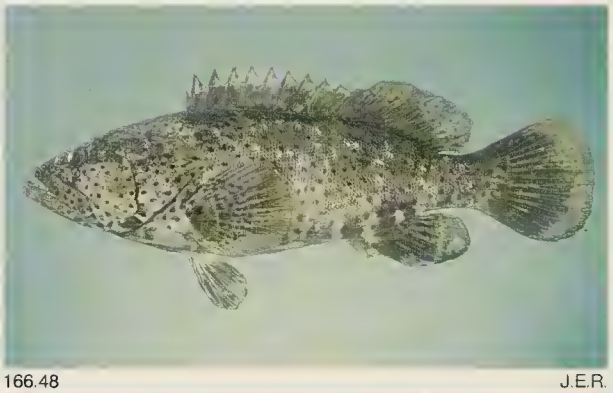
166.46 J.E.R.

PLATE 39

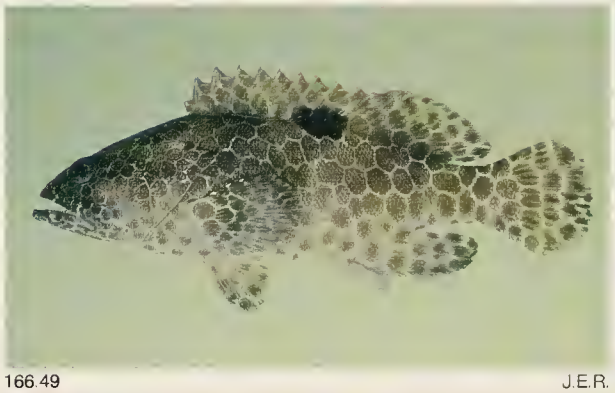
166.38 *Epinephelus chlorostigma:* 38.5 cm SL (India). **166.39** *E. fasciatus:* 15 cm SL (Mauritius). **166.40** *E. faveatus:* 18.5 cm (Mauritius). **166.41** *E. flavocaeruleus:* 66 cm SL (Kenya). **166.42** *E. fuscoguttatus:* 65 cm (Red Sea). **166.43** *E. guaza:* 7.5 cm SL (Natal). **166.44** *E. hexagonatus:* 15.5 cm SL (Mauritius). **166.46** *E. longispinis:* 40 cm (Sri Lanka).



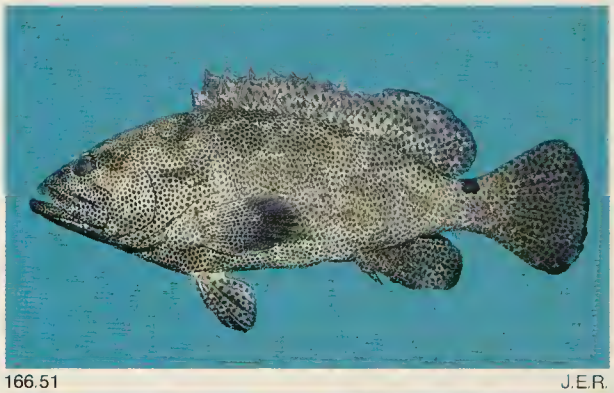
166.47 J.E.R.



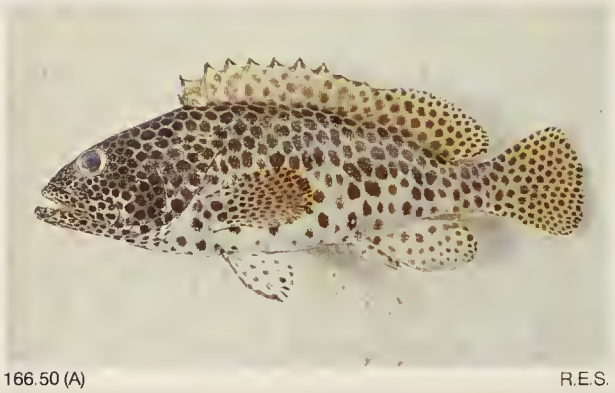
166.48 J.E.R.



166.49 J.E.R.

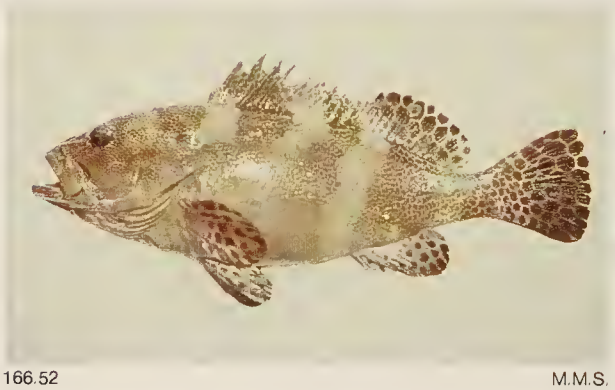


166.51 J.E.R.



166.50 (A) R.E.S.

166.50 (B) A.E. & R.W.



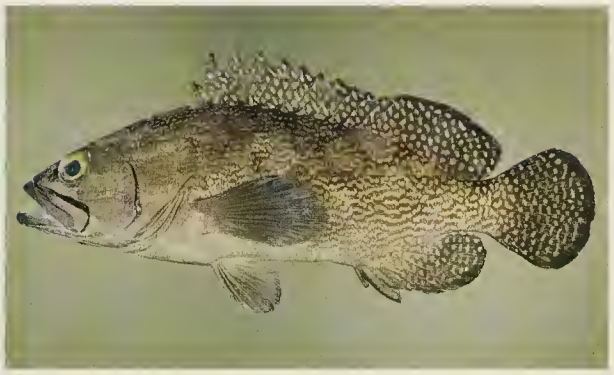
166.52 M.M.S.

166.53 J.E.R.

PLATE 40

166.47 *Epinephelus magniscuttis:* 41 cm (Natal). **166.48** *E. malabaricus:* 31.5 cm SL (India). **166.49** *E. melanostigma:* 11 cm SL (Natal). **166.50** *E. merra:* (A) 20 cm SL (N. Mozambique); (B) 6.5 cm SL (Chagos). **166.51** *E. microdon:* 49 cm (Red Sea). **166.52** *E. miliaris:* (Mozambique). **166.53** *E. morrhua:* 42 cm (Red Sea).

166.54 J.E.R.

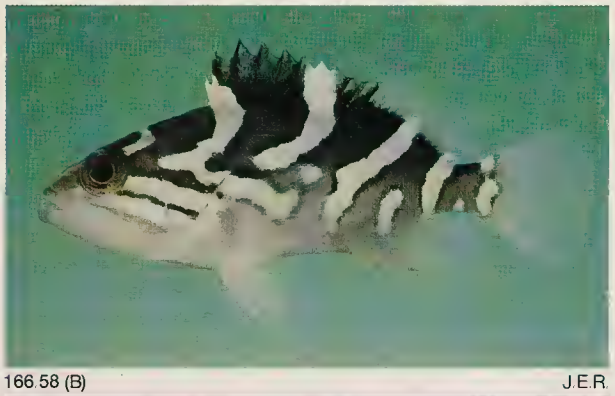


166.55 J.E.R.

166.56 (A) J.E.R.

166.56 (B) P.C.H.

166.58 (A) J.E.R.



166.58 (B) J.E.R.

166.60 (A) J.E.R.

166.60 (B) J.E.R.

PLATE 41

166.54 *Epinephelus multinotatus:* 33.5 cm SL (Persian Gulf). **166.55** *E. ongus:* 22 cm SL (Ponape). **166.56** *E. poecilonotus:* (A) 11 cm SL (Durban); (B) 29.5 cm SL (Kenya). **166.58** *E. radiatus:* (A) 29.5 cm SL (Japan); (B) 4 cm SL (Mauritius). **166.60** *E. rivulatus:* (A) 13 cm SL; (B) 22 cm SL (both Natal).

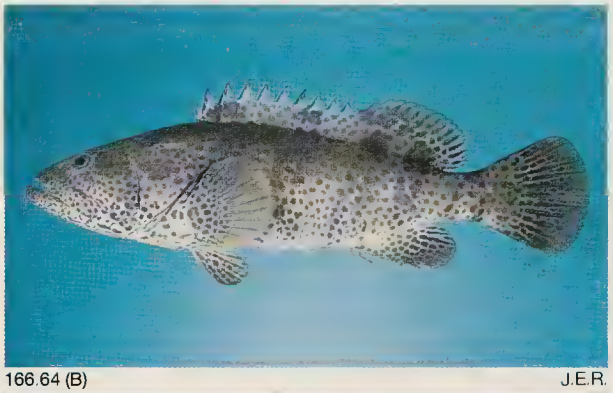
166.59 D.P.

166.61 J.E.R.

166.62 P.C.H.

166.63 J.E.R.

166.64 (A) J.E.R.



166.64 (B) J.E.R.

166.65 (A) J.E.R.

166.65 (B) J.E.R.

PLATE 42

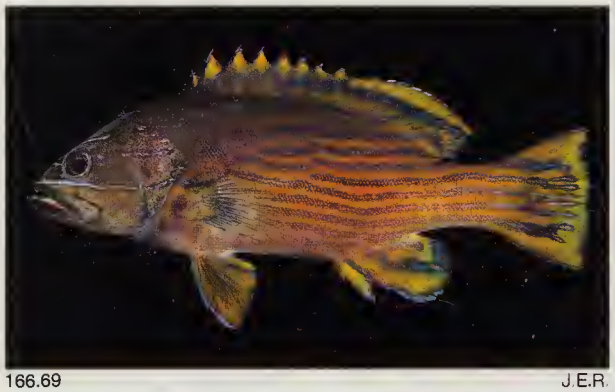
166.59 *Epinephelus retouti:* 10 cm (Mauritius). **166.61** *E. septemfasciatus:* 23 cm SL (Japan). **166.62** *E.* sp.: 50 cm SL (Natal). **166.63** *E. spilotoceps:* 18 cm SL (Marshall Ids.). **166.64** *E. suillus:* (A) 10.5 cm SL (India); (B) 32 cm SL (Persian Gulf). **166.65** *E. tauvina:* (A) 15 cm SL (Mauritius); (B) 40.5 cm SL (Red Sea).

166.66 P.C.H.

166.68 J.E.R.

166.67 (A) J.E.R.

166.67 (B) P.C.H.



166.69 J.E.R.

166.70 J.E.R.

166.72 J.E.R.

166.74 J.E.R.

PLATE 43

166.66 *Epinephelus tukula:* 32 cm SL (Natal). **166.67** *Epinephelus undulosus:* (A) 16 cm SL (Philippines); (B) 60 cm SL (Kenya). **166.68** *Gracila albomarginata:* 12.5 cm (Mauritius). **166.69** *Gracila polleni:* 15 cm SL (Philippines). **166.70** *Plectropomus areolatus:* 31.5 cm SL (Red Sea). **166.72** *Plectropomus pessuliferus:* 49 cm SL (Red Sea). **166.74** *Variola albimarginata:* 22 cm SL (Mauritius).

166.75 (A) R.E.S.

166.75 (B) J.E.R

163.2 J.E.R

164.2 M.M.S.

169.4 J.E.R

169.5 G.R.A.

171.2 P.C.H.

174.3 J.E.R

PLATE 44

166.75 *Variola louti:* (A) (Natal); (B) 9.5 cm SL (Palau Id.). **163.2** *Ambassis natalensis:* 7 cm (Natal). **164.2** *Kuhlia rupestris:* 18 cm (Mauritius). **169.4** *Pseudochromis dutoiti:* (Natal). **169.5** *Pseudochromis melas:* 8 cm (Natal). **171.2** *Pseudogramma polyacantha:* 3.5 cm (Natal). **174.3** *Priacanthus hamrur:* 25.5 cm SL (Mauritius).

PLATE 45

166.57 *Epinephelus posteli:* 61 cm SL (S. Mozambique). **166.59** *Epinephelus retouti:* 34 cm SL (Bassas de India). **166.60** *Epinephelus rivulatus:* 30 cm (Kenya). **166.64** *Epinephelus suillus:* 30 cm (Inhaca Id.). **166.71** *Plectropomus laevis:* 76 cm (Kenya). **166.72** *Plectropomus maculatus:* 30 cm (Kenya). **166.73** *Plectropomus punctatus:* 76 cm (N. Mozambique). **166.76** *Serranus cabrilla:* 13.5 cm (Knysna). **167.3** *Grammistes sexlineatus:* (A) 3 cm (Xora, Transkei); (B) 1.5 cm (Xora, Transkei); (C) 10.5 cm (N. Mozambique).

PLATE 46

168.1 *Callanthias legrasi:* 21.5 cm holotype (off Algoa Bay). **169.1** *Anisochromis kenyae:* (A) 2 cm female paratype; (B) 2 cm male holotype (both Kenya). **169.2** *Chlidichthys bibulus:* 4.5 cm SL holotype (N. Mozambique). **169.3** *Chlidichthys johnvoelckeri:* 3 cm holotype (N. Mozambique). **169.6** *Pseudochromis natalensis:* 7.5 cm (N. Mozambique). **169.7** *Pseudochromis pesi:* 4.5 cm (Natal). **169.8** *Pseudochromis tauberae:* 6.5 cm SL (Natal). **170.1** *Acanthoplesiops indicus:* 3.5 cm (Inhaca Id.).

PLATE 47

172.1 *Calloplesiops altivelis:* 14 cm (N. Mozambique). **172.3** *Plesiops multisquamatus:* 23 cm holotype (Natal). **173.1** *Pelates quadrilineatus:* 9 cm SL (Aldabra). **173.2** *Terapon jarbua:* 12.5 cm SL (Tsitsikama). **174.1** *Cookeolus boops:* 19 cm SL (off Tsitsikama). **174.2** *Priacanthus cruentatus:* 28 cm (Algoa Bay). **174.4** *Pristigenys niphonia:* 15 cm (off Algoa Bay).

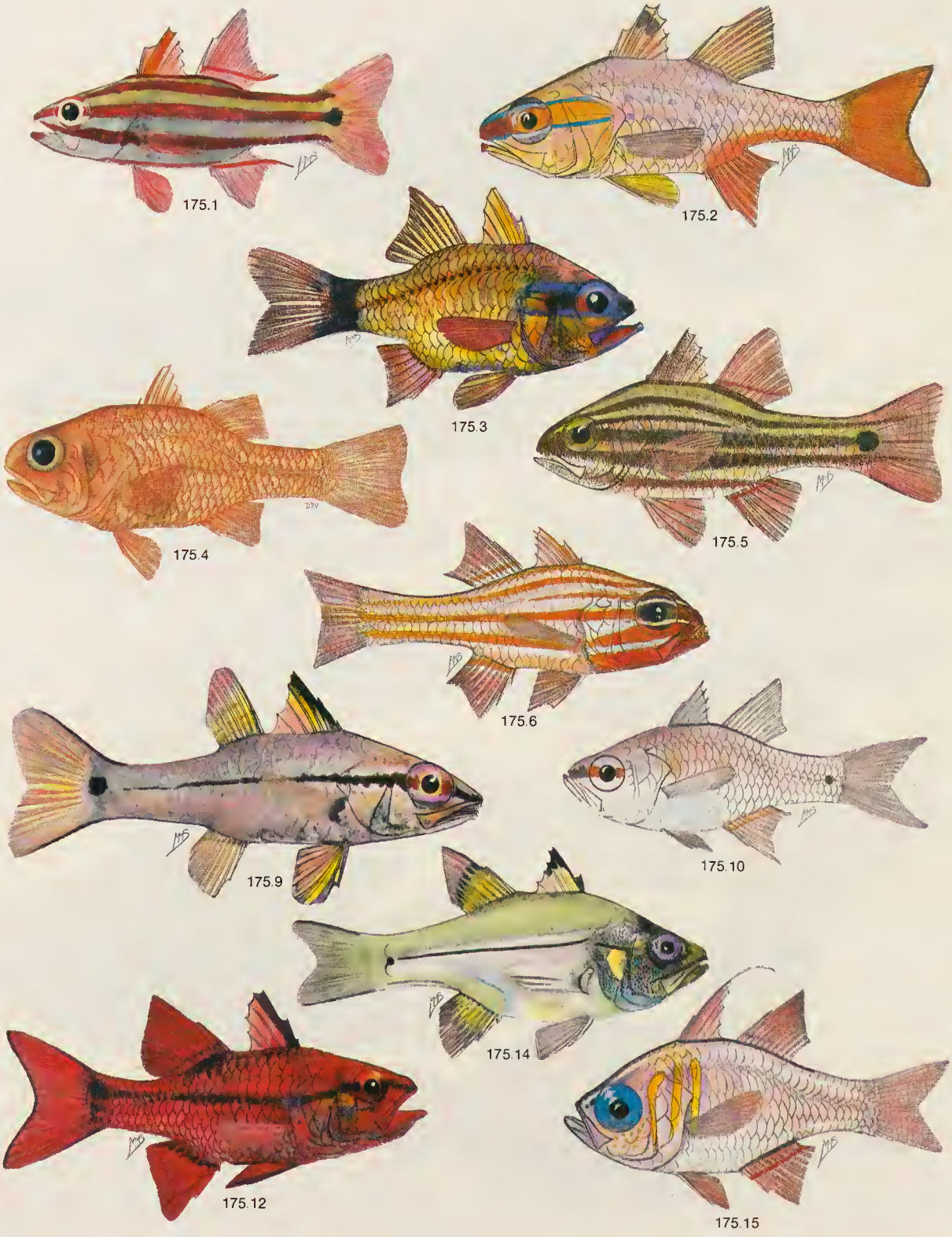


PLATE 48

175.1 *Apogon angustatus:* 9.5 cm (Inhaca). **175.2** *A. apogonoides:* 9 cm (Mozambique Id.). **175.3** *A. aureus:* 12 cm (N. Mozambique). **175.4** *A. coccineus:* 5.5 cm (Natal). **175.5** *A. cooki:* 8 cm (Inhaca Id.). **175.6** *A. cyanosoma:* 6 cm (N. Mozambique). **175.9** *A. fraenatus:* 10.5 cm (N. Mozambique). **175.10** *A. fragilis:* 4.5 cm holotype (N. Mozambique). **175.12** *A. kallopterus:* 14 cm (Inhaca Id.). **175.14** *A. lateralis:* 9 cm (Seychelles). **175.15** *A. leptacanthus:* 4.5 cm (N. Mozambique).

PLATE 49

175.16 *Apogon multitaeniatus:* 14 cm (Inhaca Id.). **175.17** *A. nigripes:* 6 cm male brooding eggs in mouth (Inhaca Id.). **175.18** *A. nigripinnis:* 8.5 cm (Inhaca Id.). **175.19** *A. nitidus:* 7.5 cm holotype (Inhaca Id.). **175.20** *A. quadrifasciatus:* 6.5 cm (Delagoa Bay). **175.23** *A. semiornatus:* 6.5 cm (S. Mozambique). **175.25** *A. taeniophorus:* 6.5 cm (Natal). **175.26** *A. thermalis:* 6.5 cm (N. Mozambique). **175.27** *A. timorensis:* 7.5 cm holotype of *A. fraxineus* (N. Mozambique). **175.28** *Apogonichthys ocellatus:* 4.5 cm (Transkei). **175.30** *Archamia fucata:* 8 cm (N. Mozambique).

PLATE 50

175.32 *Archamia mozambiquensis:* 8.5 cm holotype (Mozambique Id.). **175.34** *Cheilodipterus caninus:* 15.5 cm (N. Mozambique). **175.36** *Cheilodipterus lineatus:* 20.5 cm (Kenya). **175.37** *Cheilodipterus quinquelineatus:* 11 cm (N. Mozambique). **175.38** *Foa brachygramma:* 6.5 cm (Inhaca Id.). **175.39** *Fowleria aurita:* 9 cm (N. Mozambique). **175.40** *Neamia octospina:* 5 cm (Zanzibar). **175.43** *Sphaeramia orbicularis:* 9.5 cm (Aldabra Id.). **175.52** *Pseudamia gelatinosa:* 7.5 cm holotype (Aldabra Id.).

175.2 J.E.R.

175.5 G.R.A.

175.12 O.G.

175.22 J.E.R.

175.23 O.G.

175.31 J.E.R.

175.32 J.E.R.

175.36 G.R.A.

PLATE 51

175.2 *Apogon apogonoides:* (Kenya). **175.5** *Apogon cooki:* 8 cm (Natal). **175.12** *Apogon kallopterus:* 7 cm (Red Sea). **175.22** *Apogon savayensis:* 7 cm SL (Mauritius). **175.23** *Apogon semiornatus:* 5 cm SL (Durban). **175.31** *Archamia lineolata:* 5.5 cm SL (Red Sea). **175.32** *Archamia mozambiquensis:* 5 cm (off Natal). **175.36** *Cheilodipterus lineatus:* 15 cm (Natal).

PLATE 52

177.1 *Scombrops boops:* 36.5 cm (Algoa Bay). **178.1** *Pomatomus saltatrix:* 73.5 cm (Knysna). **179.1** *Diagramma pictum:* 10 cm (Inhaca Id.). **179.3** *Plectorhinchus flavomaculatus:* (A) 22.5 cm (Inhaca Id.); (B) 32.5 cm (Kenya). **179.4** *Plectorhinchus gaterinus:* (A) 40 cm (Kenya); (B) 9.5 cm juvenile (Tanzania); (C) 3.5 cm juvenile (Kenya). **179.6** *Plectorhinchus plagiodesmus:* (A) 30.5 cm; (B) 8 cm juvenile (both Inhaca Id.). **179.8** *Plectorhinchus shotaf:* head of 72.5 cm specimen (Kenya). **179.9** *Plectorhinchus sordidus:* 4.5 cm (N. Mozambique). **179.10** *Pomadasys commersonnii:* 68 cm (Knysna). **179.11** *Pomadasys furcatum:* 33 cm (Inhaca Id.). **179.17** *Pomadasys olivaceum:* 15 cm (Knysna). **179.18** *Pomadasys striatum:* 20 cm (Knysna).

181.4

181.5

181.2

180.1 P.C.H.

181.3 J.E.R.

181.11 J.E.R.

181.19 P.C.H.

PLATE 53

180.1 *Dinoperca petersi:* 15.7 cm SL (Durban). **181.2** *Aphareus rutilans:* 56 cm SL (Kenya). **181.3** *Aprion virescens:* 34 cm SL (off Natal). **181.4** *Etelis coruscans:* 45 cm (Natal). **181.5** *Lutjanus argentimaculatus:* 55.5 cm (E. Cape). **181.11** *Lutjanus kasmira:* 11 cm SL (Mauritius). **181.19** *Lutjanus sebae:* 59 cm SL (Kenya).

PLATE 54

181.6 *Lutjanus bohar:* 30.5 cm (N. Mozambique). **181.7** *L. ehrenbergi:* 25.5 cm (Inhaca Id.). **181.8** *L. fulviflamma:* 25.5 cm (Inhaca Id.). **181.9** *L. fulvus:* 23 cm (Poivre Id.). **181.10** *L. gibbus:* 83 cm (Kenya). **181.11** *L. kasmira:* 20 cm (N. Mozambique).

PLATE 55

181.12 *Lutjanus lemniscatus:* 37 cm (S. Mozambique). **181.13** *L. lutjanus:* 19 cm (Inhaca Id.). **181.15** *L. notatus:* 23 cm (S. Mozambique). **181.16** *L. rivulatus:* (A) 18 cm juvenile (Natal); (B) 51 cm (S. Mozambique). **181.18** *L. sanguineus:* (A) 112 cm (S. Mozambique); (B) 15 cm juvenile (Natal).

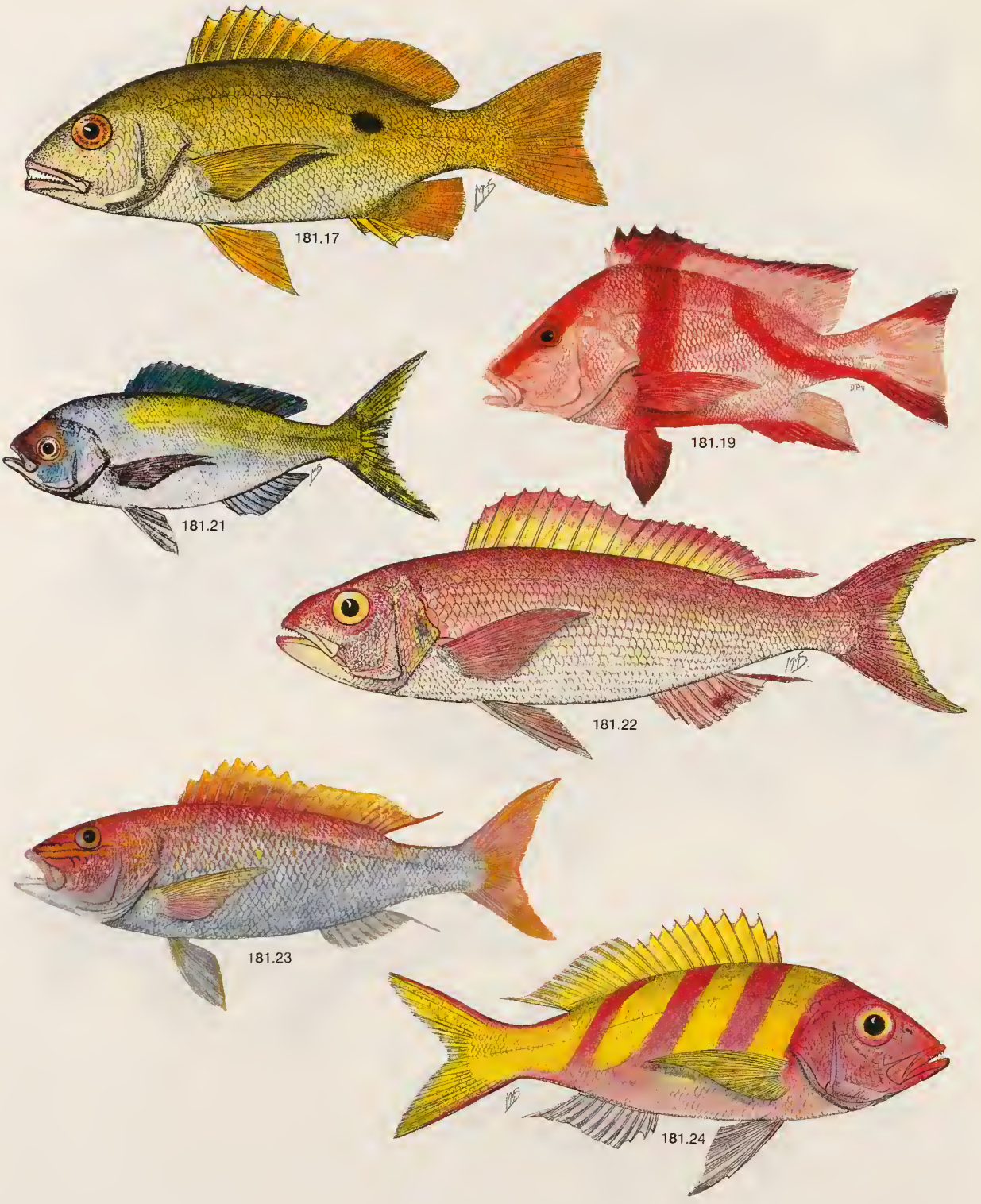


PLATE 56

181.17 *Lutjanus russellii:* 23 cm (Inhaca Id.). **181.19** *Lutjanus sebae:* 19 cm SL (Natal). **181.21** *Paracaesio xanthurus:* 18 cm (Seychelles). **181.22** *Pristipomoides filamentosus:* 76 cm (Kenya). **181.23** *Pristipomoides multidens:* 48 cm (Port Alfred?). **181.24** *Pristipomoides zonatus:* 35.5 cm (S. Mozambique).

PLATE 57

182.1 *Caesio caerulaureus:* 18 cm (N. Mozambique). **182.2** *Caesio teres:* 15 cm (S. Mozambique). **182.3** *Pterocaesio capricornis:* 16 cm holotype (N. Mozambique). **182(A)** *Gymnocaesio gymnopterus:* 15 cm (N. Mozambique). **182(B)** *Pterocaesio diagramma:* 20 cm (N. Mozambique). **182(C)** *Pterocaesio pisang:* 15 cm N. Mozambique). **182(D)** *Pterocaesio chrysozona:* 18 cm (N. Mozambique). **182(E)** *Pterocaesio tile:* 25 cm (Seychelles). **182(F)** *Caesio lunaris:* 33 cm (N. Mozambique).

PLATE 58

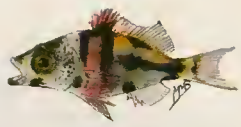
183.1 *Acanthopagrus berda*: 30 cm (Algoa Bay). **183.2** *Acanthopagrus bifasciatus*: 20 cm (S. Mozambique). **183.3** *Argyrops filamentosus*: 28 cm (Natal). **183.4** *Argyrops spinifer*: (A) 53 cm SL; (B) 50 cm SL (both Durban). **183.5** *Argyrozona argyrozona*: 33 cm (Algoa Bay). **183.6** *Boopsoidea inornata*: (A) 13 cm (Robberg, Plettenberg); (B) 6 cm juvenile (Knysna). **183.7** *Cheimerius nufar*: (A) 51 cm (S. Mozambique); (B) 21.5 cm juvenile (Tsitsikama).

PLATE 59

183.8 *Chrysoblephus anglicus:* 29 cm SL (S. Mozambique). **183.9** *Chrysoblephus cristiceps:* (A) 35.5 cm (Algoa Bay); (B) 6 cm juvenile (Knysna). **183.10** *Chrysoblephus gibbiceps:* 53.5 cm (Algoa Bay). **183.11** *Chrysoblephus laticeps:* 51 cm (Knysna). **183.12** *Chrysoblephus lophus:* 35 cm SL (Natal). **183.13** *Chrysoblephus puniceus:* 60 cm (Algoa Bay). **183.14** *Crenidens crenidens:* 20.5 cm (S. Mozambique). **183.15** *Cymatoceps nasutus:* (A) 60 cm (Algoa Bay); (B) 20.5 cm (Transkei); (C) head of 120 cm specimen (East London).

183.16 (A)

183.16 (B)



183.16 (C)

183.18

183.17

183.21

183.20

183.23

183.22

183.24

183.25

PLATE 60

183.16 *Diplodus cervinus hottentotus:* (A) 46 cm; (B) 4 cm; (C) 2 cm (all Knysna). **183.17** *Diplodus sargus capensis:* 29 cm (Knysna). **183.18** *Gymnocrotaphus curvidens:* 21 cm (Knysna); teeth of E. Cape specimen. **183.20** *Lithognathus lithognathus:* 68.5 cm (Knysna). **183.21** *Lithognathus mormyrus:* 28 cm (Knysna). **183.22** *Pachymetopon aeneum:* 30.5 cm (Algoa Bay). **183.23** *Pachymetopon blochii:* 23 cm (E. Cape). **183.24** *Pachymetopon grande:* 30.5 cm (Transkei). **183.25** *Pagellus bellotti natalensis:* 18 cm (Algoa Bay).

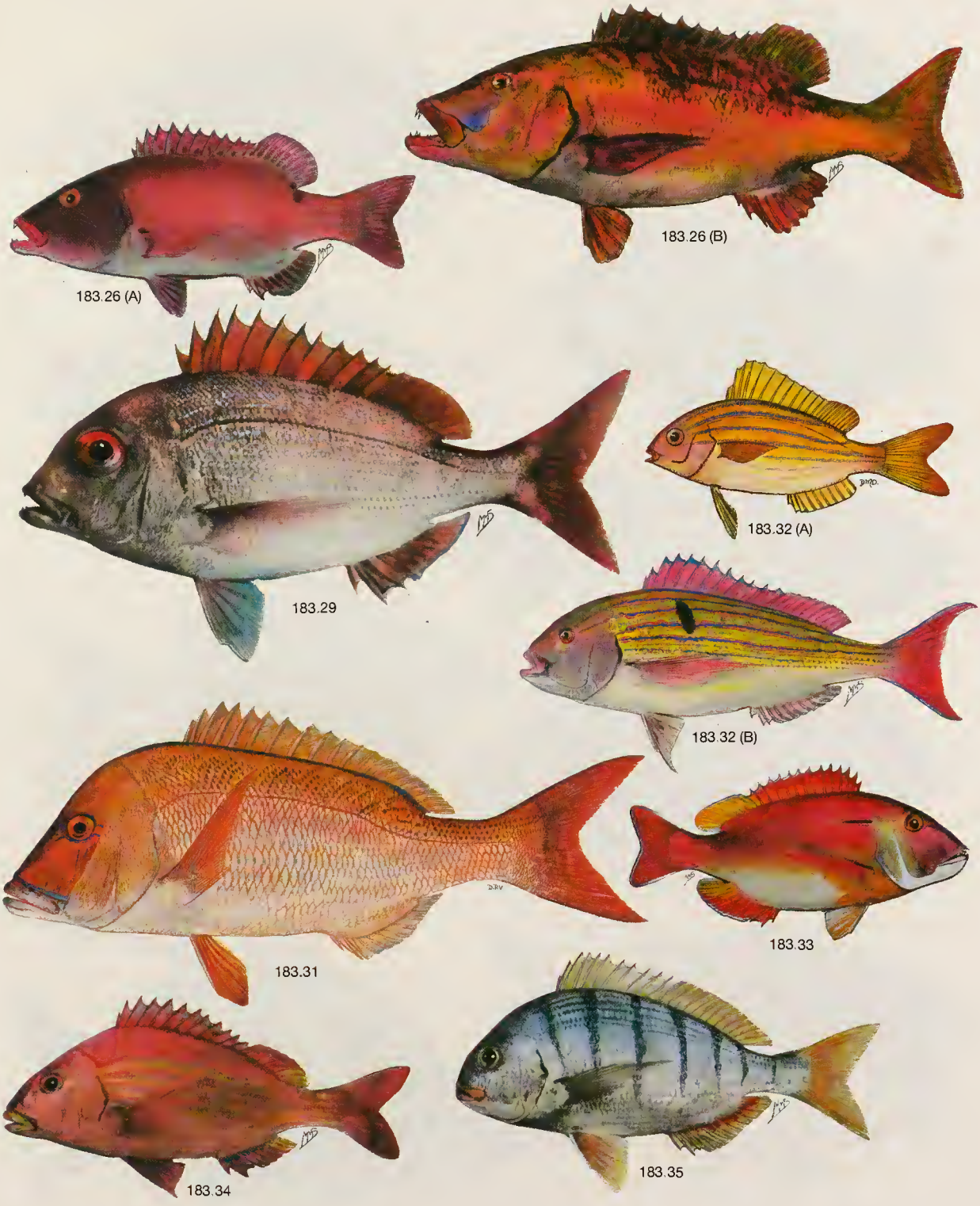
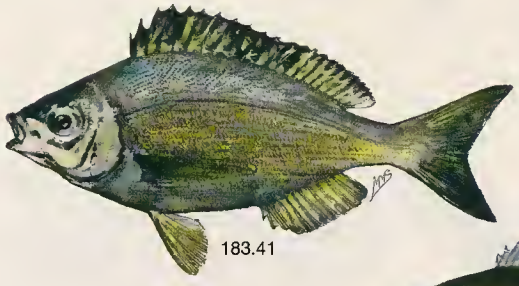


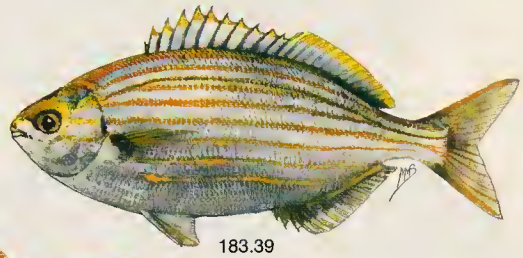
PLATE 61

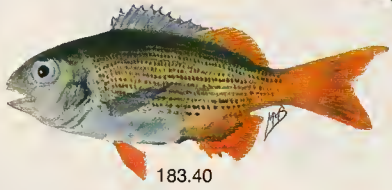
183.26 *Petrus rupestris:* (A) 23 cm (Tsitsikama); (B) 122 cm (Algoa Bay). **183.29** *Polysteganus caeruleopunctatus:* 33 cm (Kenya). **183.31** *Polysteganus praeorbitalis:* 26 cm SL (Transkei). **183.32** *Polysteganus undulosus:* (A) 7.5 cm juvenile (Knysna); (B) 120 cm (off East London). **183.33** *Porcostoma dentata:* 25.5 cm (Tsitsikama). **183.34** *Pterogymnus laniarius:* 28 cm (Algoa Bay). **183.35** *Rhabdosargus globiceps:* 35 cm (Algoa Bay).

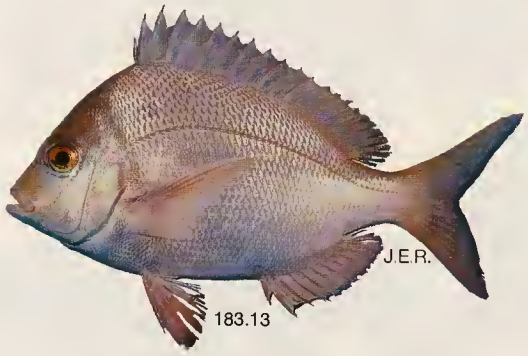
183.36

183.37

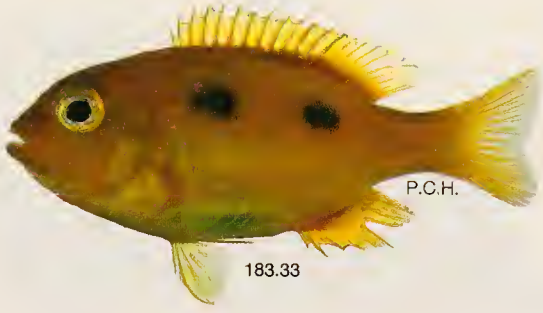

183.41


183.39

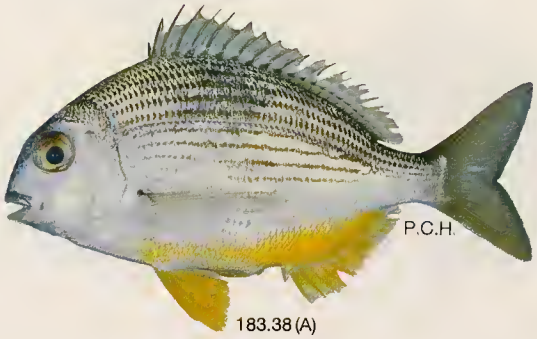

183.40



183.13



183.33



183.38 (A)

183.38 (B)

PLATE 62

183.13 *Chrysoblephus puniceus:* 23.5 cm (off Durban). **183.33** *Porcostoma dentata:* 4.5 cm SL juvenile (Tsitsikama). **183.36** *Rhabdosargus holubi:* 35.5 cm (Knysna). **183.37** *Rhabdosargus sarba:* 51 cm (Knysna). **183.38** *Rhabdosargus thorpei:* (A) 11.5 cm SL (Durban); (B) (Natal). **183.39** *Sarpa salpa:* 30.5 cm (Knysna). **183.40** *Sparodon durbanensis:* 13.5 cm juvenile (Tsitsikama). **183.41** *Spondyliosoma emarginatum:* 20.5 cm (Tsitsikama).

PLATE 63

184.1 *Spicara australis:* 20 cm (off Durban). **184.2** *Spicara axillaris:* 24 cm (False Bay). **185.1** *Gnathodentex aurolineatus:* 23 cm (Kenya). **185.3** *Gymnocranius robinsoni:* 46 cm (Inhaca Id.). **185.4** *Lethrinus concyliatus:* 48 cm holotype (N. Mozambique). **185.5** *Lethrinus crocineus:* (A) 55 cm (Kenya); (B) 45 cm holotype (N. Mozambique). **185.6** *Lethrinus elongatus:* (A) 33 cm (Kenya); (B) 84 cm (N. Mozambique).

PLATE 64

185.7 *Lethrinus harak:* 45 cm (Seychelles). **185.8** *L. hypselopterus:* 12.5 cm (N. Mozambique). **185.9** *L. kallopterus:* (A) 60 cm (Kenya); (B) 18 cm (N. Mozambique). **185.10** *L. lentjan:* (A) 20 cm; (B) 35 cm (both Kenya). **185.11** *L. mahsena:* (A) 28 cm; (B) 35 cm holotype of *L. enigmaticus* (both Seychelles). **185.12** *L. mahsenoides:* 20 cm (Kenya).

PLATE 65

185.13 *Lethrinus nebulosus*: 56 cm (Inhaca Id.). **185.14** *L. ramak*: 33 cm (Seychelles). **185.16** *L. sanguineus*: 45 cm (Kenya). **185.17** *L. variegatus*: (A) 45 cm; (B) 25 cm (both N. Mozambique). **185.18** *L. xanthochilus*: 50 cm (N. Mozambique). **185.19** *Monotaxis grandoculus*: 56 cm (Kenya).

185.1 G.R.A.

185.2 R.E.S.

185.15 J.E.R.

185.16 J.E.R.

185.19 (A) J.E.R.

185.19 (B) J.E.R.

192.3 J.E.R.

PLATE 66

185.1 *Gnathodentex aurolineatus*: 18 cm (Mauritius). **185.2** *Gymnocranius griseus*: 25 cm (Natal). **185.15** *Lethrinus rubrioperculatus:* 16 cm (Mauritius). **185.16** *Lethrinus sanguineus:* 25 cm SL (Mauritius). **185.19** *Monotaxis grandoculus:* (A) 28.5 cm (Mauritius); (B) (Maldives). **192.3** *Platax teira:* 5 cm (Kenya).

PLATE 67

186.1 *Nemipterus bipunctatus:* 21.5 cm female type of *N. delagoae* (Delagoa Bay). **186.3** *Parascolopsis eriomma:* 25.5 cm (S. Mozambique). **186.4** *Scolopsis bimaculatus:* 18 cm (S. Mozambique). **186.5** *Scolopsis ghanam:* 20.5 cm (Seychelles). **186.6** *Scolopsis vosmeri:* 23 cm (S. Mozambique). **187.1** *Coracinus capensis:* 51 cm (Knysna).

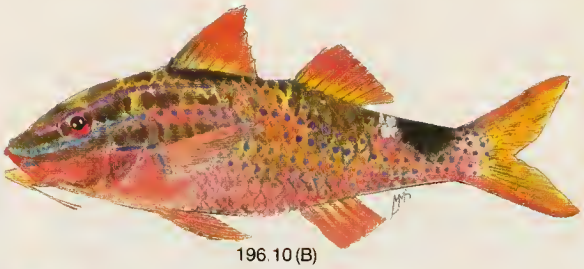
PLATE 68

187.2 *Coracinus multifasciatus:* 30.5 cm (Algoa Bay). **188.1** *Parascorpis typus:* 35 cm (Port Alfred). **189.2** *Kyphosus cinerascens:* 15 cm (Inhaca Id.). **190.1** *Neoscorpis lithophilus:* 20.5 cm (Tsitsikama). **191.1** *Scatophagus tetracanthus:* 15 cm (Inhaca Id.). **192.3** *Platax teira:* 18 cm (Natal). **193.2** *Monodactylus falciformis:* (A) 14.5 cm; (B) 3.5 cm (both Tsitsikama). **194.1** *Gerres acinaces:* 25.5 cm (Delagoa Bay).

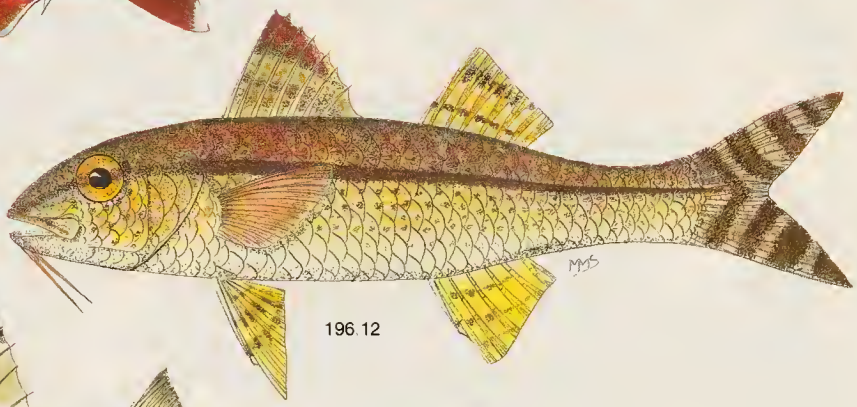
PLATE 69

196.1 *Mulloides flavolineatus:* 23 cm (S. Mozambique). **196.2** *Mulloides vanicolensis:* 20 cm (Poivre Id.). **196.3** *Parupeneus barberinus:* 20.5 cm (Zanzibar). **196.4** *Parupeneus bifasciatus:* 25.5 cm (Kenya). **196.5** *Parupeneus cinnabarinus:* (A) 25.5 cm male holotype of *Pseudupeneus seychellensis* (Seychelles); (B) 17 cm (N. Mozambique). **196.6** *Parupeneus cyclostomus:* (A) 23 cm (Seychelles), (B) 23 cm (Kenya). **196.7** *Parupeneus indicus:* 12 cm (Natal). **196.8** *Parupeneus macronema:* 13 cm (Mozambique Id.). **196.9** *Parupeneus pleurostigma:* 23 cm (N. Mozambique).

196.10 (A)

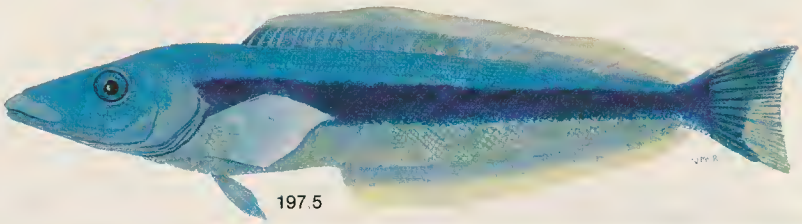


196.10 (B)



196.12

196.11



197.5

196.13 J.E.R.

197.4 R.E.S.

PLATE 70

196.10 *Parupeneus rubescens*: (A) 33 cm (Mossel Bay); (B) 14.5 cm (Knysna). **196.11** *Upeneus sulphureus*: 20.5 cm (N. Mozambique). **196.12** *Upeneus tragula*: 23 cm (S. Mozambique). **196.13** *Upeneus vittatus*: 19.5 cm (Mauritius). **197.4** *Malacanthus brevirostris*: 20 cm SL (Natal). **197.5** *Malacanthus latovittatus*: 38 cm (off the Cape).

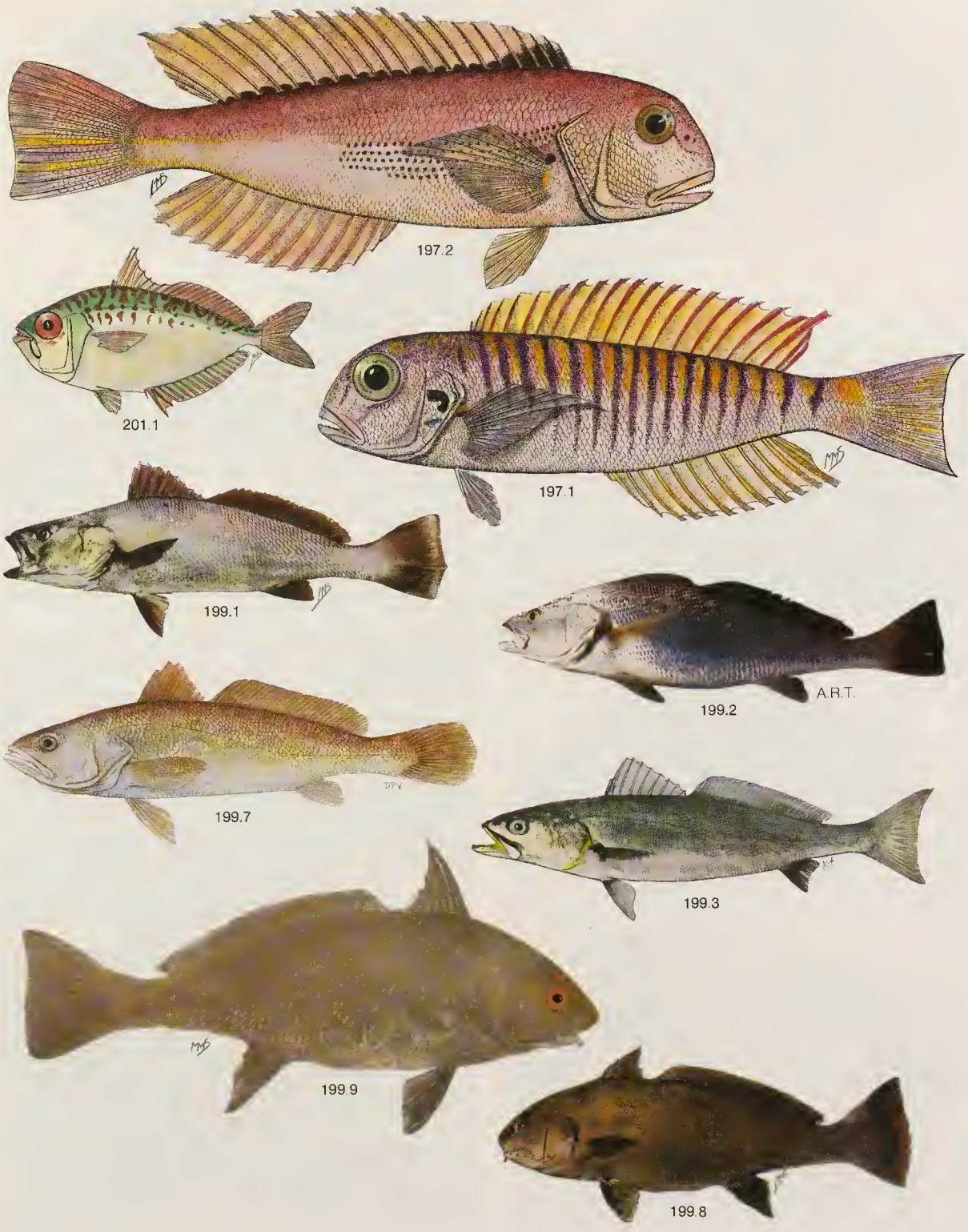


PLATE 71

197.1 *Branchiostegus doliatus:* 25.5 cm (Natal). **197.2** *Branchiostegus sawakinensis:* 30.5 cm (Natal). **199.1** *Argyrosomus hololepidotus:* 68.5 cm (Knysna). **199.2** *Argyrosomus thorpei:* (Natal). **199.3** *Atractoscion aequidens:* 91.5 cm (Knysna). **199.7** *Otolithes ruber:* 26.5 cm (Durban). **199.8** *Umbrina canariensis:* 68.5 cm (Knysna). **199.9** *Umbrina rhonchus:* 16 cm (Natal). **201.1** *Gazza minuta:* 15 cm (Natal)

PLATE 72

204.2 *Apolemichthys trimaculatus:* 10.5 cm SL (Tanzania). **204.4** *Centropyge bispinosus:* 10 cm (Pemba Id.). **204.6** *Genicanthus caudovittatus:* (A) 9.5 cm SL male (Red Sea); (B) 9 cm SL female (N. Mozambique). **204.8** *Pomacanthus chrysurus:* 25.5 cm (Kenya). **204.10** *Pomacanthus maculosus:* 26 cm (Kenya). **204.11** *Pomacanthus semicirculatus:* 38 cm (Inhaca Id.) **204.13** *Pygoplites diacanthus:* 20.5 cm (N. Mozambique).

204.7 (A)

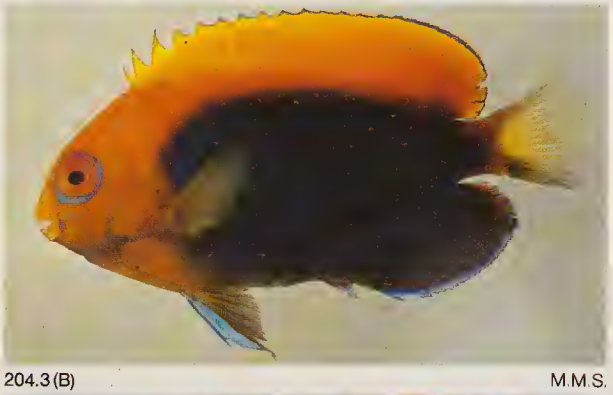
204.7 (B)

204.12

204.1 D.R.K.

204.4 D.R.K.

204.3 (A) G.R.A.



204.3 (B) M.M.S.

204.9 (A) J.E.R.

204.9 (B) R.E.S.

PLATE 73

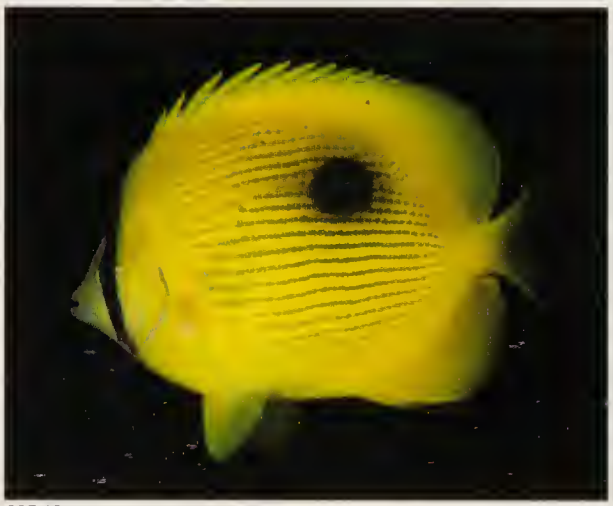
204.1 *Apolemichthys kingi:* 17 cm SL holotype (Natal). **204.3** *Centropyge acanthops:* (A) (Kenya); (B) 7 cm (Mauritius). **204.4** *Centropyge bispinosus:* 8 cm (Natal). **204.7** *Pomacanthus annulans:* (A) 10.5 cm SL (Singapore); (B) in process of changing colour. **204.9** *Pomacanthus imperator:* (A) (Mauritius); (B) (Natal). **204.12** *Pomacanthus striatus:* 3.5 cm (E. Cape).

204.11 J.E.R.

204.12 J.E.R.

205.3 J.E.R.

205.4 J.E.R.



205.19 J.E.R.

205.23 P.C.H.

PLATE 74

204.11 *Pomacanthus semicirculatus:* 28 cm (Natal). **204.12** *Pomacanthus striatus:* 5.5 cm SL juvenile (Natal). **205.3** *Chaetodon blackburnii:* 10.5 cm (Natal). **205.4** *Chaetodon dolosus:* 13.5 cm (Natal). **205.19** *Chaetodon zanzibarensis:* 12 cm (Seychelles). **205.23** *Heniochus diphreutes:* 10 cm SL (Durban).

PLATE 75

205.1 *Chaetodon auriga:* 15.5 cm (Inhaca Id.). **205.2** *C. bennetti:* 12.5 cm (Seychelles). **205.5** *C. falcula:* 12.5 cm (S. Mozambique). **205.6** *C. guttatissimus:* 12.5 cm (Durban). **205.7** *C. kleini:* 12.5 cm (N. Mozambique). **205.8** *C. lineolatus:* 25.5 cm (S. Mozambique). **205.9** *C. lunula:* (A) 5 cm juvenile (Transkei); (B) 18 cm (Inhaca Id.). **205.10** *C. madagaskariensis:* 12.5 cm (Inhaca Id.).

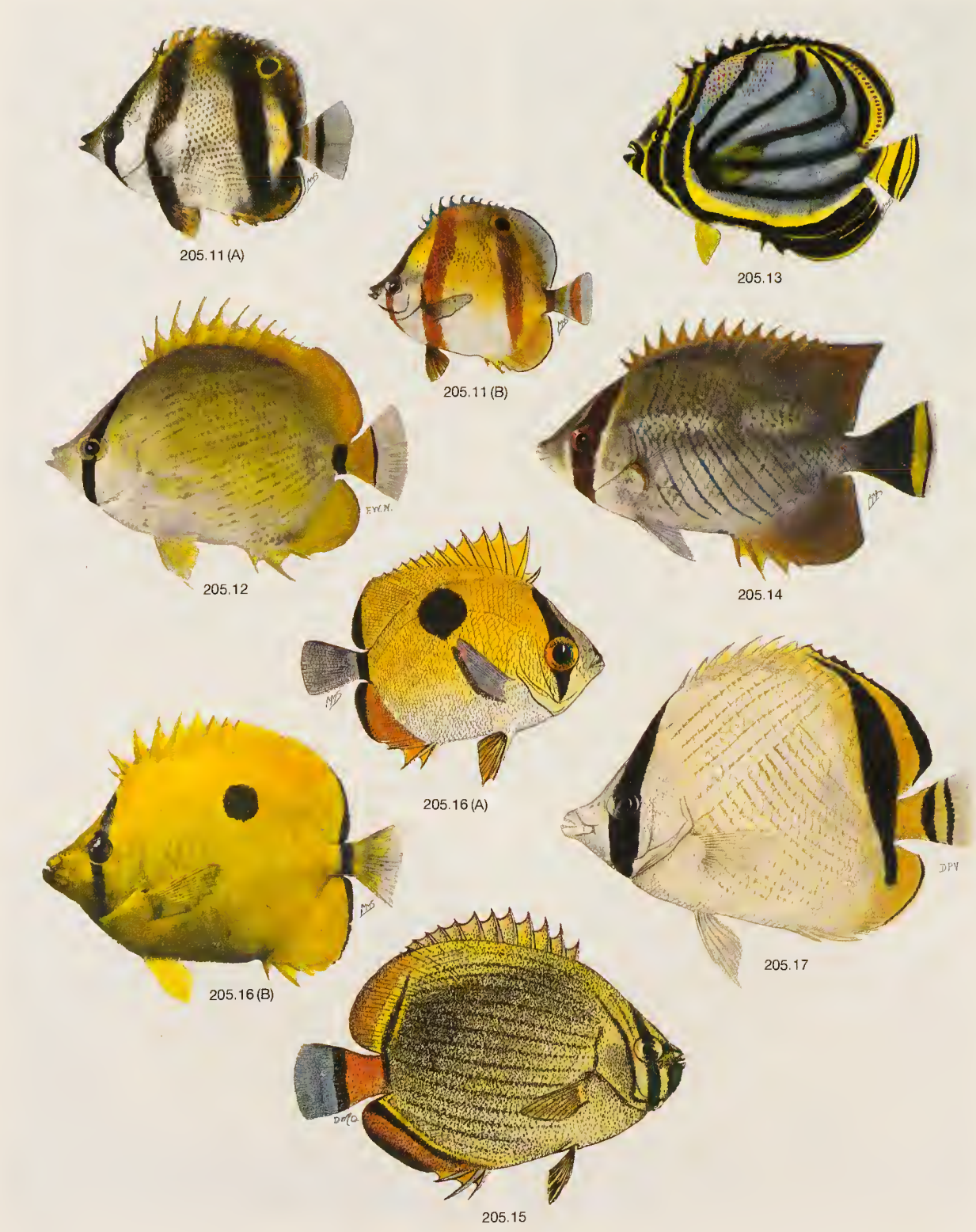


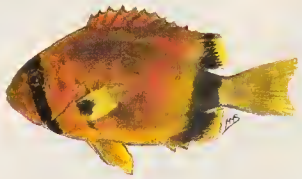
PLATE 76

205.11 *Chaetodon marleyi:* (A) 7.5 cm; (B) 2 cm juvenile (both E. Cape). **205.12** *C. melannotus:* 12.5 cm (Kenya). **205.13** *C. meyeri:* 11.5 cm (N. Mozambique). **205.14** *C. trifascialis:* 12.5 cm (N. Mozambique). **205.15** *C. trifasciatus:* 10 cm (N. Mozambique). **205.16** *C. unimaculatus:* (A) 7.5 cm; (B) 15.5 cm (both Port Alfred). **205.17** *C. vagabundus:* 8.5 cm SL (Madagascar).

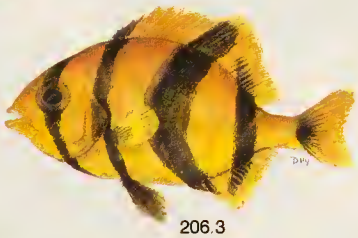
PLATE 77

204.8 *Pomacanthus chrysurus*: 11.5 cm (Kenya). **205.18** *Chaetodon xanthocephalus*: (A) 14 cm (Durban); (B) 9 cm (N. Mozambique). **205.19** *Chaetodon zanzibarensis*: 14 cm (Astove Id.). **205.20** *Forcipiger flavissimus*: 20.5 cm (S. Mozambique). **205.21** *Hemitaurichthys zoster*: 8 cm SL (Mauritius). **205.22** *Heniochus acuminatus*: 18 cm (Seychelles).

209.3



206.1



206.3

209.1

J.E.R.

205.24

207.1

J.E.R.

209.2

PLATE 78

205.24 *Heniochus monoceros:* 16.5 cm SL (Réunion). **206.1** *Oplegnathus conwayi:* 10 cm juvenile (Plettenberg Bay). **206.3** *Oplegnathus robinsoni:* ca. 10 cm composite juvenile (Natal). **207.1** *Brama brama:* 50 cm (off Algoa Bay). **209.1** *Emmelichthys nitidus nitidus:* 30 cm (off Cape west coast). **209.2** *Erythrocles schlegelii:* 35 cm SL (Japan). **209.3** *Plagiogeneion rubiginosus:* 15 cm (off Algoa Bay).

PLATE 79

210.1 *Alectis ciliaris:* 9.5 cm (Algoa Bay). **210.2** *Alectis indicus:* 61 cm (N. Mozambique). **210.3** *Alepes djedaba:* 25.5 cm (S. Mozambique). **210.4** *Atule mate:* 30 cm (N. Mozambique). **210.5** *Carangoides armatus:* 27 cm male (Natal). **210.7** *Carangoides chrysophrys:* 18 cm (Swartkops River, Algoa Bay). **210.9** *Carangoides equula:* 36 cm (Swartkops River, Algoa Bay). **210.10** *Carangoides ferdau:* 61 cm (Inhaca Id.). **210.11** *Carangoides fulvoguttatus:* 30 cm (Swartkops River, Algoa Bay).

PLATE 80

210.5 *Carangoides armatus:* 22 cm FL (Kenya). **210.12** *Carangoides gymnostethus:* 60 cm (Kenya). **210.13** *Carangoides hedlandensis:* 17 cm FL female (Kenya). **210.15** *Carangoides oblongus:* 56 cm (Kenya). **210.19** *Caranx melampygus:* ca. 60 cm (Inhaca Id.). **210.20** *Caranx papuensis:* 56 cm (Kenya). **210.21** *Caranx sem:* (A) 58.5 cm (Natal); (B) 17.5 cm type of *Caranx williamsi* (Durban); (C) 52 cm (Natal).

PLATE 81

210.22 *Caranx sexfasciatus:* (A) 58 cm (E. Cape); (B) 16.5 cm (Swartkops River, Algoa Bay); (C) 48 cm FL (Algoa Bay). **210.27** *Decapterus macrosoma:* 17 cm (Knysna). **210.31** *Elagatis bipinnulatus:* 90 cm (Alfonse Id.). **210.32** *Gnathanodon speciosus:* 25 cm (Inhaca Id.). **210.33** *Lichia amia:* (A) 9 cm juvenile; (B) 138 cm (both Knysna). **210.35** *Naucrates ductor:* 30 cm (E. Cape). **210.36** *Parastromateus niger:* (A) ca. 7 cm juvenile (Natal); (B) 15 cm (S. Mozambique). **210.37** *Pseudocaranx dentex:* (A) 75 cm (Tsitsikama); (B) ca. 55 cm (E. Cape).

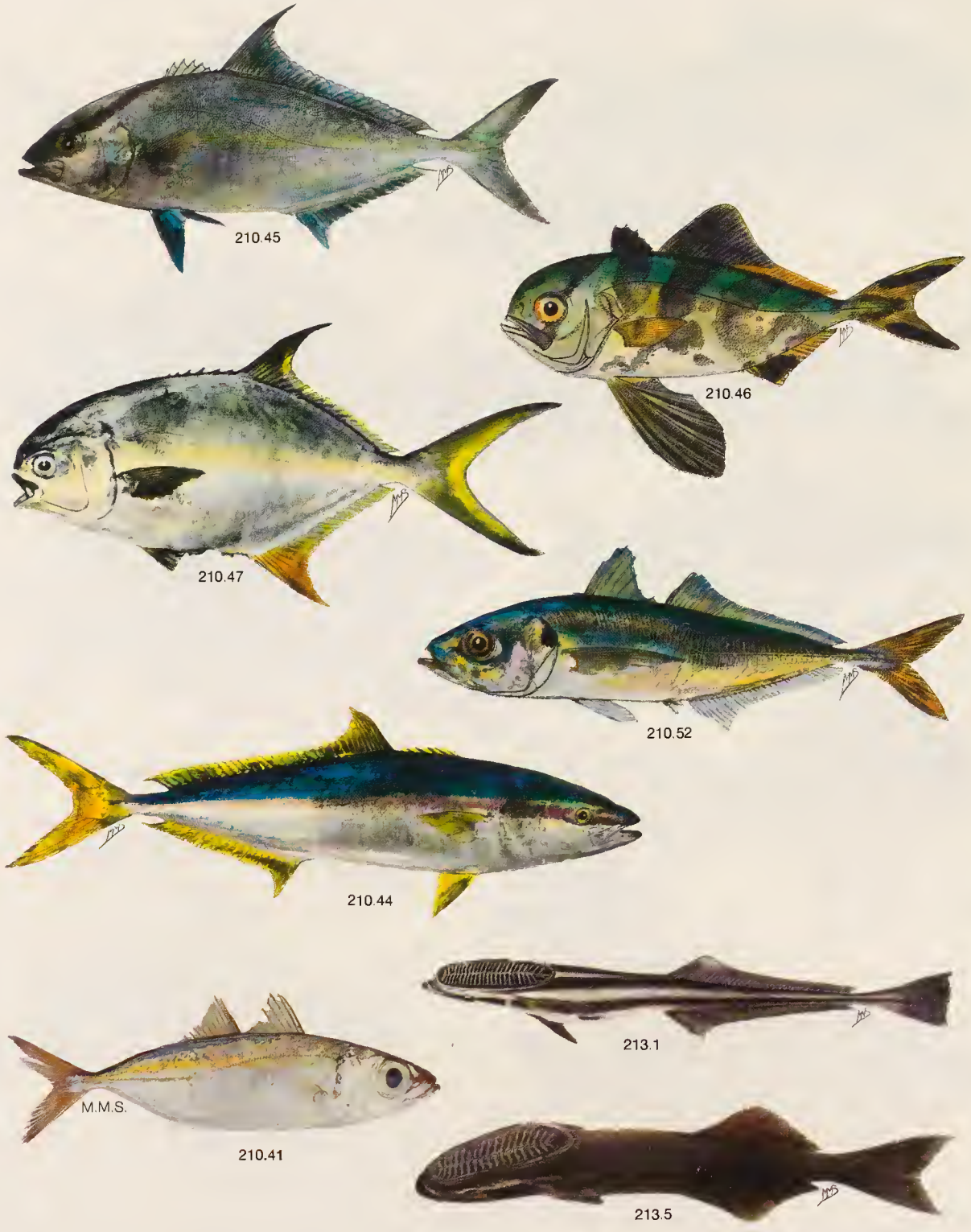


PLATE 82

210.41 *Selar crumenophthalmus:* 17 cm FL (N. Mozambique). **210.44** *Seriola lalandi:* 96 cm (Algoa Bay). **210.45** *Seriola rivoliana:* 53 cm (Kenya). **210.46** *Seriolina nigrofasciata:* 18 cm juvenile (Natal). **210.47** *Trachinotus africanus:* 38 cm (N. Mozambique). **210.52** *Trachurus trachurus:* 20.5 cm (Lambert's Bay). **213.1** *Echeneis naucrates:* 75 cm (Algoa Bay). **213.5** *Remora remora:* 30 cm (Algoa Bay).

PLATE 83

211.2 Coryphaena hippurus: (A) 91.5 cm (Port Alfred); (B) 53.5 cm female (Mossel Bay); (C) head of 125 cm male (East London); (D) 3 cm juvenile (Port Alfred); (E) 12.6 cm juvenile (Natal); (F) 9 cm juvenile (Transkei). **214.1** *Amblycirrhitus bimacula:* 7.5 cm (S. Mozambique). **214.2** *Cirrhitichthys oxycephalus:* 7.5 cm (N. Mozambique). **214.3** *Cirrhitus pinnulatus:* 20.5 cm (Kenya). **214.5** *Cyprinocirrhitus polyactis:* 11.5 cm SL (Natal). **214.6** *Paracirrhites arcatus:* 8 cm SL (Natal). **214.7** *Paracirrhites forsteri:* 21 cm (Natal).

214.6 J.E.R.

215.2 P.C.H.

216.3 J.E.R.

216.4 J.E.R.

J.E.R.

219.38 M.M.S.

219.24 (A) G.R.A.

219.24 (B) J.E.R.

PLATE 84

214.6 *Paracirrhites arcatus:* 3 cm (Mauritius). **215.2** *Cheilodactylus pixi:* 8.5 cm SL (Algoa Bay). **216.3** *Pempheris mangula:* 12.5 cm (Mauritius). **216.4** *Pempheris schwenki:* 12.5 cm (Seychelles). **219.13** *Chromis dasygenys:* 11 cm (Durban). **219.24** *Chrysiptera unimaculata:* (A) juvenile (Kosi Bay), (B) 7.5 cm (Mauritius). **219.38** *Plectroglyphidodon phoenixensis:* 10 cm (Mauritius).

PLATE 85

215.1 *Cheilodactylus fasciatus:* 15 cm (E. Cape). **215.3** *Chirodactylus brachydactylus:* (A) 18 cm (Durban), (B) 5 cm juvenile (E. Cape). **215.4** *Chirodactylus grandis.* 74 cm (Algoa Bay). **215.5** *Chirodactylus jessicalenorum:* 29 cm FL holotype (Natal). **216.1** *Parapriacanthus ransonneti:* 7 cm (Natal). **216.2** *Pempheris adusta:* 20 cm (Durban). **218.1** *Oreochromis mossambica:* (A) 36 cm male, (B) 34 cm female (both Port Alfred; paintings by Hilda Jubb). **219.1** *Abudefduf natalensis:* 12 cm SL paraype (Natal). **219.3** *Abudefduf septemfasciatus:* 15.5 cm (N. Mozambique).

PLATE 86

219.4 *Abudefduf sexfasciatus:* 15 cm (N. Mozambique). **219.5** *Abudefduf sordidus:* 23 cm (Seychelles). **219.6** *Abudefduf sparoides:* 12 cm (Aldabra Id.). **219.7** *Abudefduf vaigiensis:* 20 cm (Inhaca Id.). **219.8** *Amphiprion akallopisos:* 7 cm (N. Mozambique). **219.9** *Amphiprion allardi:* (A) 3 cm juvenile; (B) 11.5 cm (both N. Mozambique). **219.10** *Chromis agilis:* 7 cm paratype (Zanzibar). **219.12** *Chromis caerulea:* 4.5 cm (Inhaca Id.). **219.13** *Chromis dasygenys:* 12 cm (Inhaca Id.). **219.14** *Chromis dimidiata:* 7 cm (Inhaca Id.). **219.16** *Chromis nigrura:* 5 cm type (Inhaca Id.).

PLATE 87

219.17 *Chromis opercularis:* 4 cm (N. Mozambique). **219.21** *Chrysiptera annulata:* 7 cm (N. Mozambique). **219.22** *Chrysiptera glauca:* 8 cm (Seychelles). **219.23** *Chrysiptera leucopoma:* 5 cm (Inhaca Id.). **219.24** *Chrysiptera unimaculata:* 6.5 cm (Inhaca Id.). **219.26** *Dascyllus carneus:* 6 cm (Inhaca Id.). **219.28** *Lepidozygus tapeinosoma:* 10 cm holotype of *L. anthioides* (Astove Id.). **219.29** *Neopomacentrus cyanomos:* 10 cm (N. Mozambique). **219.32** *Paraglyphidodon melas:* 5.5 cm (Kenya). **219.33** *Plectroglyphidodon dicki:* (A) 9 cm; (B) 4 cm juvenile (both N. Mozambique).

PLATE 88

219.34 *Plectroglyphidodon imparipennis:* 5.5 cm (N. Mozambique). **219.35** *Plectroglyphidodon johnstonianus:* 6 cm holotype of *P. nitidus* (Aldabra Id.) **219.36** *Plectroglyphidodon lacrymatus:* 9 cm (Inhaca Id.). **219.37** *Plectroglyphidodon leucozonus:* (A) 5 cm juvenile (Transkei); (B) 10 cm (S. Mozambique). **219.39** *Pomacentrus caeruleus:* 7.5 cm holotype of *P. pulcherrimus* (N. Mozambique). **219.40** *Pomacentrus pavo:* 9 cm (Zanzibar). **219.41** *Pomacentrus trichourus:* 7.5 cm (Tanzania). **219.42** *Pomacentrus trilineatus:* (A) 4 cm juvenile; (B) 5.5 cm (both N. Mozambique). **219.43** *Stegastes fasciolatus:* 11.5 cm holotype of *Pomacentrus luteobrunneus* (Astove Id.). **219.44** *Stegastes nigricans:* 5.5 cm (Kenya).

219.15 G.R.A.

219.18 G.R.A.

219.25 G.R.A.

219.38 J.E.R.

220.2 J.E.R.

220.3 J.E.R.

220.6 R.E.S.

220.7 J.E.R.

PLATE 89

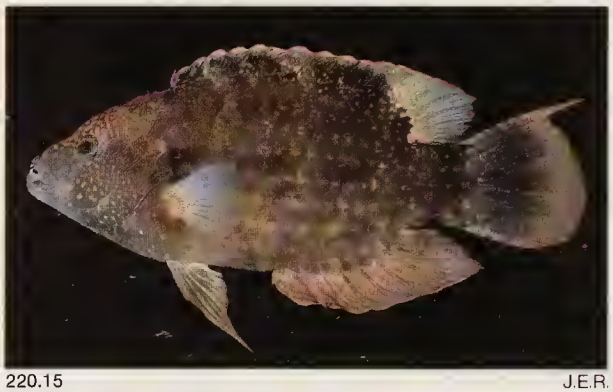
219.15 *Chromis lepidolepis:* (New Caledonia). **219.18** *Chromis ternatensis:* (Maldives). **219.25** *Dascyllus aruanus:* (Seychelles). **219.38** *Plectroglyphidodon phoenixensis:* 6.5 cm SL (Mauritius). **220.2** *Anampses lineatus:* 9.5 cm SL (Mauritius). **220.3** *Anampses meleagrides:* 11 cm SL (Mauritius). **220.6** *Bodianus axillaris:* 5 cm SL (Natal). **220.7** *Bodianus bilunulatus:* 22 cm SL female (Natal).

220.10 P.C.H.

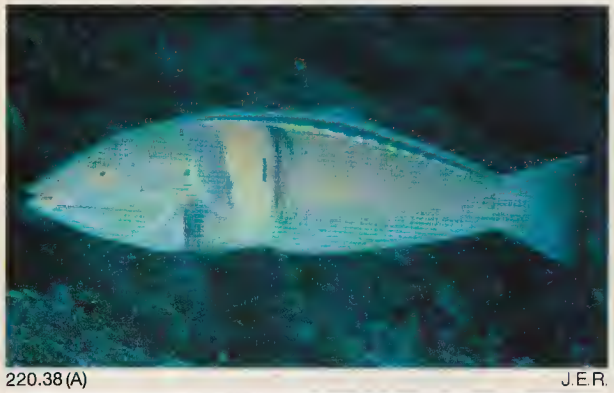
220.11 R.E.S.

220.21 (A) R.E.S.

220.21 (B) R.E.S.



220.15 J.E.R.



220.38 (A) J.E.R.

220.38 (B) P.C.H.

220.38 (C) J.E.R.

PLATE 90

220.10 *Bodianus perditio:* 43 cm SL (Natal). **220.11** *Cheilinus bimaculatus:* 6.5 cm (Natal). **220.15** *Cheilinus trilobatus.* 19.5 cm SL (Mauritius). **220.21** *Coris caudimacula:* (A) 14.5 cm SL (Transkei); (B) 8 cm SL (Natal). **220.38** *Hologymnosus doliatus:* (A) 37 cm; (B) 4.2 cm SL (both Natal); (C) 23 cm SL female (Mauritius).

220.22 (A) J.E.R.

220.22 (B) J.E.R.

220 (A) J.E.R.

220 (B) J.E.R.

220.28 (A) J.E.R.

220.28 (B) J.E.R.

220.28 (C) J.E.R.

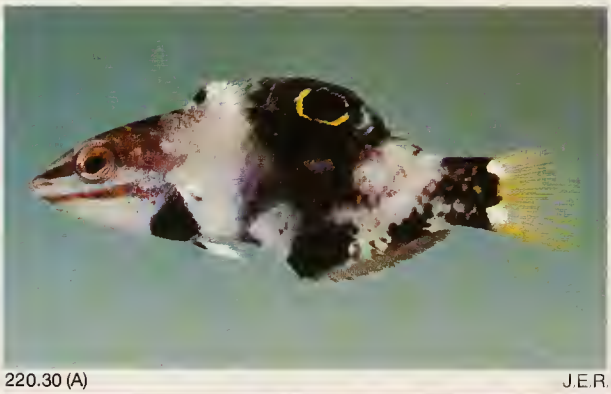
220.30 J.E.R.

PLATE 91

220.22 *Coris formosa:* (A) 19.5 cm SL female (Seychelles); (B) 35 cm SL male (Sri Lanka). **220** *Hologymnosus annulatus:* (A) 24.5 cm SL female; (B) 9.5 cm SL (both Mauritius). **220.28** *Halichoeres cosmetus:* (A) 2.5 cm SL; (B) 7.5 cm SL (both Natal); (C) 7 cm SL (Maldives). **220.30** *Halichoeres hortulanus:* 17 cm SL female (Mauritius).

220.29 (A) J.E.R.

220.29 (B) J.E.R.

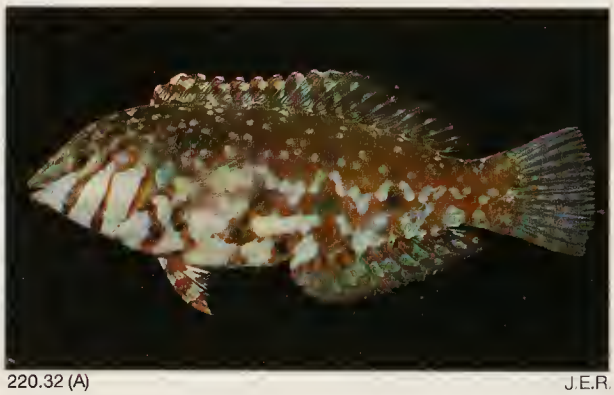


220.30 (A) J.E.R.

220.30 (B) J.E.R.

220.31 (A) J.E.R.

220.31 (B) J.E.R.



220.32 (A) J.E.R.

220.32 (B) J.E.R.

PLATE 92

220.29 *Halichoeres dussumieri:* (A) 7 cm SL female; (B) 8 cm SL male (both Singapore). **220.30** *H. hortulanus:* (A) 3 cm SL juvenile (Samoa); (B) 20 cm SL male (Mauritius). **220.31** *H. iridis:* (A) 7 cm SL female holotype; (B) 9 cm SL male (both Mauritius). **220.32** *H. lapillus:* (A) 7 cm SL female; (B) 10 cm SL male (both Mauritius).

PLATE 93

220.1 *Anampses caeruleopunctatus:* (A) 18 cm female; (B) 25.5 cm male (both N. Mozambique). **220.3** *Anampses meleagrides:* 12 cm female (N. Mozambique). **220** *Anampses twistii:* (A) 3.75 cm; (B) 15 cm (both N. Mozambique). **220.4** *Anchichoerops natalensis:* 50 cm (Natal). **220.5** *Bodianus anthioides:* 18 cm (Seychelles). **220.6** *Bodianus axillaris:* 12 cm (S. Mozambique).

PLATE 94

220.7 *Bodianus bilunulatus:* 30 cm (Natal). **220.8** *Bodianus diana:* (A) 18 cm (N. Mozambique); (B) 9 cm holotype of *Lepidaplois aldabrensis* (Aldabra). **220.9** *Bodianus leucostictus:* 27 cm holotype of *Lepidaplois luteopunctatus* (S. Mozambique). **220.12** *Cheilinus chlorourus:* 20 cm (Seychelles). **220.13** *Cheilinus digrammus:* 20 cm (N. Mozambique). **220.14** *Cheilinus oxycephalus:* 12 cm (N. Mozambique). **220.18** *Choerodon gymnogenys:* 21 cm (Zanzibar). **220.19** *Cirrhilabrus exquisitus:* 8.5 cm holotype (N. Mozambique).

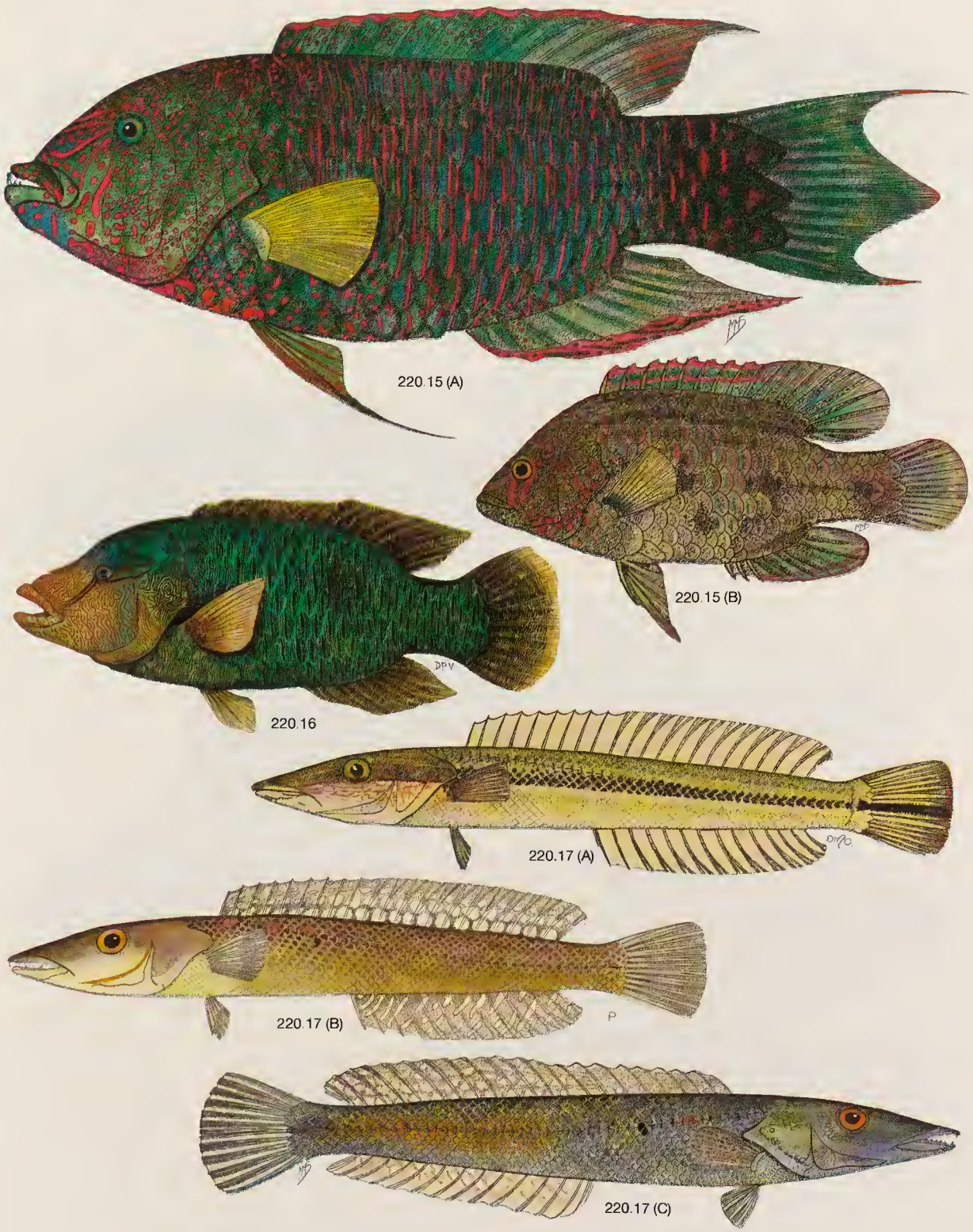


PLATE 95

220.15 *Cheilinus trilobatus:* (A) 37 cm (S. Mozambique), (B) 12 cm juvenile (Inhaca Id.). **220.16** *Cheilinus undulatus:* 60 cm (Zanzibar). **220.17** (A-C) *Cheilio inermis:* all between 25 and 30 cm, from different algae beds.

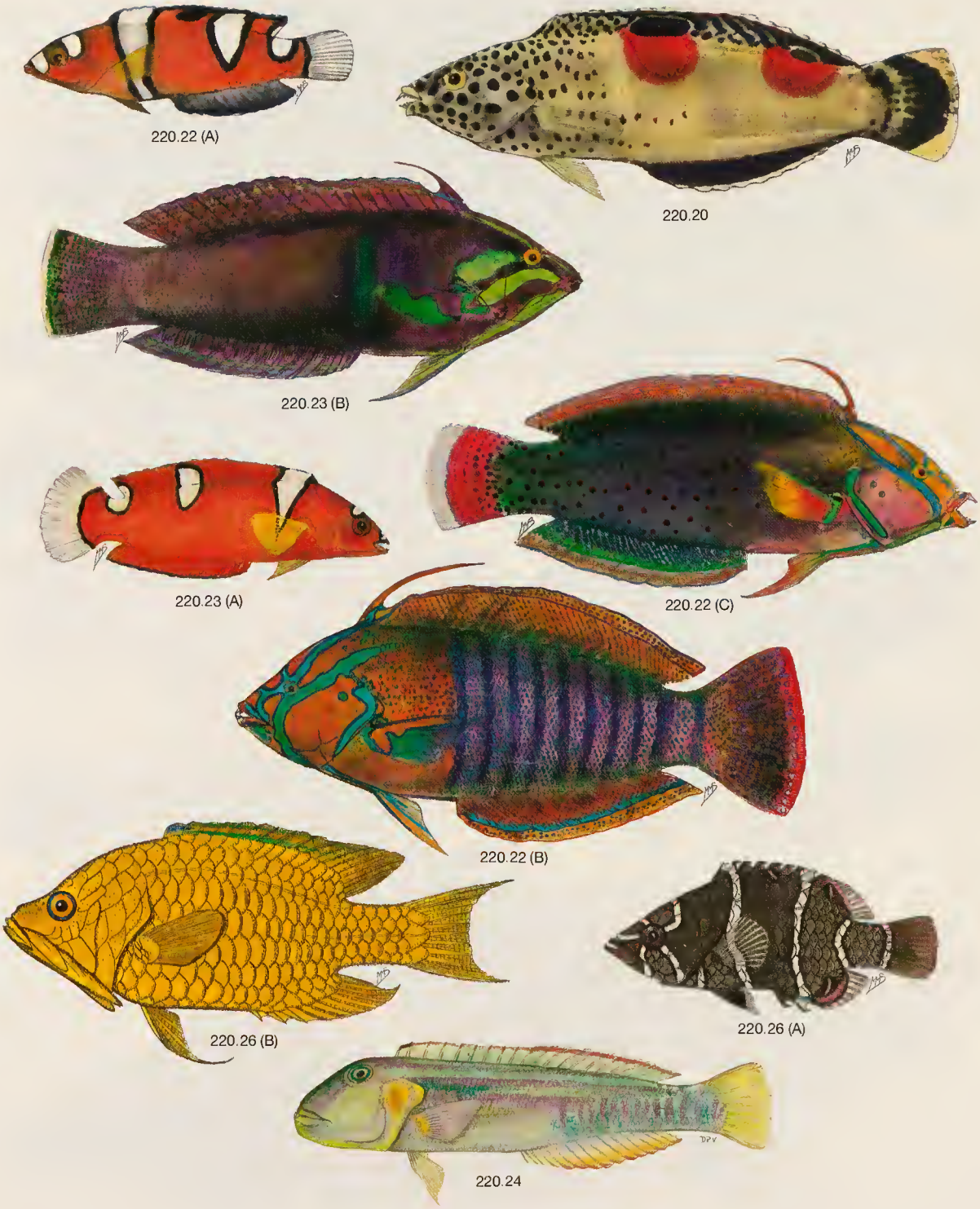


PLATE 96

220.20 *Coris aygula:* 12.5 cm juvenile (Natal). **220.22** *Coris formosa:* (A) 5.5 cm juvenile (S. Mozambique); (B) 45 cm terminal male (Kenya); (C) 30 cm initial-phase adult (S. Mozambique). **220.23** *Coris gaimard africana:* (A) 7 cm juvenile; (B) 25 cm (both Kenya). **220.24** *Cymolutes praetextatus:* 12 cm (N. Mozambique). **220.26** *Epibulus insidiator:* (A) 4 cm juvenile; (B) 18 cm (both N. Mozambique).

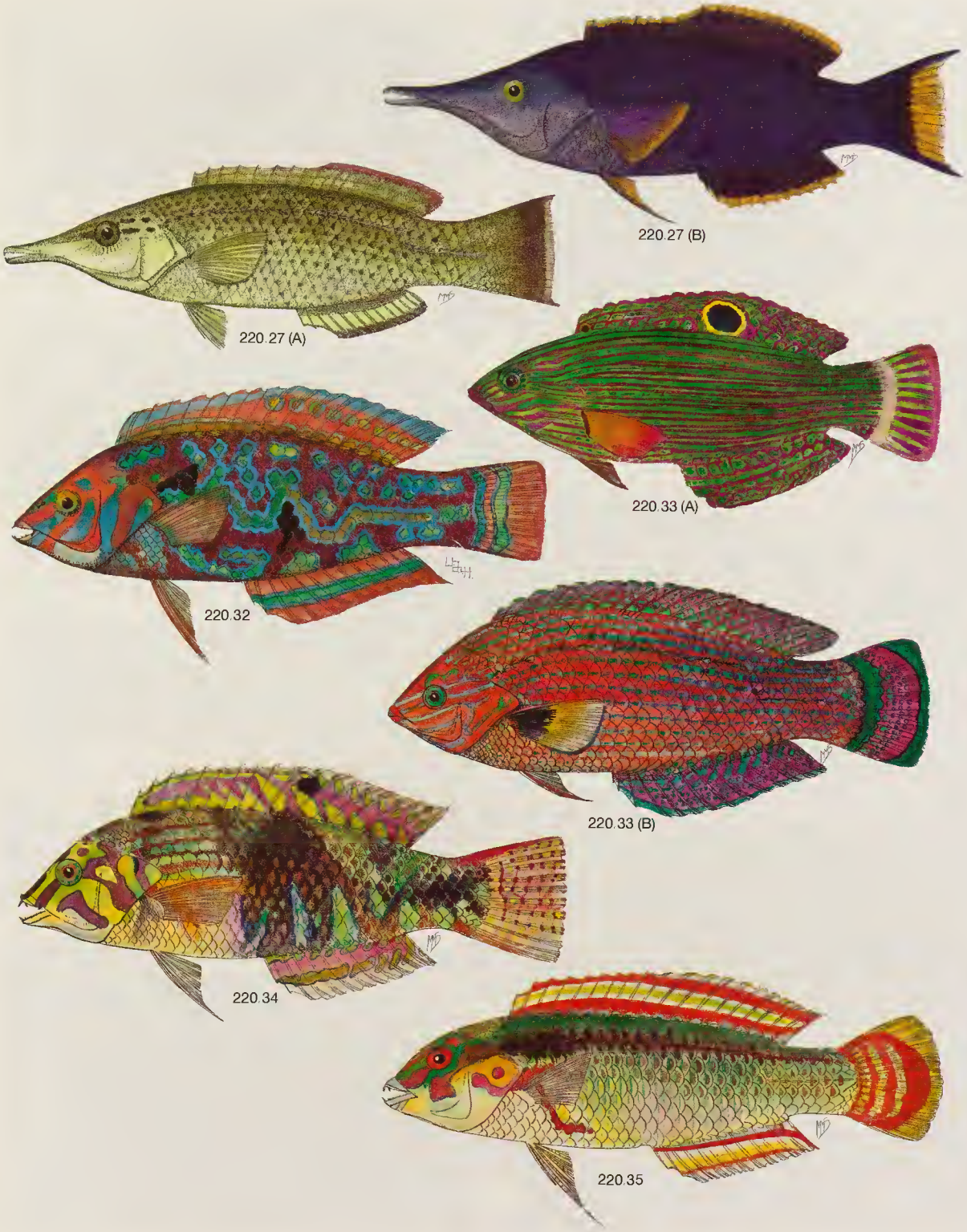


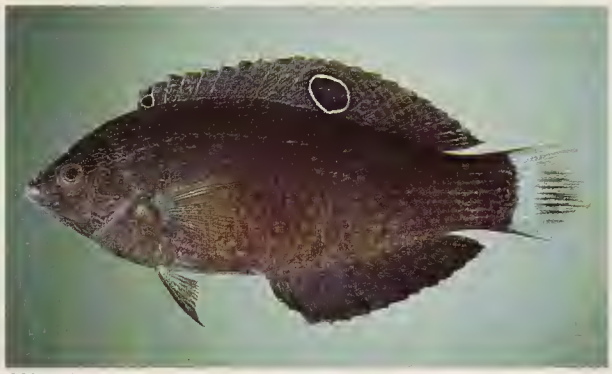
PLATE 97

220.27 *Gomphosus caeruleus*: (A) 12.5 cm female; (B) 17.5 cm male (both Inhaca Id.). **220.32** *Halichoeres lapillus*: 9 cm holotype (Inhaca Id.). **220.33** *Halichoeres marginatus*: (A) 10 cm juvenile; (B) 13 cm (both Inhaca Id.). **220.34** *Halichoeres nebulosus*: 10 cm (Transkei). **220.35** *Halichoeres scapularis*: 12.5 cm male (N. Mozambique).

PLATE 98

220.36 *Hemigymnus fasciatus:* (A) 4 cm juvenile (Durban); (B) 21 cm (Seychelles). **220.37** *Hemigymnus melapterus:* 30 cm (Kenya). **220.38** *Hologymnosus doliatus:* (A) 30 cm female (Seychelles); (B) 44 cm male (S. Mozambique). **220.40** *Labroides bicolor:* 10 cm (Inhaca Id.). **220.42** *Macropharyngodon bipartitus:* (A) 7 cm female holotype of *M. varialvus*; (B) 10 cm male holotype (both N. Mozambique).

220.33 (A) J.E.R.



220.33 (B) J.E.R.

220.33 (C) J.E.R.

220.34 J.E.R.

220 (A) J.E.R.

220.35 J.E.R.

220 (B) J.E.R.

220 (C) J.E.R.

PLATE 99

220.33 *Halichoeres marginatus:* (A) 2.5 cm SL juvenile (Samoa); (B) 8.5 cm female (Marshall Ids.); (C) 12.5 cm SL male (Mauritius). **220.34** *H. nebulosus:* 4.5 cm SL male (Natal). **220** (A) *H. pelicieri:* 5 cm Sl female (Mauritius). **220.35** *H. scapularis:* 16 cm SL male (Mauritius). **220** (B) *H. trispilus:* 5 cm SL male holotype (Maldives). **220** (C) *H. zeylonicus:* 13.5 cm SL male (India).

220.39 J.E.R.

220.40 J.E.R.

220.41 J.E.R.

220.51 J.E.R.

220.50 (A) J.E.R.

220.50 (B) J.E.R.

220.45 J.E.R.

220.53 J.E.R.

PLATE 100

220.39 *Labrichthys unilineatus:* 6.5 cm SL (Samoa). **220.40** *Labroides bicolor:* 3.5 cm SL (Natal). **220.41** *Labroides dimidiatus:* 10 cm (Natal). **220.45** *Novaculichthys macrolepidotus:* 7.5 cm SL (Seychelles). **220.50** *Pseudodax moluccanus:* (A) 4 cm SL juvenile (Palau Id.); (B) 15.5 cm SL female (Tahiti). **220.51** *Pseudojuloides cerasinus:* 8 cm SL male (Hawaii). **220.53** *Pteragogus pelycus:* 5 cm SL (Mauritius).

220.55 (A) J.E.R.

220.55 (B) J.E.R.

220.57 (A) J.E.R.

220.57 (B) J.E.R.

220.59 (A) J.E.R.

220.59 (B) J.E.R.

220.61 J.E.R.

220.68 J.E.R.

PLATE 101

220.55 *Stethojulis albovittata:* (A) 10 cm male, (B) 10.5 cm female (both Mauritius). **220.57** *Stethojulis strigiventer:* (A) 10 cm male (Australia); (B) 6.5 cm female (Palau). **220.59** *Thalassoma genivittatum:* (A) 12.5 cm male; (B) 16 cm female (both Mauritius). **220.61** *Thalassoma hebraicum:* 16 cm SL male (Natal). **220.68** *Xyrichtys pentadactylus:* 16 cm female (Red Sea).

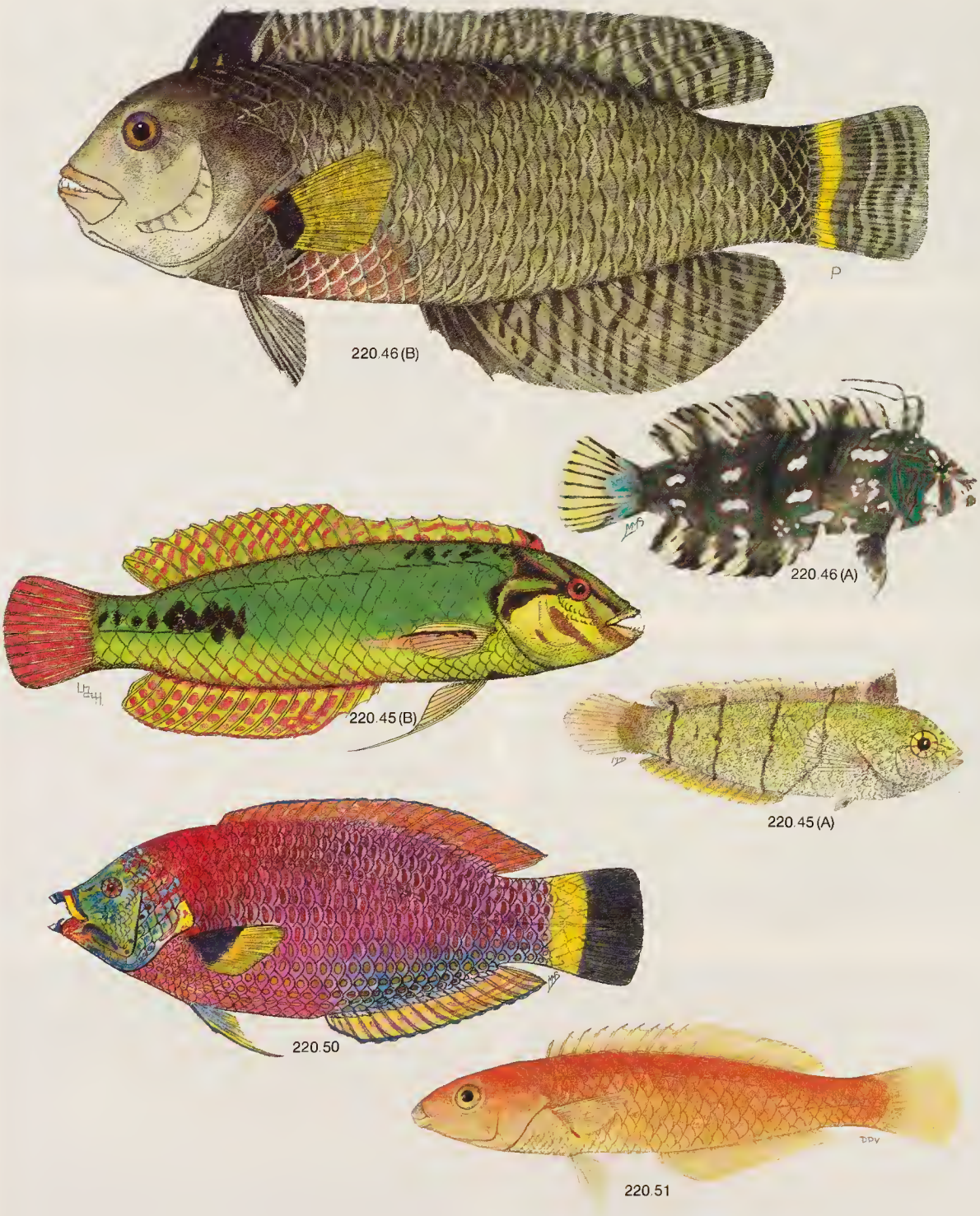
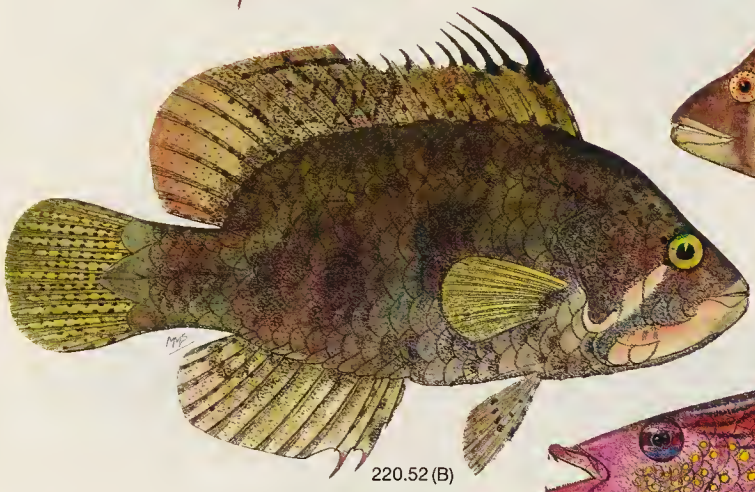


PLATE 102

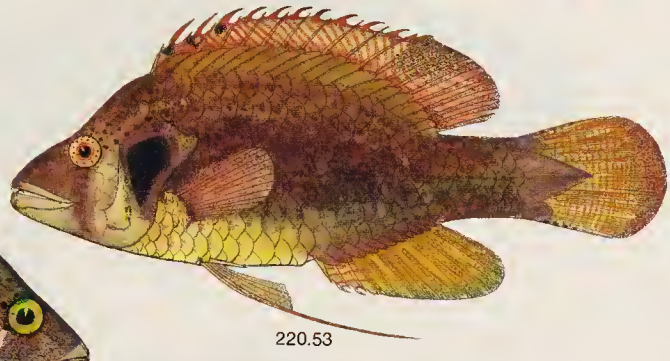
220.45 *Novaculichthys macrolepidotus:* (A) 2.5 cm juvenile; (B) 18 cm (both Inhaca Id.). **220.46** *Novaculichthys taeniourus:* (A) 7.5 cm juvenile (Aldabra); (B) 25.5 cm (Inhaca Id.). **220.50** *Pseudodax moluccanus:* 30 cm (Kenya). **220.51** *Pseudojuloides cerasinus:* 6 cm female (Natal).

220.48

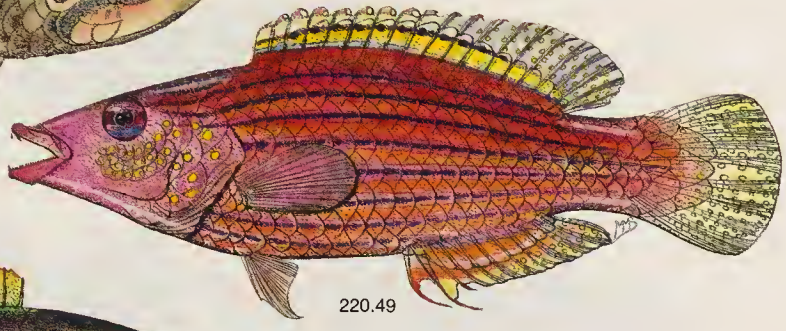
220.47



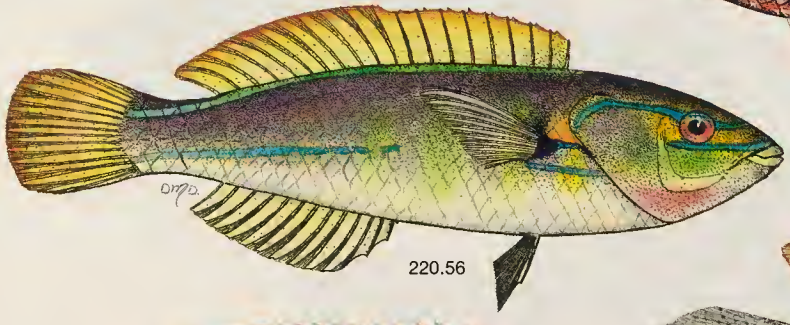
220.52 (B)



220.53



220.49



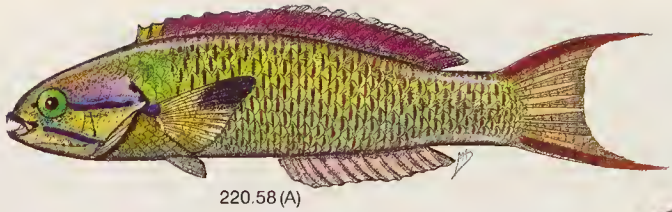
220.56

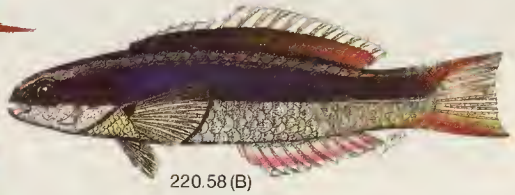
220.52 (A)

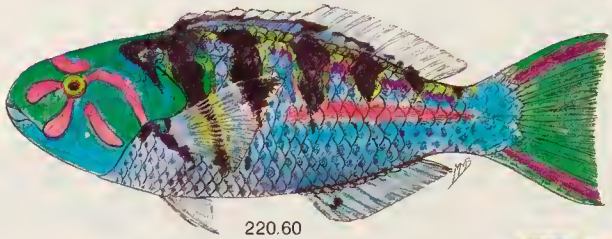
220.54

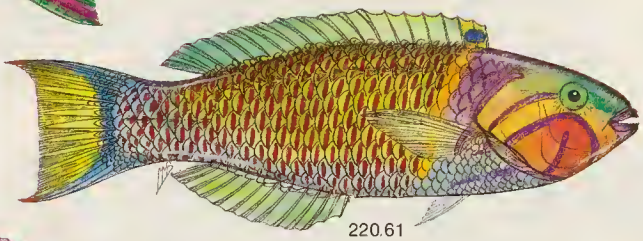
PLATE 103

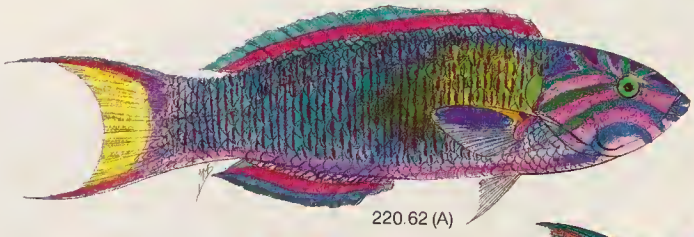
220.47 *Pseudocheilinus evanidus:* 6 cm (Aldabra). **220.48** *Pseudocheilinus hexataenia:* 10 cm large male (N. Mozambique). **220.49** *Pseudocheilinus octotaenia:* 9.5 cm holotype of *P. margaretae* (Aldabra). **220.52** *Pteragogus flagellifer:* (A) 8 cm male (Inhaca Id.); (B) 10 cm female (S. Mozambique). **220.53** *Pteragogus pelycus:* 15 cm female (Natal). **220.54** *Pteragogus taeniops:* 12.5 cm (Natal). **220.56** *Stethojulis interrupta:* 10 cm male (Inhaca Id.).


220.58 (A)

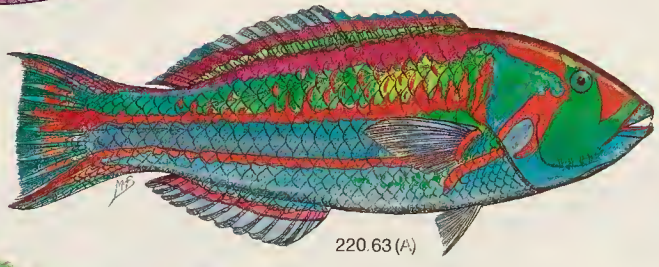

220.58 (B)

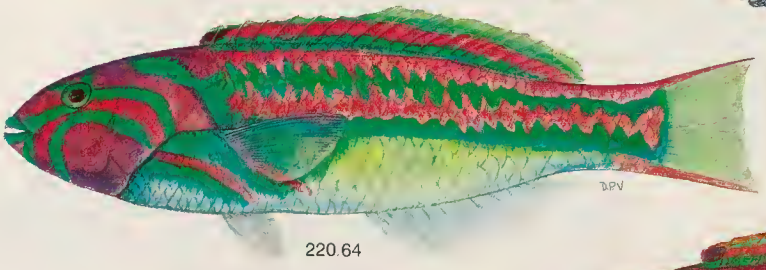

220.60


220.61


220.62 (A)

220.62 (B)


220.63 (A)


220.64

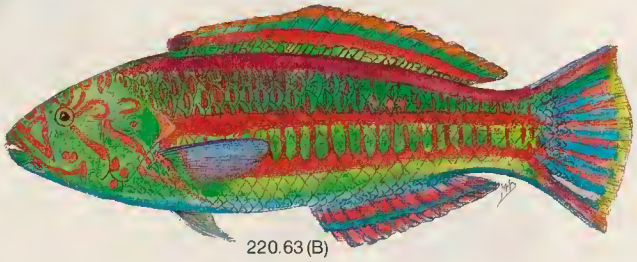

220.63 (B)

PLATE 104

220.58 *Thalassoma amblycephalum:* (A) 12.5 cm male (S. Mozambique); (B) 7.5 cm female (Transkei). **220.60** *T. hardwicke:* 17 cm (N. Mozambique). **220.61** *T. hebraicum:* 15 cm (Seychelles). **220.62** *T. lunare:* (A) 17.5 cm; (B) 3.5 cm juvenile (both Transkei). **220.63** *T. purpureum:* (A) 30 cm terminal male; (B) 23 cm initial phase (both Transkei). **220.64** *T. quinquevittatum:* 16.5 cm (Transkei).

PLATE 105

220.65 *Thalassoma trilobatum*: 20 cm (Transkei). **220.67** *Xyrichtys pavo*: 30 cm (Seychelles). **221.1** *Calotomus spinidens*: 18 cm (Inhaca Id.). **221.3** *Leptoscarus vaigiensis*: (A) 23 cm female, (B) 25 cm male (both Inhaca Id.).

PLATE 106

221.4 *Bolbometopon muricatum*: 100 cm. **221.14** *Scarus psittacus*: 29 cm. **221.15** *S. rubroviolaceus*: 76 cm terminal male holotype of *Margaritodon africanus*. **221.16** *S. russelii*: 33 cm. **221.17** *S. scaber*: 28 cm. **221.19** *S. tricolor*: 30 cm. **221** (A) *S. viridifucatus*: 17.5 cm. **221** (B) *S. gibbus*: 28 cm male. **221** (C) *S. gibbus* 50 cm male. **221** (D) *S. viridifucatus*: 23 cm. All fishes on this plate from western Indian Ocean.

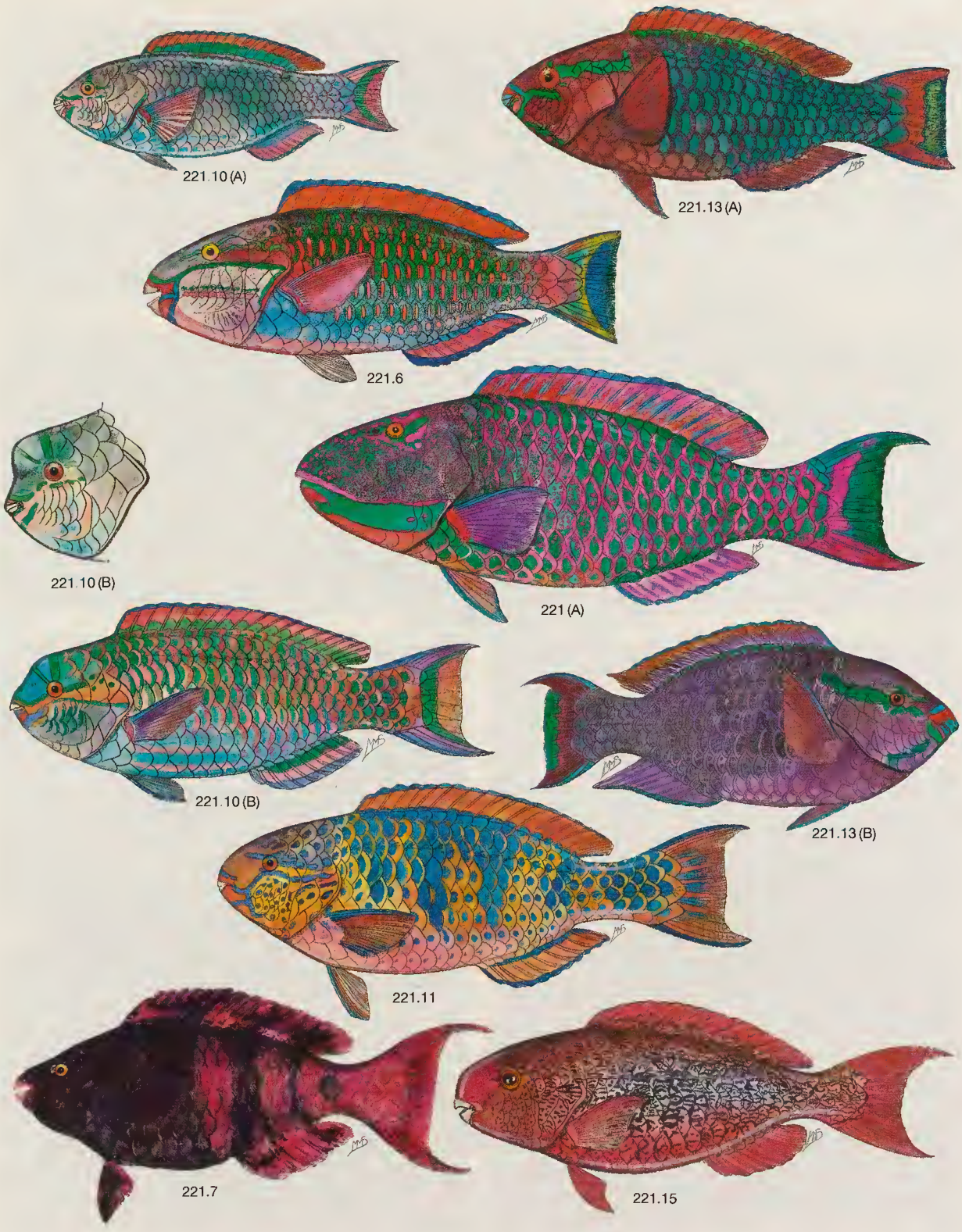


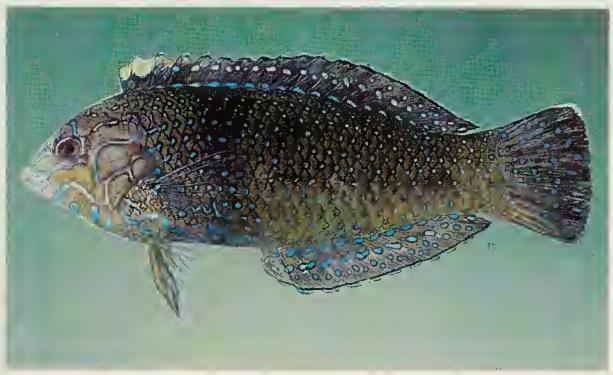
PLATE 107

221 (A) *Cetoscarus bicolor:* 90 cm large male. **221.6** *Scarus atrilunula:* 27.5 cm. **221.7** *S. caudofasciatus:* 45 cm. **221.10** *S. festivus:* (A) 25 cm; (B) 30 cm; above, head of 45 cm fish. **221.11** *S. ghobban:* 55 cm male (Inhaca Id.). **221.13** *S. niger:* (A) 22.5 cm female; (B) 40 cm male. **221.15** *S. rubroviolaceus:* 27.5 cm. All fishes on this plate from western Indian Ocean.

PLATE 108

221 (A-C) *Cetoscarus bicolor*: (A) 8 cm juvenile; (B) 22.5 cm adolescent; (C) 45 cm female. **221** (D) *Scarus gibbus*: 28 cm female. **221** (E) *S. falcipinnis:* 53 cm. **221.5** *Hipposcarus harid*: (A) 22.5 cm female; (B) 50 cm male. **221.6** *Scarus atrilunula*: 25 cm. **221.11** *S. ghobban:* 80 cm terminal male. **221.12** *S. globiceps*: 17 cm. **221.13** *S. niger*: 17.5 cm female. **221.16** *S. russelii:* 25 cm. All fishes on this plate from western Indian Ocean.

220.43 (A) J.E.R.



220.43 (B) J.E.R.

220.42 J.E.R.

220.44 J.E.R.

221.1 (A) J.E.R.

221.1 (B) J.E.R.

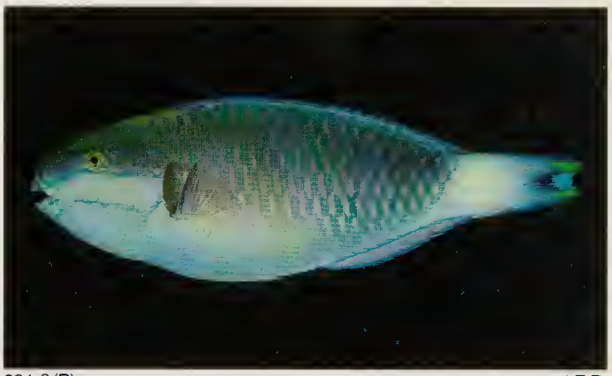
221.5 J.E.R.

221.7 J.E.R.

PLATE 109

220.42 *Macropharyngodon bipartitus:* 9.5 cm SL male (Mauritius). **220.43** *Macropharyngodon cyanoguttatus:* (A) 8.5 cm SL female (Réunion); (B) 9.5 cm SL male (Mauritius). **220.44** *Macropharyngodon vivienae:* 4 cm SL (Natal). **221.1** *Calotomus carolinus:* (A) 21 cm SL female; (B) 32 cm SL male (both Hawaii). **221.5** *Hipposcarus harid:* 33.5 cm SL male (Red Sea). **221.7** *Scarus caudofasciatus:* 35.5 cm SL male (Mauritius).

221.6 (A) J.E.R.



221.6 (B) J.E.R.

221.8 D.K.

221.10 J.E.R.

221.11 J.E.R.

221.12 J.E.R.

221 (A) J.E.R.

221.15 J.E.R.

PLATE 110

221.6 *Scarus atrilunula:* (A) initial phase; (B) terminal male (both Kenya). **221.8** *S. cyanescens:* (Natal). **221** (A) *S. falcipinnis:* 38.5 cm SL male (Mauritius). **221.10** *S. festivus:* 29 cm SL male (Marshall Ids.) **221.11** *S. ghobban:* 17.5 cm SL (Bahrain). **221.12** *S. globiceps:* 11 cm SL (Australia). **221.15** *S. rubroviolaceus:* 35.5 cm SL (Marshall Ids.).

221.14 (A) J.E.R.

221.14 (B) J.E.R.

221.16 J.E.R.

221.17 J.E.R.

221.18 (A) J.E.R.

221.18 (B) J.E.R.

221.19 (A) J.E.R.

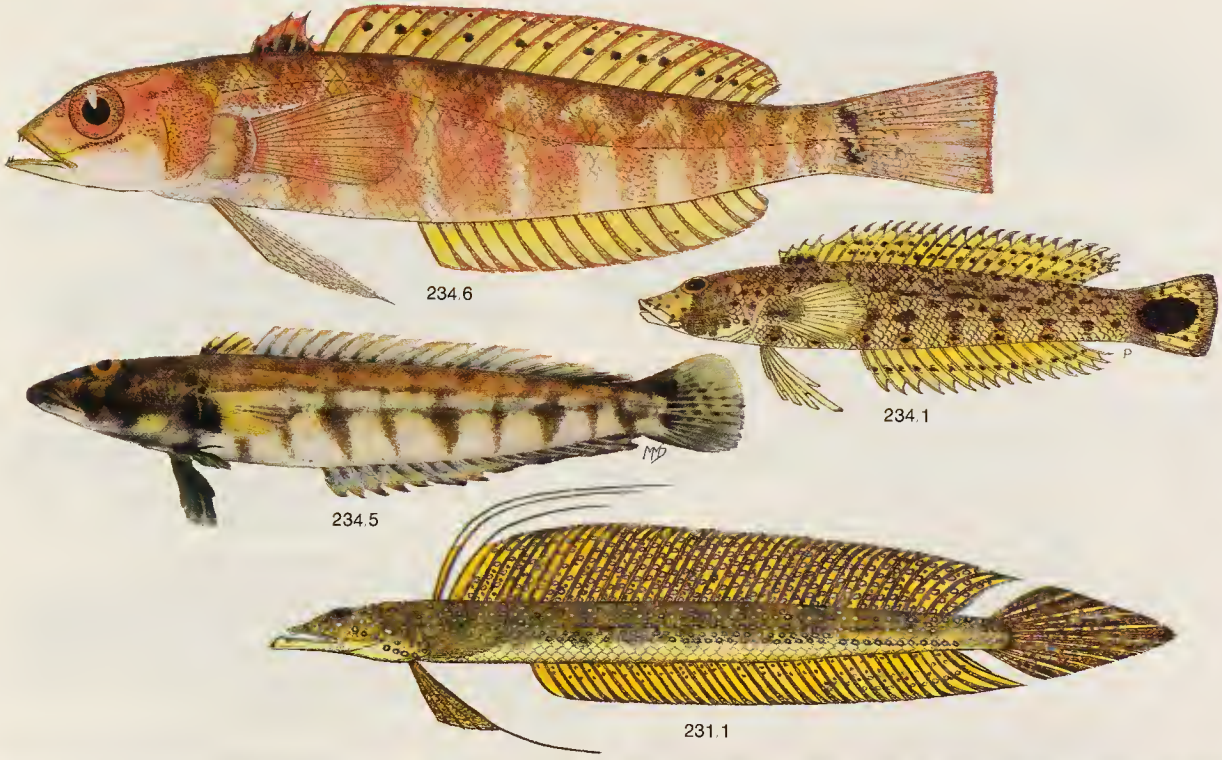
221.19 (B) J.E.R.

PLATE 111

221.14 *Scarus psittacus:* (A) 15.5 cm SL female (Hawaii); (B) 11.5 cm SL male (Tanzania). **221.16** *S. russelii:* 35.5 cm SL male (Mauritius). **221.17** *S. scaber:* 14.5 cm SL female (Red Sea). **221.18** *S. sordidus:* (A) 15.5 cm SL female (Johnston Id.); (B) 20 cm SL male (Bahrain). **221.19** *S. tricolor:* (A) 20.5 cm SL female; (B) 28.5 cm SL male (both Seychelles).

PLATE 112

222.3 *Liza dumerilii:* 23 cm (Algoa Bay). **222.7** *Liza richardsonii:* 43 cm (Knysna). **222.8** *Liza tricuspidens:* 76 cm (Knysna). **222.10** *Mugil cephalus:* 30.5 cm (Knysna). **222.12** *Valamugil buchanani:* 57 cm (Inhaca). **224.5** *Sphyraena flavicauda:* 31 cm (N. Mozambique). **225.2** *Opistognathus muscatensis:* 38 cm (Natal). **226.3** *Owstonia weberi:* 20.5 cm (Mozambique). **227.1** *Halidesmus scapularis:* 16 cm (E. Cape). **229.1** *Champsodon capensis:* 14 cm (Natal).



226.3 P.C.H.

234.4 J.E.R.

234.8 R.E.S.

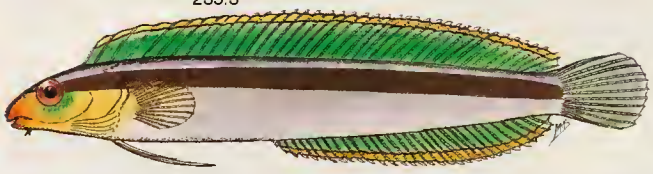
235.38 P.C.H.

PLATE 113

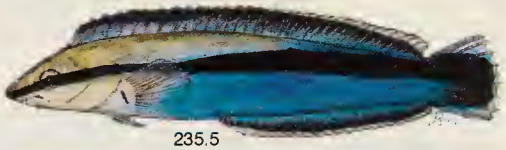
226.3 *Owstonia weberi:* 25 cm SL (Kenya). **231.1** *Trichonotus marleyi:* 19 cm holotype (Natal). **234.1** *Parapercis hexophthalma:* 25.5 cm female (Inhaca). **234.4** *Parapercis punctulata:* 10 cm SL male (Mauritius). **234.5** *Parapercis robinsoni:* 18 cm (Transkei). **234.6** *Parapercis schauinslandi:* 6.5 cm (Durban). **234.8** *Parapercis xanthozona:* 15 cm SL (Natal). **235.38** *Plagiotremus tapeinosoma:* 6 cm SL (Natal).

235.3

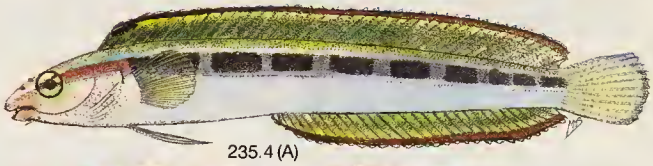
235.2



235.4 (B)



235.5

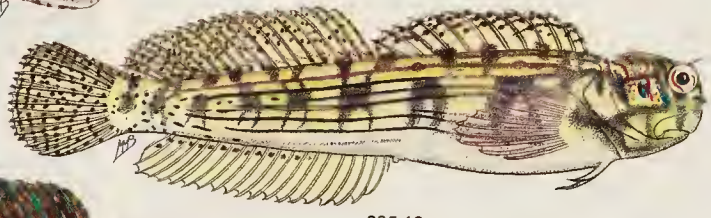


235.4 (A)

235.14 (A)

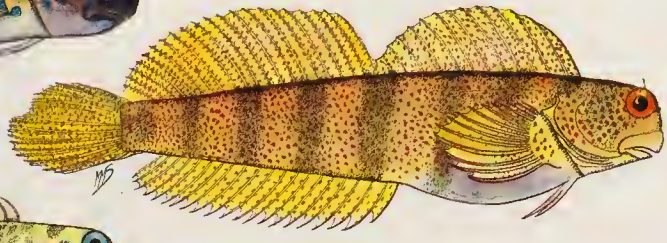
235.15

235.14 (B)



235.16

235.21 (A)



235.21 (B)

235.26

PLATE 114

235.2 *Antennablennius australis:* 6 cm (Inhaca Id.). **235.3** *Antennablennius bifilum:* 7.5 cm (Transkei). **235.4** *Aspidontus dussumieri:* (A) 8.5 cm holotype of *A. wamiziensis;* (B) 8 cm (both N. Mozambique). **235.5** *Aspidontus taeniatus tractus:* 11.5 cm (N. Mozambique). **235.14** *Exallias brevis:* (A) 5.5 cm (S. Mozambique); (B) 13 cm (N. Mozambique). **235.15** *Hirculops cornifer:* 6 cm female type of subspecies *H. c. menos* (Mozambique Id.). **235.16** *Istiblennius andamensis:* 7 cm female (S. Mozambique). **235.21** *Istiblennius impudens:* (A) 12.5 cm male holotype, subspecies of *I. c. menos* (St. Pierre Id.); (B) 12 cm female paratype (N. Mozambique). **235.26** *Omobranchus elongatus:* 5 cm (Inhaca Id.).

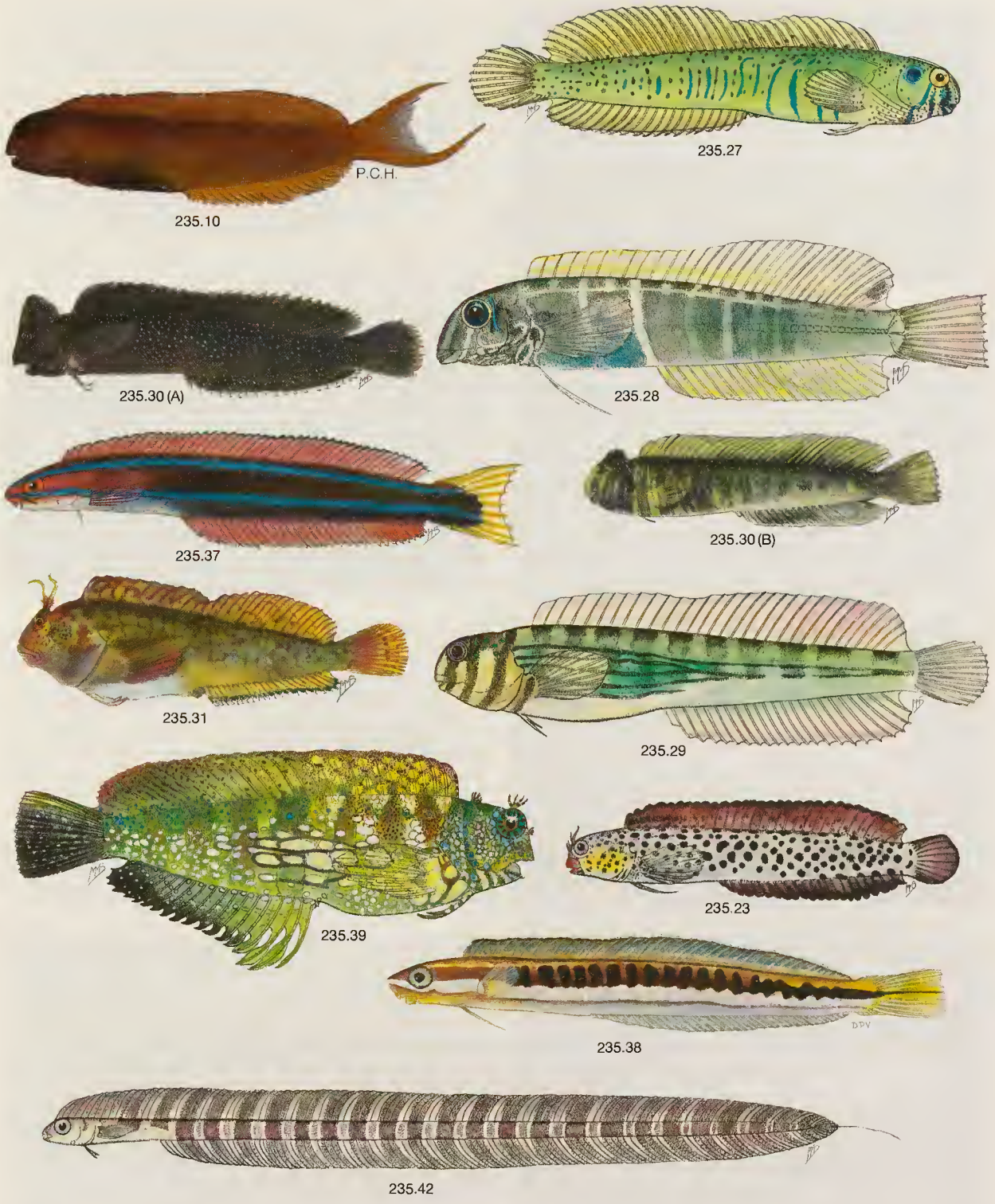


PLATE 115

235.10 *Ecsenius midas:* 10 cm SL (Natal). **235.23** *Laiphognathus multimaculatus:* 4.5 cm holotype (S. Mozambique). **235.27** *Omobranchus fasciolatus:* 5 cm (Inhaca). **235.28** *Omobranchus ferox:* 5.5 cm holotype of *O. dealmeida* (Delagoa Bay). **235.29** *Omobranchus punctatus:* 4 cm holotype of *O. japonicus scalatus* (Delagoa Bay). **235.30** *Omobranchus woodi:* (A) 9 cm male; (B) 8 cm female (both Knysna). **235.31** *Parablennius cornutus:* 10 cm (Transkei). **235.37** *Plagiotremus rhinorhynchos:* 8 cm (N. Mozambique). **235.38** *Plagiotremus tapeinosoma:* 10 cm (Inhaca). **235.39** *Salarias fasciatus:* 11.5 cm (N. Mozambique). **235.42** *Xiphasia setifer:* 30 cm (Natal).

235.11 J.E.R.

235.19 R.E.S.

235.20 J.E.R.

235.34 J.E.R.

235.36 J.E.R.

236.4 J.E.R.

236.5

236.7 J.E.R.

PLATE 116

235.11 *Ecsenius nalolo:* 5.5 cm SL (Natal). **235.19** *Istiblennius flaviumbrinus:* 10 cm female (Natal). **235.20** *Istiblennius gibbifrons:* 7.5 cm SL (Mauritius). **235.34** *Pereulixia kosiensis:* 12 cm (Natal). **235.36** *Petroscirtes mitratus:* 5.5 cm (Kenya). **236.4** *Enneapterygius elegans:* 2.5 cm male (Mauritius). **236.5** *Enneapterygius pusillus:* 2 cm (Queensland, Australia). **236.7** *Helcogramma fuscopinna:* 5 cm male (Natal).

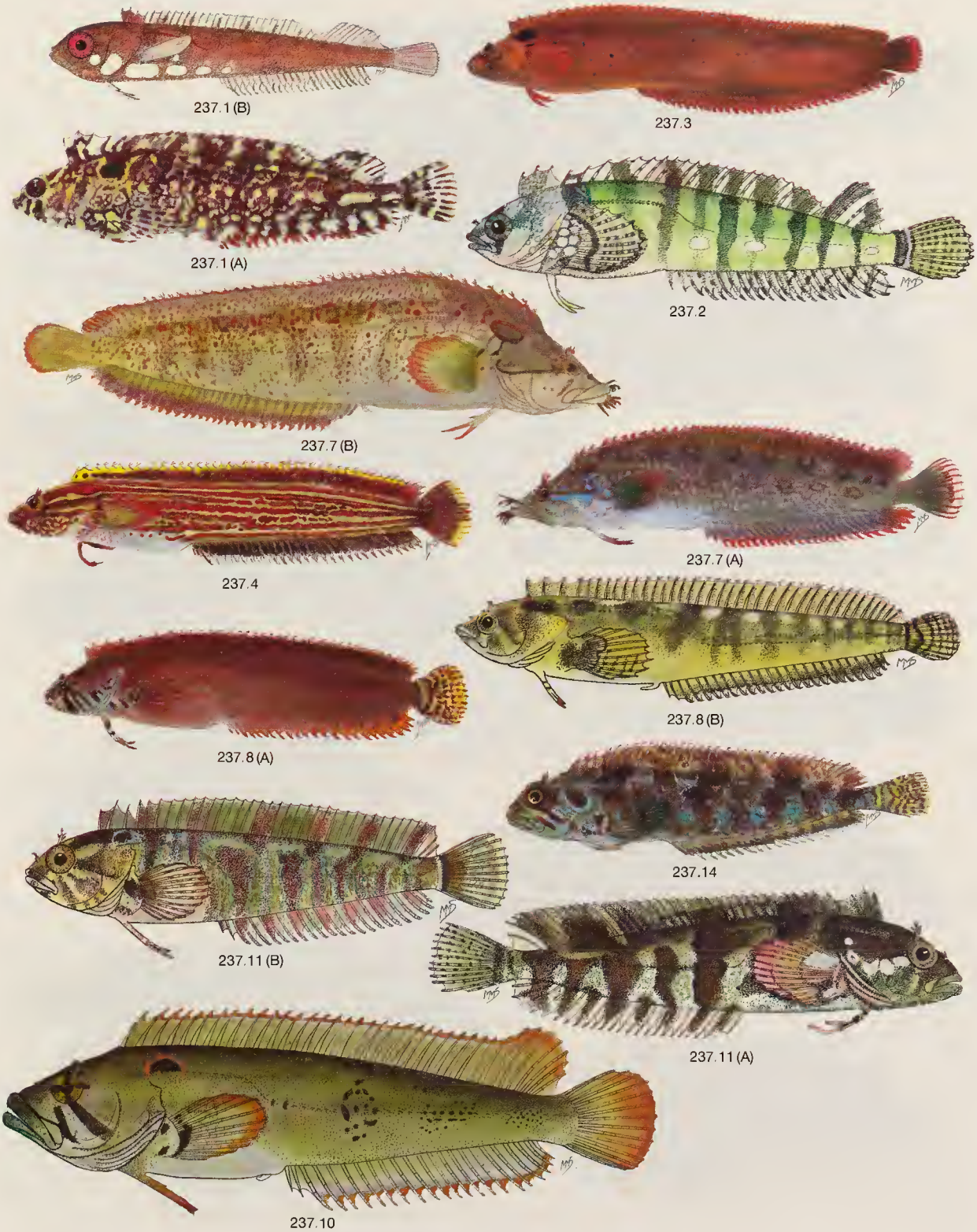


PLATE 117

237.1 *Blennioclinus brachycephalus:* (A) 7.5 cm (E. Cape); (B) 2.5 cm (Transkei). **237.2** *Blennioclinus stella:* 5 cm holotype (Transkei). **237.3** *Blennophis anguillaris:* 18 cm (E. Cape). **237.4** *Blennophis striatus:* 11 cm (E. Cape). **237.7** *Cirrhibarbis capensis:* (A) 12.5 cm (East London); (B) 12.5 cm (Salt Vlei, E. Cape). **237.8** *Climacoporus navalis:* (A) 7 cm; (B) 7.5 cm (both E. Cape). **237.10** *Clinus acuminatus:* 10 cm (Lambert's Bay). **237.11** *Clinus agilis:* (A) 10 cm (Lambert's Bay); (B) 8 cm (Knysna). **237.14** *Clinus cottoides:* 8 cm (East London).

PLATE 118

237.13 *Clinus brevicristatus:* 8 cm (False Bay). **237.15** *C. helenae:* 7.5 cm (East London). **237.19** *C. robustus:* 33 cm (E. Cape). **237.22** *C. superciliosus:* (A) 14 cm male (Tsitsikama); (B) 16 cm female (Knysna); (C) 15 cm male (Knysna). **237.23** *C. taurus:* 7 cm (E. Cape). **237.24** *C. venustris:* 8 cm (Algoa Bay). **237.25** *C. woodi:* 12.5 cm holotype (Transkei). **237.26** *Fucomimus mus:* (A) 8.5 cm (Port Alfred); (B) 8.5 cm (E. Cape). **237.27** *Muraenoclinus dorsalis:* 6 cm (E. Cape).

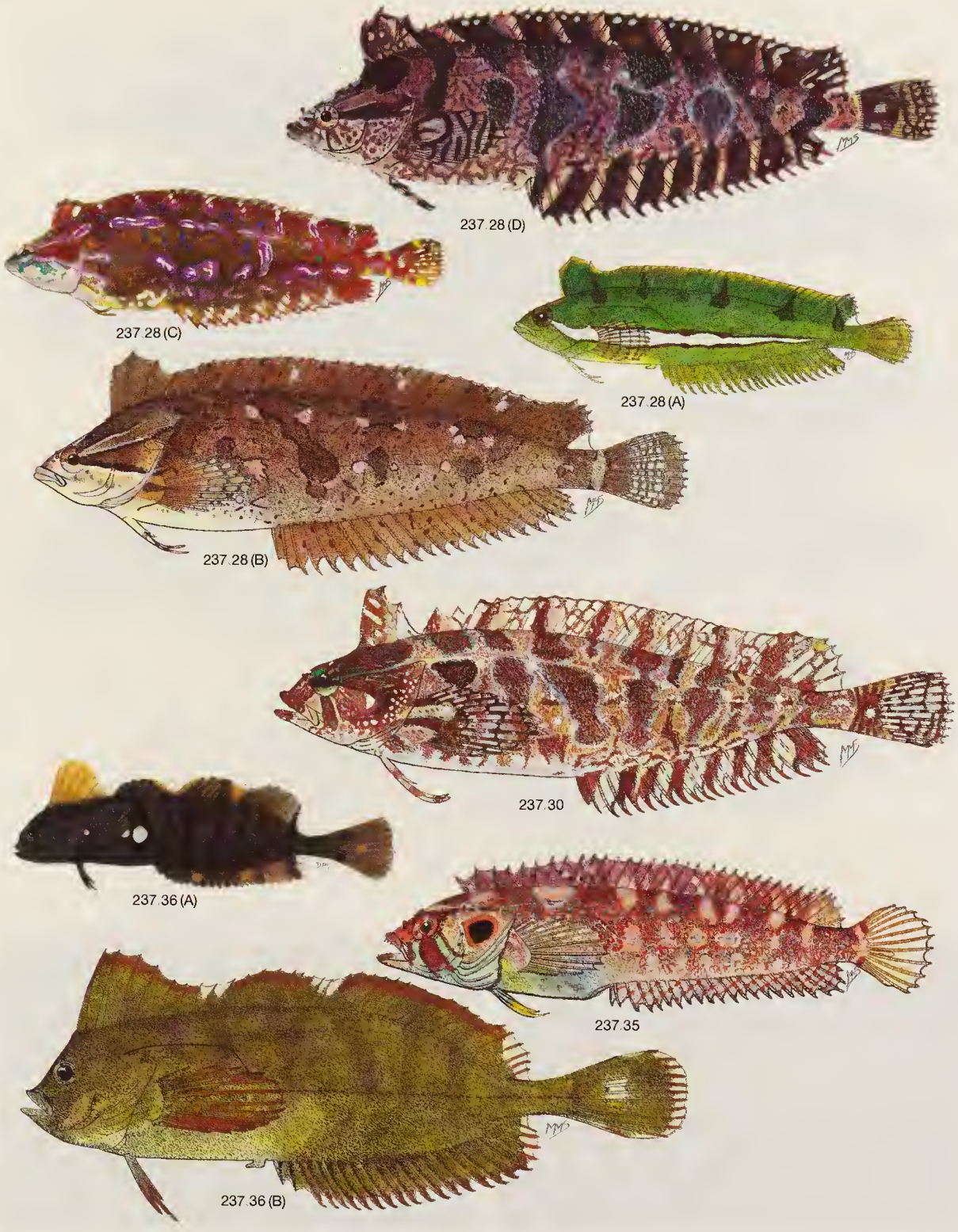
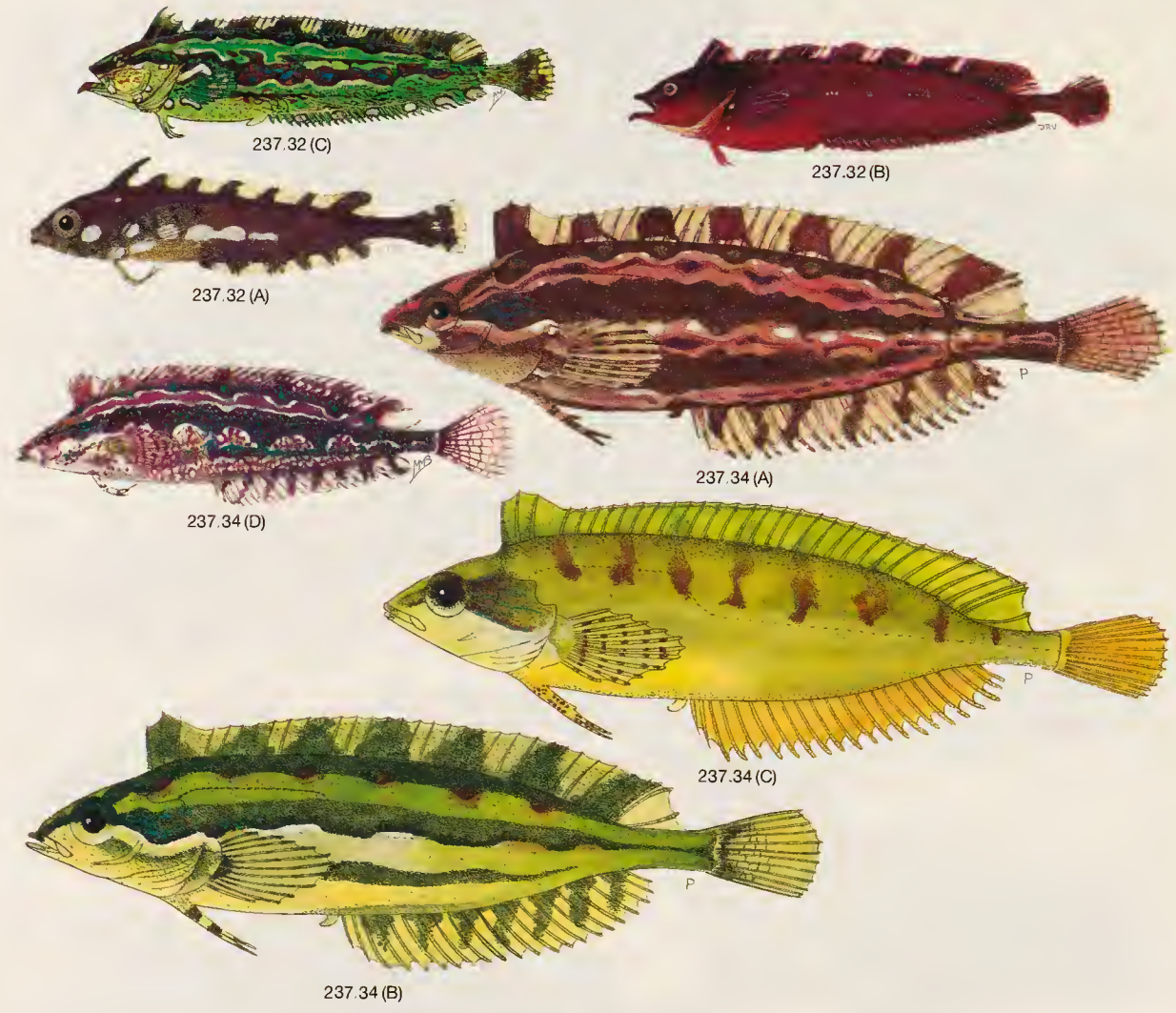


PLATE 119

237.28 *Pavoclinus graminis*: (A) 7.5 cm (Transkei); (B) 12.5 cm (Transkei), (C) 11 cm (Tsitsikama); (D) 12.5 cm (Transkei). **237.30** *Pavoclinus laurentii*: 15 cm (Transkei). **237.35** *Pavoclinus profundus*: 5 cm holotype (off Knysna). **237.36** *Smithichthys fucorum*: (A) 4 cm; (B) 18 cm (both E. Cape).



237.32 (C)

237.32 (B)

237.32 (A)

237.34 (A)

237.34 (D)

237.34 (C)

237.34 (B)

237.29 P.C.H.

238.1 P.C.H

PLATE 120

237.29 *Pavoclinus smalei:* 5 cm SL (Tsitsikama). **237.32** *Pavoclinus mentalis*: (A) 2.5 cm (Port Alfred); (B) 25 cm SL (East London); (C) 22 cm (E. Cape). **237.34** *Pavoclinus pavo:* (A) 10 cm; (B) 10 cm; (C) 10 cm (all E. Cape); (D) 8 cm (Tsitsikama). **238.1** *Bleekeria renniei:* 6.5 cm (east coast).

PLATE 121

239.3 *Callionymus marleyi:* 7.5 cm (Durban). **239.4** *Diplogrammus infulatus:* 9 cm holotype (Inhaca Id.). **239.6** *Paracallionymus costatus:* 15 cm (Inhaca Id.). **239.7** *Synchiropus marmoratus:* (A) 10.5 cm male, (B) 9 cm female (S. Mozambique). **239.8** *Synchiropus monacanthus:* 15 cm male holotype (Port Alfred). **239.10** *Synchiropus stellatus:* (A) 7.5 cm male, (B) 3.5 female (both Natal).

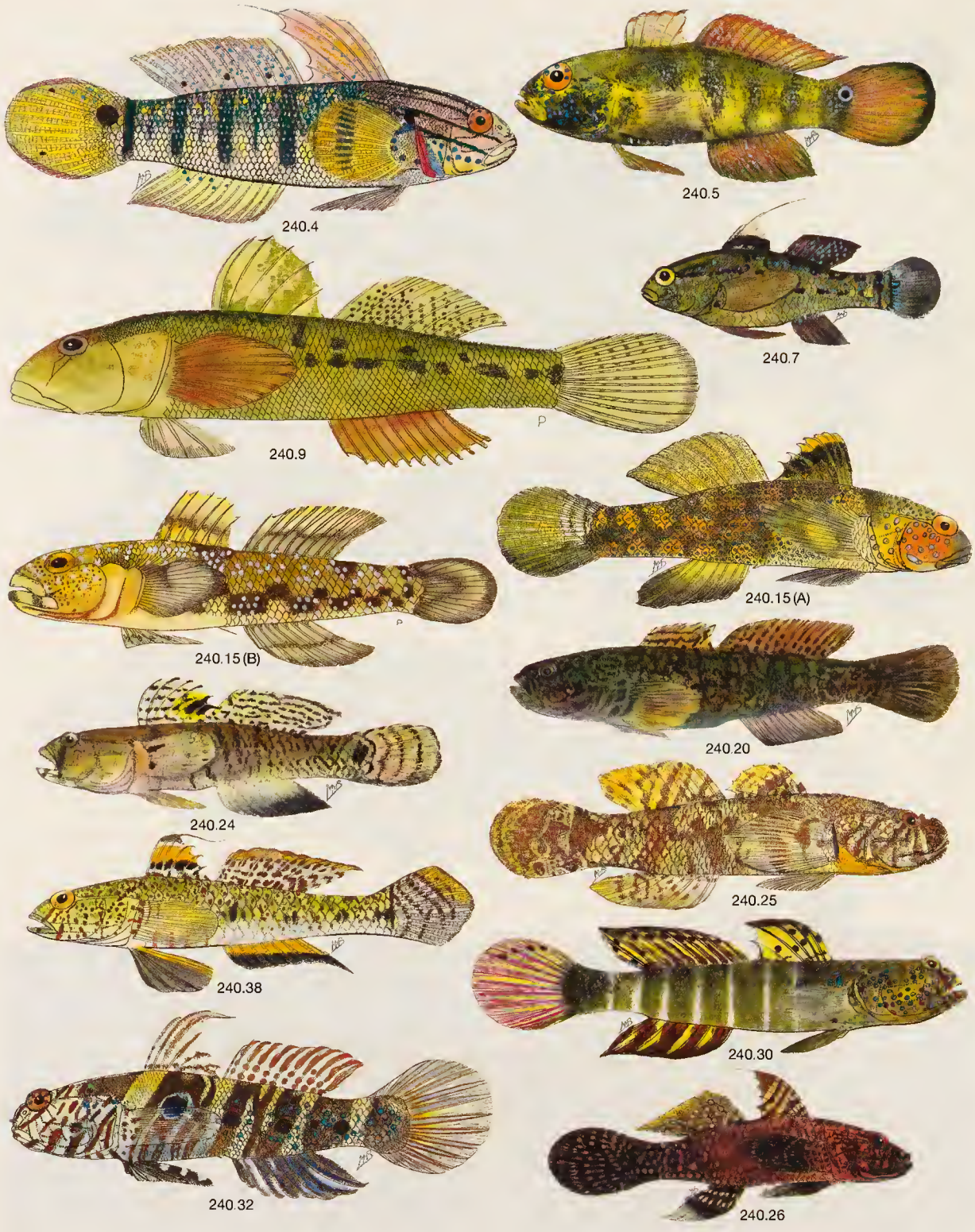
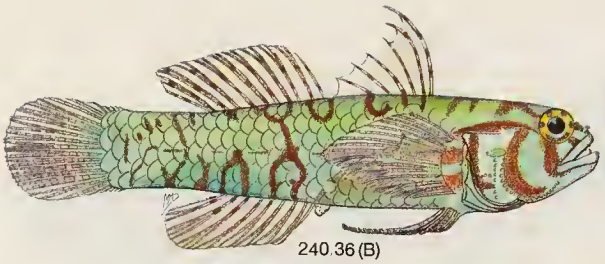
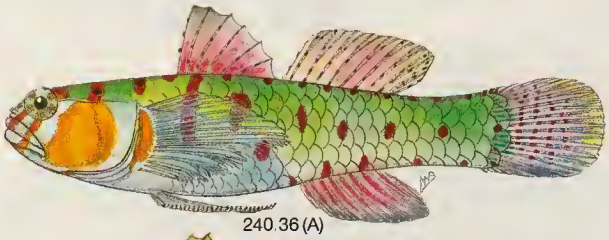


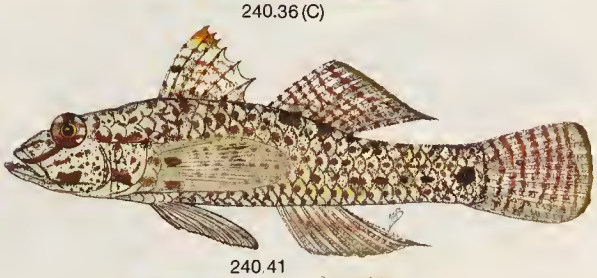
PLATE 122

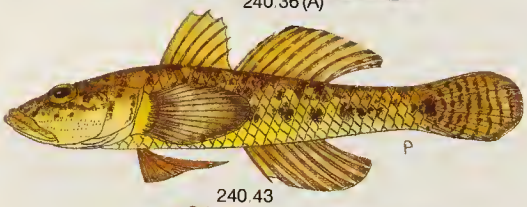
240.4 *Amblygobius albimaculatus:* 14 cm (S. Mozambique). **240.5** *Amblygobius sphynx:* 11 cm holotype of *Gobius stagon* (Inhaca). **240.7** *Asterropteryx semipunctatus:* 5.5 cm (S. Mozambique). **240.9** *Awaous aeneofuscus:* 13 cm (E. Cape). **240.15** *Bathygobius fuscus:* (A) 5.5 cm (N. Mozambique); (B) 7.5 cm (Inhaca). **240.20** *Caffrogobius caffer:* 14.5 cm (Knysna). **240.24** *Caffrogobius saldanha:* 8.5 cm holotype of *Ctenogobius cloatus* (Knysna). **240.25** *Callogobius flavobrunneus:* 6 cm holotype (N. Mozambique). **240.26** *Callogobius maculipinnis:* 5 cm holotype of *Drombus irrasus* (Seychelles). **240.30** *Cryptocentrus cryptocentrus:* 10 cm (Seychelles). **240.32** *Cryptocentrus strigilliceps:* 5 cm (S. Mozambique). **240.38** *Favonigobius reichei:* 5 cm (N. Mozambique).


240.36 (B)

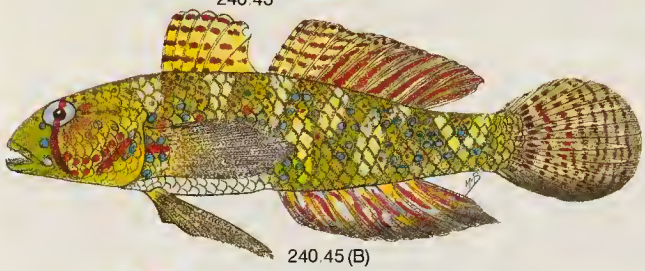
240.36 (C)

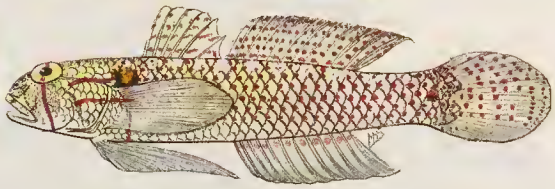

240.36 (A)


240.41

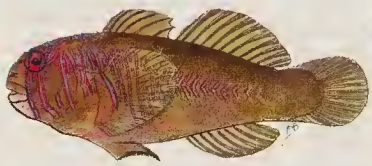

240.43

240.45 (A)

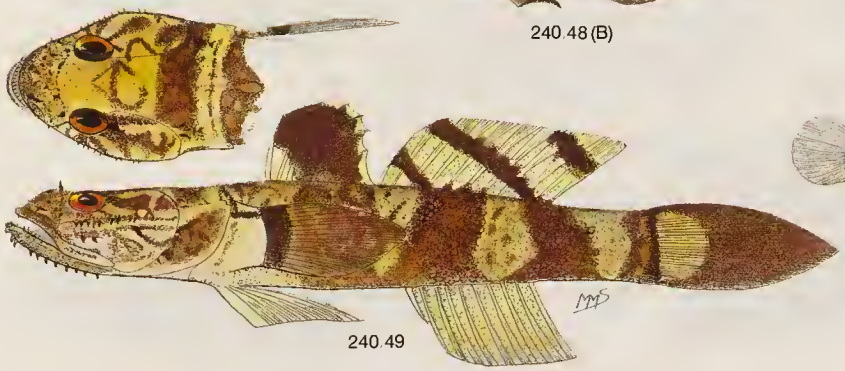

240.45 (B)


240.46

240.47


240.48 (B)

240.48 (A)


240.49

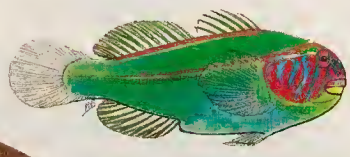

240.48 (C)

PLATE 123

240.36 *Eviota prasina:* (A) 2.5 cm female paratype of *E. verna* (N. Mozambique), (B) 2.5 cm male holotype of *E. verna* (Aldabra), (C) 2 cm female paratype of *E. verna* (N. Mozambique). **240.41** *Fusigobius neophytus:* 6 cm holotype of subspecies *africanus* (N. Mozambique). **240.43** *Glossogobius callidus:* 10.5 cm (Sundays River). **240.45** *Gnatholepis* sp. 1: (A) 7.5 cm (Inhaca), (B) 6 cm (N. Mozambique). **240.46** *Gnatholepis* sp 2: 5 cm (N. Mozambique). **240.47** *Gobiodon citrinus:* 4.5 cm (Kenya). **240.48** *Gobiodon rivulatus:* (A) 4 cm; (B) 3.5 cm; (C) 3 cm (all N. Mozambique). **240.49** *Gobiopsis pinto:* 5 cm holotype (Delagoa Bay) and head.

PLATE 124

240.54 *Hetereleotris zonata:* 5.5 cm (Transkei) and dorsal view of head. **240.59** *Mahidolia mystacina:* 7.5 cm holotype of *M. duque* (Inhaca Id.). **240.61** *Monishia william:* 6 cm holotype (Transkei). **240.66** *Oligolepis keiensis:* 7 cm (Inhaca Id.). **240.67** *Oplopomus oplopomus:* 6 cm (Inhaca Id.). **240.68** *Oxyurichthys lemayi:* 15 cm holotype (Inhaca Id.). **240.71** *Oxyurichthys papuensis:* 18 cm (N. Mozambique). **240.76** *Paragobiodon modestus:* 2.5 cm (Delagoa Bay). **240.84** *Priolepis cincta:* 5 cm (Inhaca Id.).

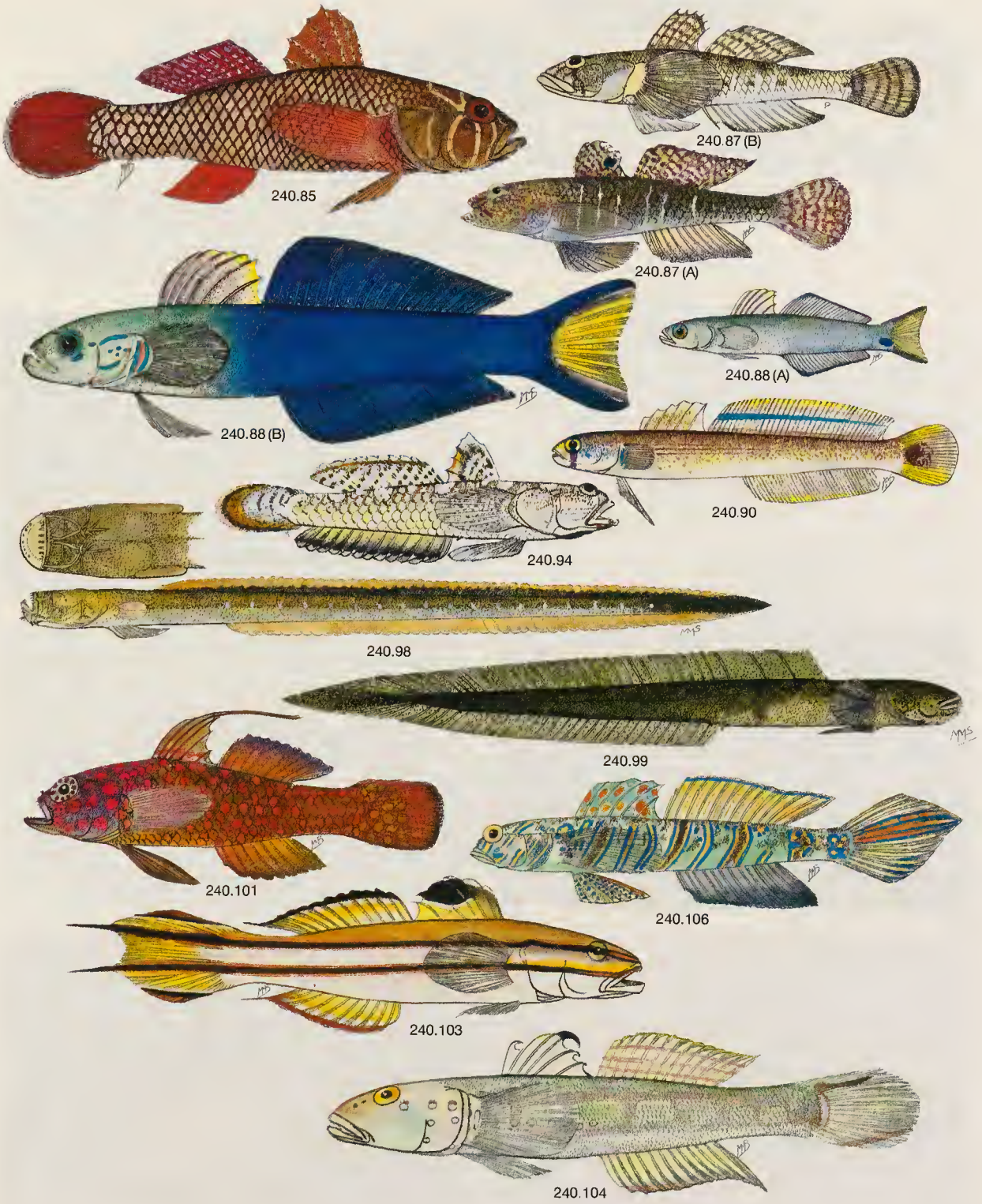
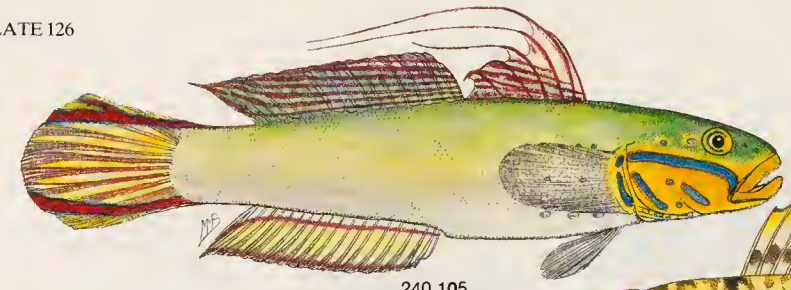
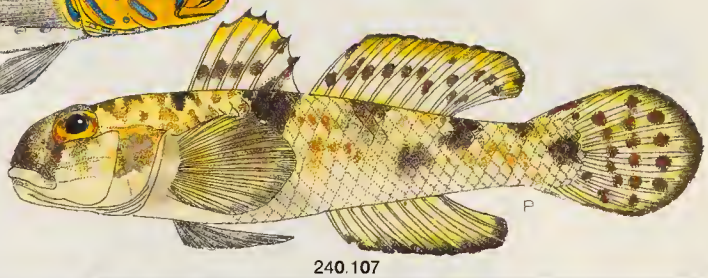


PLATE 125

240.85 *Priolepis inhaca:* 5 cm holotype (Inhaca Id.). **240.87** *Psammogobius knysnaensis:* (A) 5 cm; (B) 6 cm (both Knysna). **240.88** *Ptereleotris evides:* (A) 5 cm juvenile paratype of *P. tricolor;* (B) 12 cm holotype of *P. tricolor* (both Kenya). **240.90** *Ptereleotris lineopinnis:* 11.5 cm holotype (painted after H.W. Bell-Marley; Natal). **240.94** *Silhouettea insinuans:* 4.5 cm holotype (Seychelles). **240.98** *Taenioides esquivel:* 27 cm holotype (Delagoa Bay) and dorsal view of head. **240.99** *Taenioides jacksoni:* 9 cm holotype (Natal). **240.101** *Trimma macrophthalma:* 2.5 cm holotype of *Zonogobius flammeus* (N. Mozambique). **240.103** *Valenciennea helsdingenii:* 16.5 cm (Inhaca Id.). **240.104** *Valenciennea sexguttata:* 7 cm (Seychelles). **240.106** *Vanderhorstia delagoae:* 7.5 cm (Inhaca Id.).



240.105



240.107

240.2 P.C.H.

240.3 J.E.R.

240.14 J.E.R.

240.89 J.E.R.

240.64 (A) R.E.S.

240.64 (B) J.E.R.

PLATE 126

240.2 *Amblyeleotris aurora:* 6.5 cm SL (Natal). **240.3** *Amblyeleotris wheeleri:* 7 cm (Natal). **240.14** *Bathygobius cyclopterus:* 6.5 cm (Seychelles). **240.64** *Nemateleotris magnifica:* (A) 5.5 cm SL (Natal); (B) (Natal). **240.89** *Ptereleotris heteroptera:* 7.5 cm (Moorea). **240.105** *Valenciennea strigata:* 13.5 cm (Inhaca Id.). **240.107** *Yongeichthys nebulosus:* 10 cm (Inhaca Id.).

PLATE 127

241.3 *Calumia godeffroyi*: 3.5 cm holotype (Zanzibar). **241.8** *Ophiocara porocephala*: 45 cm juvenile (Seychelles). **241.9** *Prionobutis koilomatodon*: 4 cm juvenile (Delagoa Bay). **241.10** *Xenisthmus africanus*: 4 cm holotype (N. Mozambique). **243.3** *Acanthurus leucosternon*: 13 cm (N. Mozambique). **243.5** *Acanthurus mata*: 20.5 cm (Seychelles). **243.11** *Acanthurus triostegus*: 38 cm (N. Mozambique). **243.25** *Naso lituratus*: (A) 60 cm; (B) 17.5 cm (both N. Mozambique). **244.1** *Zanclus canescens*: 26 cm (Wit Sands, Heidelberg).

PLATE 128

243.22 *Naso brevirostris:* (A) 55 cm (Zanzibar); (B) 3.5 cm juvenile (N. Mozambique). **243.30** *Naso unicornis:* 60 cm (N. Mozambique). **243.31** *Naso vlamingii:* 60 cm (N. Mozambique). **245.1** *Siganus stellatus:* 18 cm (Inhaca Id.). **245.2** *Siganus sutor:* 23 cm (Inhaca Id.). **247.8** *Thyrsites atun:* 18 cm FL (E. Cape). **248.4** *Lepidopus caudatus:* 51 cm (Knysna). **248.6** *Trichiurus lepturus:* 51 cm (Port Alfred).

243.1 J.E.R.

243.2 J.E.R.

243.4 J.E.R.

243.6 J.E.R.

243.7 J.E.R.

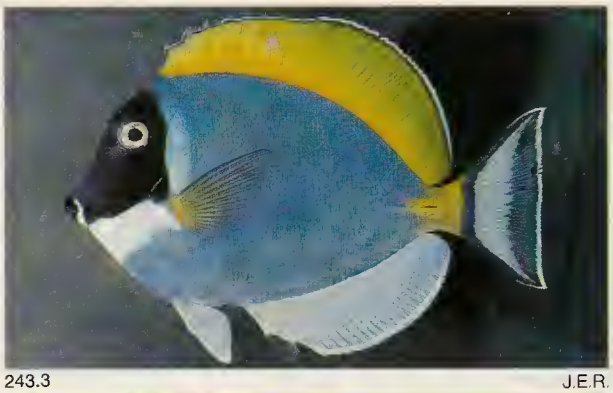
243.8 J.E.R.

243.10 J.E.R.

243.12 J.E.R.

PLATE 129

243.1 *Acanthurus blochii:* 17 cm SL (Hawaii). **243.2** *A. dussumieri:* 28 cm (Hawaii). **243.4** *A. lineatus:* 27 cm (Palau Ids.). **243.6** *A. nigricauda:* 22 cm (Eniwetok Id.). **243.7** *A. nigrofuscus:* 14.5 cm (Gulf of Aqaba). **243.8** *A. nubilus:* 25 cm (Pitcairn Id.). **243.10** *A. thompsoni:* 20 cm (Tahiti). **243.12** *A. xanthopterus:* 53 cm (Eniwetok Id.).



243.3 J.E.R.

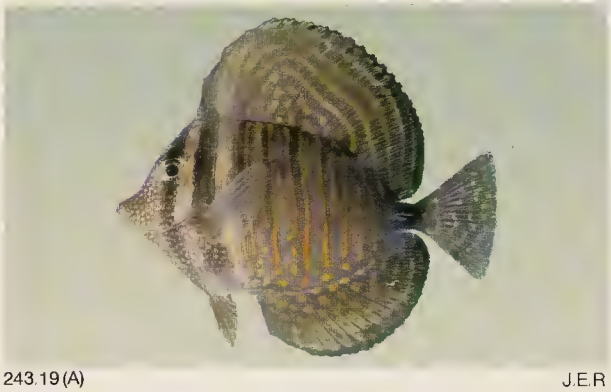
243.5 P.C.H.

243.13 J.E.R.

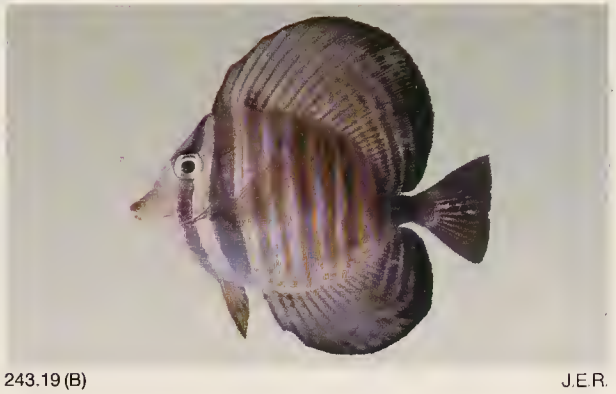
243.15 J.E.R.

243.16 J.E.R.

243.18 M.M.S.



243.19 (A) J.E.R



243.19 (B) J.E.R.

PLATE 130

243.3 *Acanthurus leucosternon:* 12 cm (Natal). **243.5** *Acanthurus mata:* 5 cm SL (Natal). **243.13** *Ctenochaetus binotatus:* 15 cm (Tahiti). **243.15** *Ctenochaetus strigosus:* 18 cm (Seychelles). **243.16** *Paracanthurus hepatus:* 21 cm (Fanning Id.). **243.18** *Zebrasoma scopas:* ca. 10 cm (Mauritius). **243.19** *Zebrasoma veliferum:* (A) 8.5 cm (Mauritius); (B) 10 cm (Red Sea).

PLATE 131

249.4 *Euthynnus affinis:* 70 cm (Cape St. Francis). **249.7** *Katsuwonus pelamis:* 63 cm (off Algoa Bay). **249.8** *Rastrelliger kanagurta:* 22 cm FL (Natal). **249.9** *Sarda orientalis:* 60 cm (Algoa Bay). **249.10** *Sarda sarda:* 37 cm (off Port Alfred). **249.11** *Scomber japonicus:* 60 cm (off Algoa Bay). **249.12** *Scomberomorus commerson:* 110 cm (Kenya). **249.13** *Scomberomorus plurilineatus:* (A) 33 cm juvenile (Delagoa Bay), (B) 74 cm FL (off Natal). **249.15** *Thunnus albacares:* 60.5 cm (Algoa Bay). **249.18** *Thynnus thynnus thynnus:* 213 composite (Cape). **250.1** *Luvarus imperialis:* 26 cm juvenile (Japan; reconstructed after Abe & Kobata).

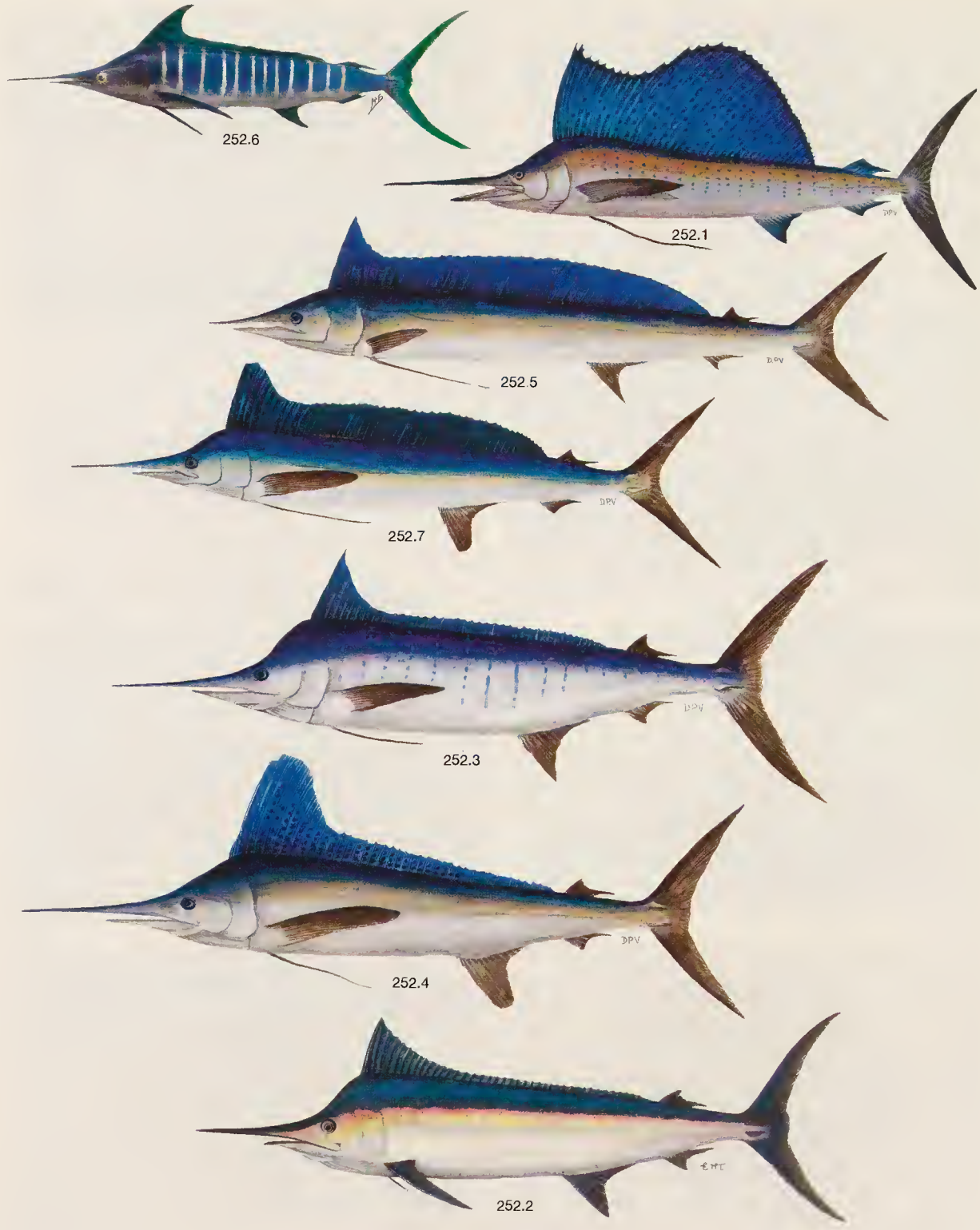


PLATE 132

252.1 *Istiophorus platypterus:* 260 cm (Natal). **252.2** *Makaira indica:* 420 cm FL (Natal). **252.3** *Makaira nigricans:* 360 cm (Natal). **252.4** *Tetrapturus albidus:* 260 cm (off east coast). **252.5** *Tetrapturus angustirostris:* 190 cm (off east coast). **252.6** *Tetrapturus audax:* 270 cm (off Mossel Bay). **252.7** *Tetrapturus pfluegeri:* 165 cm (Cape west coast).

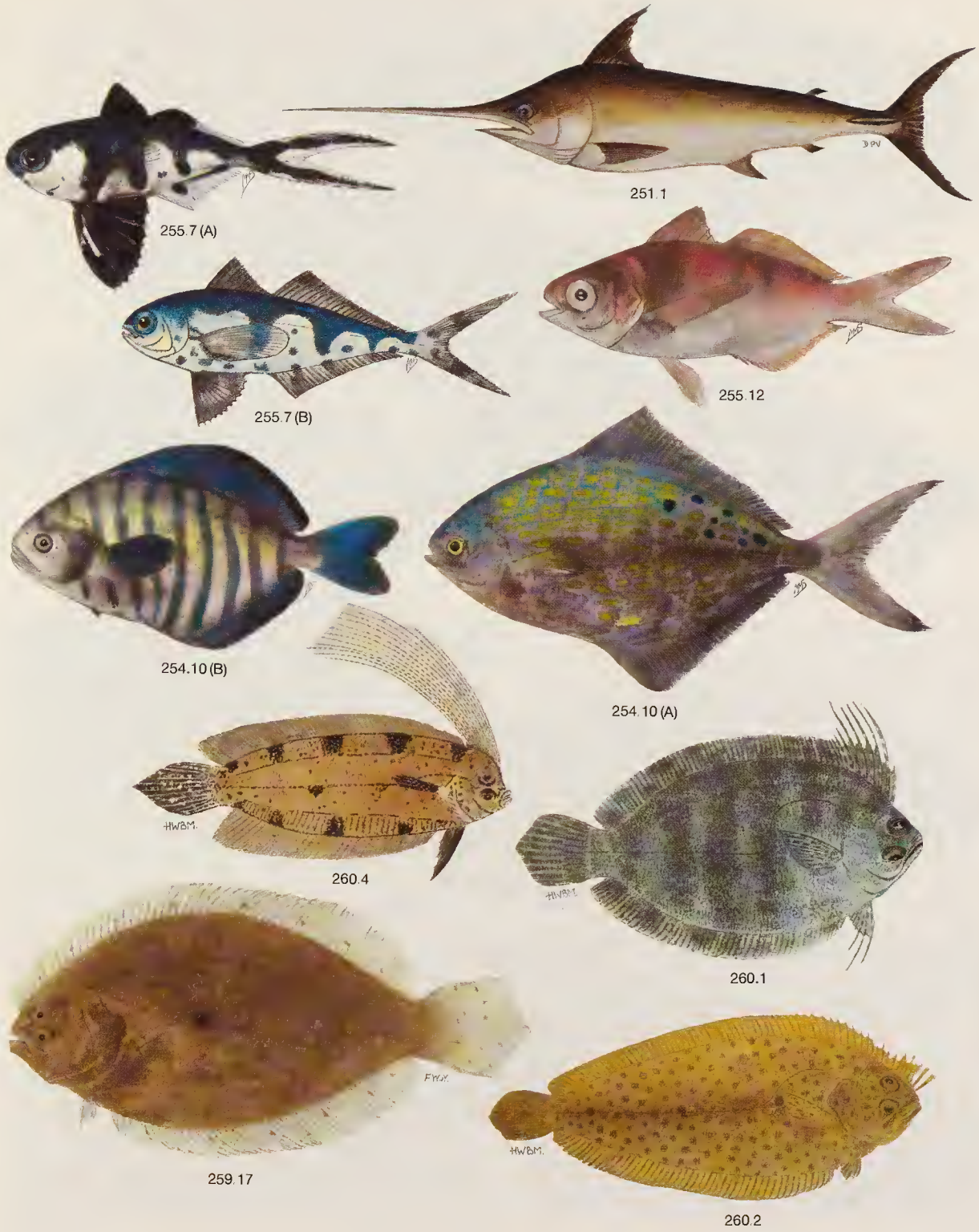


PLATE 133

251.1 *Xiphias gladius*: 255 cm (after Nakamura, 1984). **254.10** *Stromateus fiatola*: (A) 25.5 cm adult, (B) 11 cm juvenile (both Natal). **255.7** *Nomeus gronovii*: (A) 5 cm (Natal), (B) 9 cm (off East London). **255.12** *Psenes whiteleggii*: 5 cm (Durban). **259.17** *Pseudorhombus arsius*: 25 cm (Knysna). **260.1** *Marleyella bicolorata*: 12 cm (Natal). **260.2** *Paralichthodes algoensis*: 20 cm (Natal). **260.4** *Samaris cristatus*: 12.5 cm (Natal).

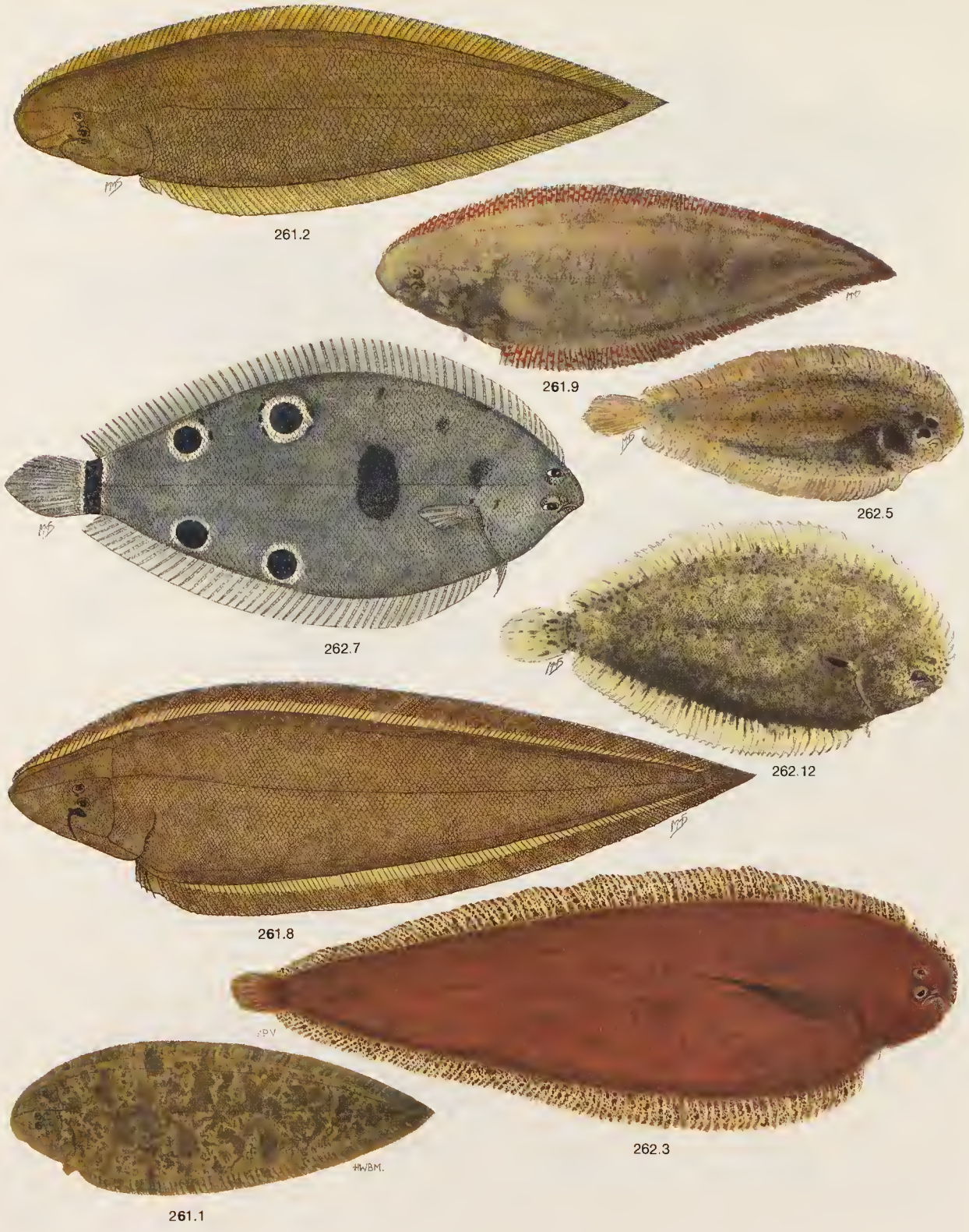
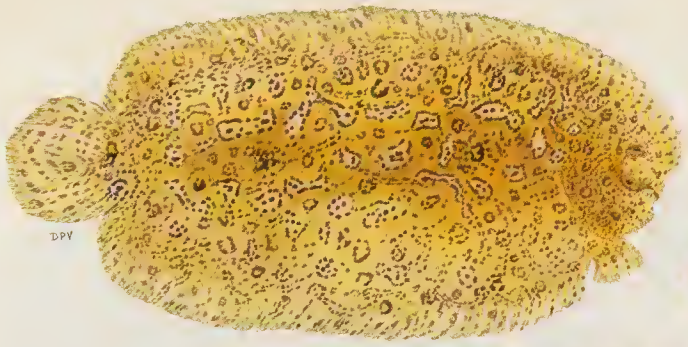


PLATE 134

261.1 *Cynoglossus acaudatus:* 12.5 cm (Natal). **261.2** *Cynoglossus attenuatus:* 15 cm (N. Mozambique). **261.8** *Cynoglossus marleyi:* 22 cm (N. Mozambique). **261.9** *Cynoglossus zanzibarensis:* 30.5 cm (Knysna). **262.3** *Austroglossus pectoralis:* 23.5 cm (Algoa Bay). **262.5** *Heteromycteris capensis:* 5 cm (Knysna). **262.7** *Monochirus ocellatus:* 10 cm (Knysna). **262.12** *Solea bleekeri:* 12.5 cm (Knysna).



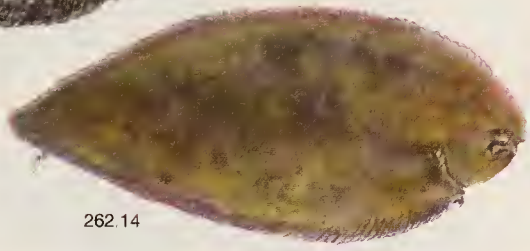
262.9

262.13 (B)

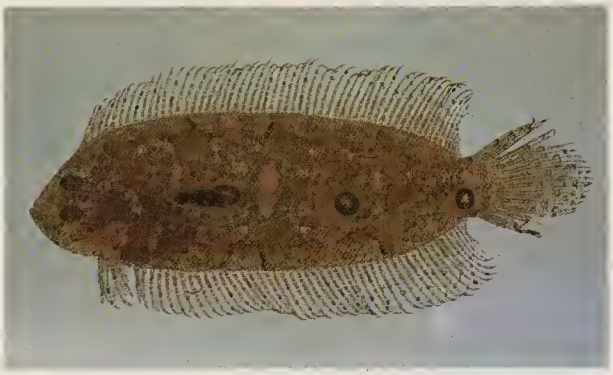
262.13 (A)

262.15

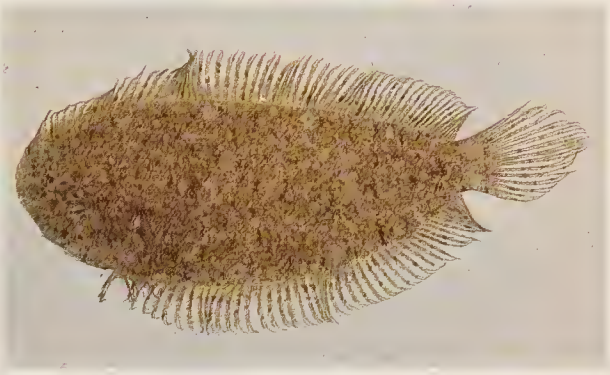
262.16



262.14



260.5 P.C.H.



262.8 R.E.S.

262.10 R.E.S.

268.9 J.E.R.

PLATE 135

260.5 *Samariscus triocellatus:* 6 cm SL (Natal). **262.8** *Parachirus xenicus:* 6 cm SL (Natal). **262.9** *Pardachirus marmoratus:* 20 cm SL (N. Mozambique). **262.10** *Pardachirus morrowi:* 13 cm SL (Natal). **262.13** *Solea fulvomarginata:* (A) 75 cm (Fish River Mouth); (B) blind side of 75 cm specimen. **262.14** *Synaptura marginata:* 29.5 cm (Tsitsikama). **262.15** *Synapturichthys kleini:* 45 cm (Pinda). **262.16** *Zebrias regani:* 12.5 cm (Natal). **268.9** *Canthigaster amboinensis:* 8.5 cm SL (Mauritius).

PLATE 136

263.1 *Abalistes stellatus:* 33 cm (Cape Infanta). **263.2** *Balistapus undulatus:* 18 cm (Tanzania). **263.3** *Balistes vetula:* 32 cm SL (Ascension Id., Atlantic). **263.4** *Balistoides conspicillum:* 28 cm (S. Mozambique). **263.5** *Balistoides viridescens:* 12.5 cm (Seychelles). **263.6** *Canthidermis maculatus:* (A) 6 cm juvenile (E. Cape); (B) 34 cm (Mossel Bay). **263.11** *Pseudobalistes flavimarginatus:* 30.5 cm (Seychelles).

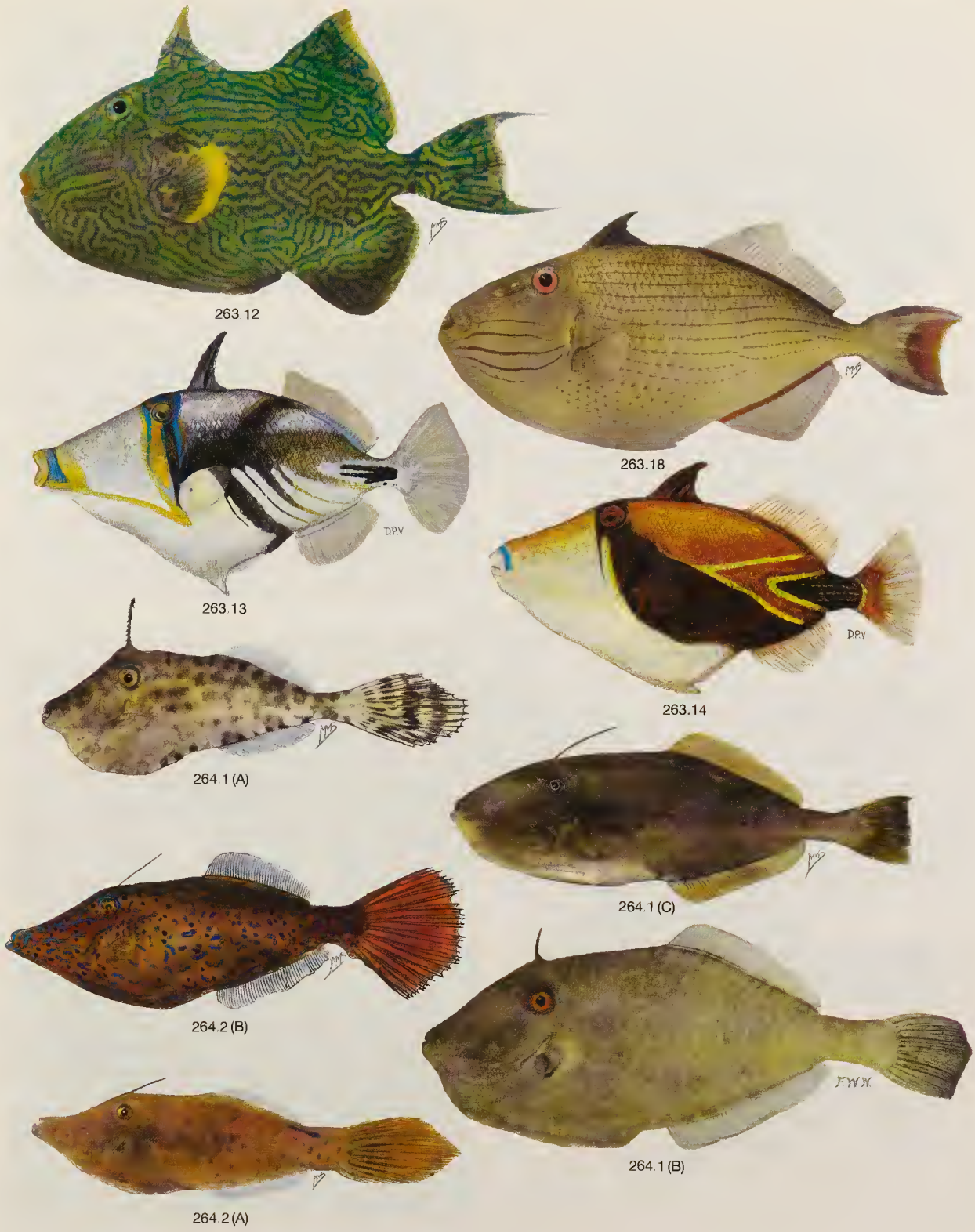


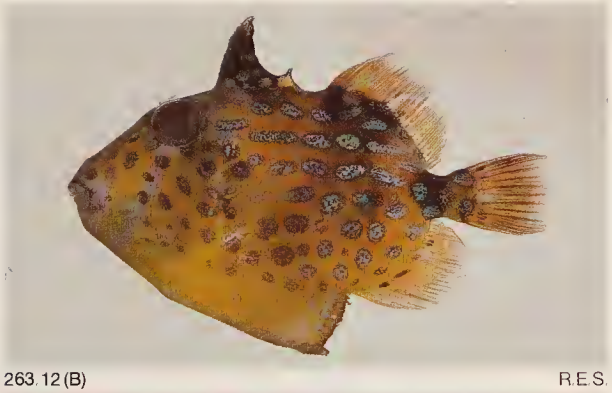
PLATE 137

263.12 *Pseudobalistes fuscus:* 25 cm (S. Mozambique). **263.13** *Rhinecanthus aculeatus:* 18 cm (Inhaca). **263.14** *Rhinecanthus rectangulus:* 14 cm (Seychelles). **263.18** *Xanthichthys lineopunctatus:* 30 cm (Durban). **264.1** *Aluterus monoceros:* (A) 6 cm (Natal); (B) 57 cm (east coast); (C) 43.5 cm (Algoa Bay). **264.2** *Aluterus scriptus:* (A) 19 cm (Mozambique); (B) 51 cm (Seychelles).

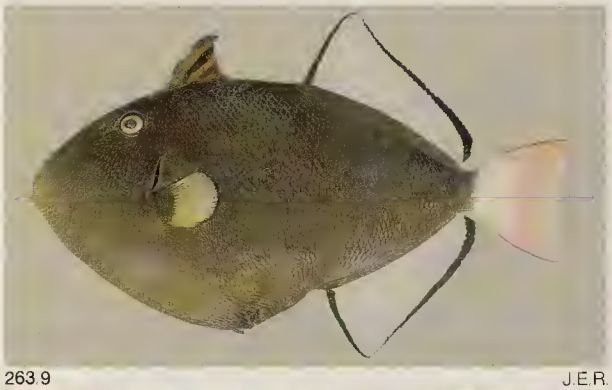
PLATE 138

264.4 *Cantherhines dumerilii:* 30 cm (Natal). **264.5** *Cantherhines fronticinctus:* 19 cm (Seychelles). **264.6** *Cantherhines pardalis:* (A) 7.5 cm juvenile, (B) 18 cm (both Tsitsikama). **264.7** *Oxymonacanthus longirostris:* 9 cm (Seychelles). **264.9** *Paramonacanthus barnardi:* 11 cm (Inhaca Id.). **264.11** *Pervagor melanocephalus:* 10 cm (Inhaca Id.). **264.13** *Stephanolepis auratus:* 19 cm (Port Alfred).

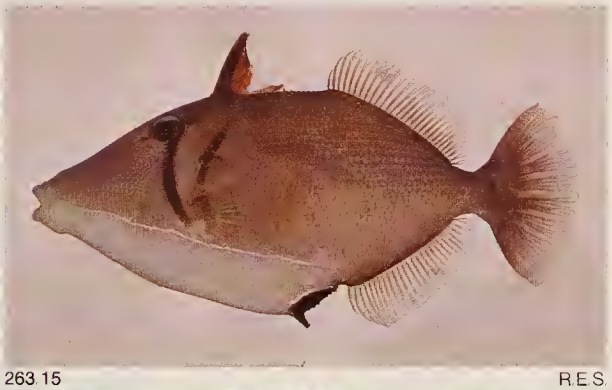
263.12 (A) J.E.R.



263.12 (B) R.E.S.



263.9 J.E.R.



263.15 R.E.S.

263.16 (A) J.E.R.

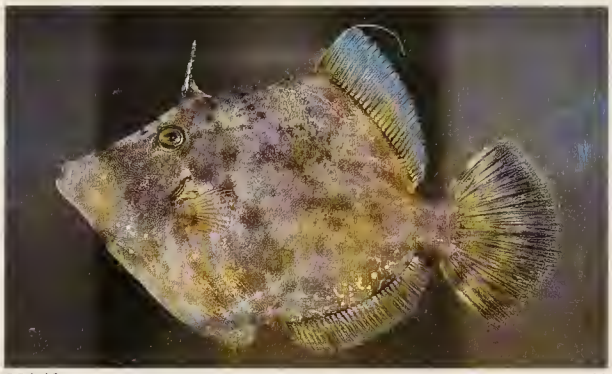
263.16 (B) J.E.R.

263.17 J.E.R.

264.8 R.E.S.

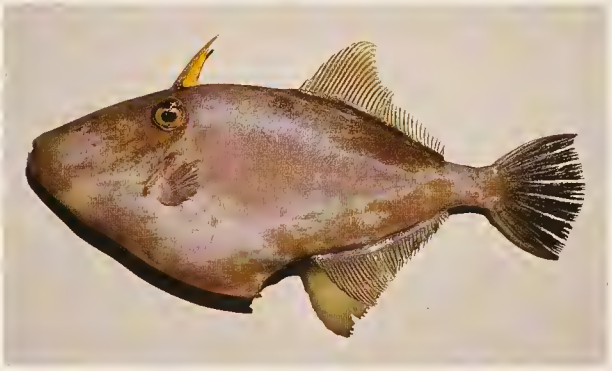
PLATE 139

263.9 *Melichthys vidua:* 20.5 cm (Palau Id.). **263.12** *Pseudobalistes fuscus:* (A) 29 cm (Tanzania); (B) 5 cm SL (Natal). **263.15** *Sufflamen bursa:* 14.5 cm SL (Natal). **263.16** *Sufflamen chrysopterus:* (A) 4 cm juvenile (Mauritius); (B) (Mauritius). **263.17** *Sufflamen fraenatus:* 26 cm (Natal)
264.8 *Paraluteres prionurus:* 7 cm SL (Natal).



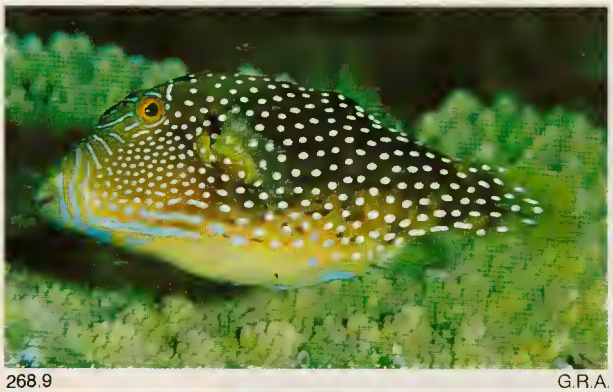
264.13 P.C.H.

264.15 M.M.S.



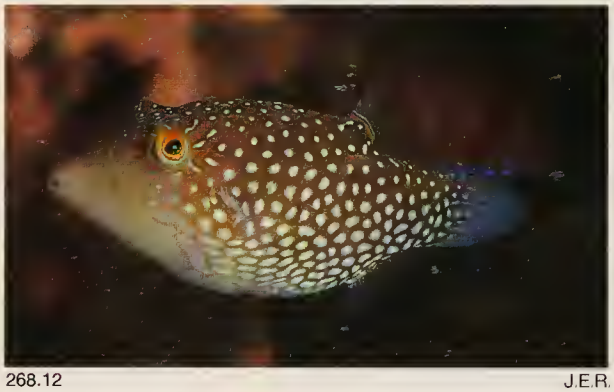
264.16 P.C.H.

266.5 P.C.H.



268.9 G.R.A.

268.11 J.E.R.



268.12 J.E.R.

268.14 G.R.A.

PLATE 140

264.13 *Stephanolepis auratus:* 19 cm (Transkei). **264.15** *Thamnaconus fajardoi:* 16 cm (Mauritius). **264.16** *Thamnaconus modestoides:* 31.5 cm SL (Kenya). **266.5** *Lactoria fornasini:* 4 cm SL (Natal). **268.9** *Canthigaster amboinensis:* 10 cm (Natal). **268.11** *Canthigaster coronata:* (Mauritius). **268.12** *Canthigaster janthinoptera:* (Natal). **268.14** *Canthigaster smithae:* 8 cm (Mauritius).

PLATE 141

266.1 *Acanthostracion quadricornis:* 20.5 cm (Knysna). **266.3** *Lactoria cornuta:* 25.5 cm (Knysna). **266.4** *Lactoria diaphana:* (A) 12.5 cm (East London); (B) 2 cm juvenile (Transkei). **266.5** *Lactoria fornasini:* 12.5 cm (off Port Alfred). **266.6** *Ostracion cubicus:* (A) 25 cm adult (Shimoni); (B) 1.5 cm juvenile (Knysna). **266.7** *Ostracion meleagris:* (A) 18 cm female (Inhaca Id.) and front view of head; (B) 23 cm male (Knysna). **266.9** *Tetrosomus concatenatus:* (A) 2 cm juvenile, dorsal and lateral views (Knysna); (B) 28 cm male, front and side views (East London).

PLATE 142

267.1 *Triodon macropterus:* 25.5 cm (S. Mozambique). **268.1** *Amblyrhynchotes honckenii:* (A) 20.5 cm; (B) 19 cm (both Knysna). **268.2** *Arothron hispidus:* (A) 33 cm male (Durban); (B) pectoral fin axil; (C) 7.5 cm (E. Cape); (D) 8 cm (Inhaca Id.). **268.3** *Arothron immaculatus:* 12.5 cm (Transkei). **268.5** *Arothron mappa:* 30.5 cm (N. Mozambique). **268.8** *Arothron stellatus:* (A) 7.5 cm juvenile; (B) 35.5 cm (both E. Cape).

PLATE 143

268.7 *Arothron nigropunctatus:* (A) 35.5 cm; (B) 10 cm (both Seychelles). **268.10** *Canthigaster bennetti:* 10 cm (Kenya). **268.15** *Canthigaster solandri:* 10 cm (Mozambique). **268.16** *Canthigaster valentini:* 7.5 cm (Zanzibar). **268.17** *Chelonodon laticeps:* 10 cm (Delagoa Bay). **268.18** *Chelonodon pleurospilus:* (A) 7 cm (Mozambique); (B) 12.5 cm holotype (Natal). **268.19** *Lagocephalus guentheri:* 11.5 cm SL (off Algoa Bay). **268.20** *Lagocephalus inermis:* 25 cm (Kei River Mouth). **268.21** *Lagocephalus lagocephalus:* 38 cm (Knysna). **268.24** *Pelagocephalus marki:* 10 cm SL adult male (Sardinia Bay).

PLATE 144

268.22 *Lagocephalus lunaris:* 23 cm (Delagoa Bay). **268.23** *Lagocephalus scleratus:* 23 cm (Inhaca). **268.25** *Sphoeroides pachygaster:* 23 cm (Knysna). **268.26** *Takifugu oblongus:* 23 cm (Natal). **268.27** *Torquigener hypselogeneion:* 6.5 cm SL (Knysna). **269.8** *Lophodiodon calori:* 12.5 cm (Inhaca). **270.2** *Mola mola:* (A) 91.5 cm (Algoa Bay) and front view; (B) 12 cm juvenile (Transkei). **270.4** *Ranzania laevis:* 56 cm (Transkei).

Fin formula key to bony fishes

The main problem in identification is to find some feature to point the way. It is easy to recognise a shark or a sole or a swordfish. It is in the large group of ordinary fishes, particularly with the "bream" configuration, that the amateur encounters most difficulty. The eels (Families 39–53), which either lack dorsal and anal fins altogether or have the fin rays so reduced as to be uncountable without the aid of an X-ray machine, are not included in the key. This fin formula key provides a short cut to the identification of some 1 500 species, and while it may appear rather formidable, manipulation is so simple that it can be mastered in a short time by even a schoolboy. After studying the directions, a matter of half an hour at most, you will become most easily familiar with its manipulation by trying it out on a few common fishes.

How to use this key

The system presented here is numerical and based on the number of spines and soft-rays in the dorsal and anal fins. The least variable feature in most fishes is the number of anal fin spines, which is the number in the far left column. Then come, in order, the numbers of dorsal fin spines, anal fin soft-rays, and last, dorsal fin soft-rays. Before you try the key, read up about dorsal and anal fins (pp. 2 & 3). Be careful not to prick yourself with the dorsal and anal fin spines, which are venomous on some fishes (e.g. scorpionfishes). Count the spines and rays in the dorsal and anal fins, and arrange the numbers in the following order: (1) anal spines, (2) dorsal spines, (3) anal soft-rays, and (4) dorsal soft-rays. Suppose you find 3, 12, 21, 21; find the point at which the number in the far left column changes to "3" and follow along until you find 12, 21, 21. This indicates *Pomacanthus maculosus*. Now check the diagnosis and illustration of this species in the main text to confirm your identification.

Notes

1. An asterisk denotes a fin divided into two or more separate fins.
2. The last soft-ray in most fishes is usually divided to the base and may look like two rays, but it counts only as one ray in the key.
3. If the dorsal fin is divided, there is usually a single spine at the beginning of the second fin, and it is not always easy to see.
4. You must allow for variation in counts not yet recorded, so that if you have, for example, "3, 9, 14, 15" and cannot immediately find it in the key, vary the secondary counts and try "3, 8, 14, 15" or "3, 10, 14, 15" or "3, 9, 15, 15" and so on. This takes only a few moments, and the illustrations of these species will often show if you are on the wrong track.
5. In small juveniles of some species, e.g. a 5 cm specimen of *Pomadasys commersoni*, the posteriormost anal fin spine is not completely developed and looks like a soft-ray.
6. If you are sure of your counts and fail to trace the fish, make every effort to get it to a museum, for it may be a species new to science or a new record for southern Africa.

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	0	11-13	*Opisthoproctus soleatus*	**63.2**
0	0	0	18-22	*Nannocampus pictus*	**145.26**
0	0	0	21-24	*Nannocampus elegans*	**145.25**
0	0	3	16-18	*Hippocampus capensis*	**145.17**
0	0	3	16-20	*Halicampus dunckeri*	**145.10**
0	0	3	17-24	*Micrognathus andersonii*	**145.22**
0	0	3	21-26	*Halicampus mataafae*	**145.11**
0	0	3	28-32	*Syngnathus watermeyeri*	**145.30**
0	0	3	33-42	*Syngnathus acus*	**145.29**
0	0	3-4	4-6	*Malthopsis mitriagera*	**104.7**
0	0	3-4	16-20	*Cosmocampus banneri*	**145.4**
0	0	3-4	20-24	*Phoxocampus belcheri*	**145.27**
0	0	3-4	22-23	*Halicampus zavorensis*	**145.12**
0	0	3-5	4-6	*Diplecogaster megalops*	**110.3**
0	0	4	4	*Halieutaea spicata*	**104.4**
0	0	4	4-5	*Halieutaea fitzsimonsi*	**104.2**
0	0	4	4-5	*Malthopsis tiarella*	**104.8**
0	0	4	5	*Halieutaea hancocki*	**104.3**
0	0	4	5-6	*Malthopsis luteus*	**104.6**
0	0	4	6	*Dibranchus stellulatus*	**104.1**
0	0	4	6	*Halieutopsis micropus*	**104.5**
0	0	4	15-18	*Hippocampus kuda*	**145.19**
0	0	4	16-17	*Acentronura tentaculata*	**145.1**
0	0	4	16-17	*Hippocampus whitei*	**145.21**
0	0	4	17-19	*Hippocampus histrix*	**145.18**
0	0	4	17-21	*Choeroichthys smithi*	**145.3**
0	0	4	18-21	*Festucalex erythraeus*	**145.9**
0	0	4	19-21	*Hippocampus trimaculatus*	**145.20**
0	0	4	20-23	*Doryrhamphus multiannulatus*	**145.8**
0	0	4	20-26	*Doryrhamphus dactyliophorus*	**145.7**
0	0	4	21-23	*Doryrhamphus bicarinatus*	**145.5**
0	0	4	21-29	*Doryrhamphus excisus excisus*	**145.6**
0	0	4	24-32	*Trachyrhamphus bicoarctatus*	**145.31**
0	0	4	27-34	*Choeroichthys sculptus*	**145.2**
0	0	4	37-54	*Microphis brachyurus*	**145.24**
0	0	4	38-48	*Syngnathoides biaculeatus*	**145.28**
0	0	4	60-69	*Microphis fluviatilis*	**145.23**
0	0	4-5	19-21	*Hippocampus camelopardalis*	**145.16**
0	0	5	5	*Eurypegasus draconis*	**142.1**
0	0	5	5	*Lissonanchus lusheri*	**110.8**
0	0	5	5	*Pegasus volitans*	**142.2**
0	0	5	5-6	*Apletodon pellegrini*	**110.1**
0	0	5-6	5-6	*Eckloniaichthys scylliorhiniceps*	**110.4**
0	0	5-7	11-12	*Chaunax pictus*	**103.2**
0	0	6	8	*Pherallodus smithi*	**110.9**
0	0	6-7	7-9	*Chorisochismus dentex*	**110.2**
0	0	6-7	8-9	*Tylerius spinosissimus*	**268.29**
0	0	6-7	12	*Chaunax pencillatus*	**103.1**
0	0	7	8-9	*Torquigener* sp.	**268.28**
0	0	7-8	8-9	*Torquigener hypselogeneion*	**268.27**
0	0	7-9	8-9	*Winteria telescopa*	**63.4**
0	0	7-9	10-12	*Microstoma microstoma*	**61.2**
0	0	7-9	15-19	*Albula vulpes*	**38.1**
0	0	7-10	10-12	*Rhynchohyalus natalensis*	**63.3**
0	0	8	8-9	*Chelonodon pleurospilus*	**268.18**
0	0	8	9-10	*Amblyrhynchotes honckenii*	**268.1**
0	0	8-9	8-9	*Lactoria cornuta*	**266.3**
0	0	8-9	8-9	*Sphoeroides pachygaster*	**268.25**
0	0	8-9	9-10	*Canthigaster bennetti*	**268.10**
0	0	8-9	9-10	*Chelonodon laticeps*	**268.17**
0	0	8-9	9-11	*Lepadichthys lineatus*	**110.7**
0	0	8-9	10-11	*Lepadichthys caritus*	**110.5**
0	0	8-9	14-17	*Opisthoproctus grimaldii*	**63.1**
0	0	8-9	17-20	*Anoplogaster cornuta*	**131.1**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	8-10	8-10	*Canthigaster solandri*	**268.15**
0	0	8-10	9-11	*Saurida gracilis*	**79.2**
0	0	8-10	10-11	*Prognichthys brevipinnis*	**116.11**
0	0	8-10	10-11	*Prognichthys sealei*	**116.12**
0	0	8-10	10-13	*Synodus variegatus*	**79.9**
0	0	8-10	11-13	*Synodus englemani*	**79.5**
0	0	8-10	11-13	*Synodus jaculum*	**79.8**
0	0	8-10	12-14	*Synodus binotatus*	**79.4**
0	0	8-10	12-14	*Synodus hoshinonis*	**79.6**
0	0	8-10	13-15	*Bathypterois phenax*	**76.6**
0	0	8-10	13-16	*Bathypterois atricolor*	**76.2**
0	0	8-10	13-17	*Chanos chanos*	**58.1**
0	0	8-10	16-19	*Gigantura chuni*	**80.1**
0	0	8-11	10-12	*Lagocephalus scleratus*	**268.23**
0	0	8-11	13-15	*Cheilopogon nigricans*	**116.3**
0	0	9	8-9	*Ostracion cubicus*	**266.6**
0	0	9	9	*Lactoria diaphana*	**266.4**
0	0	9	9	*Lactoria fornasini*	**266.5**
0	0	9	9	*Ostracion meleagris*	**266.7**
0	0	9	9	*Pelagocephalus marki*	**268.24**
0	0	9	9-10	*Canthigaster smithae*	**268.14**
0	0	9	9-10	*Canthigaster valentini*	**268.16**
0	0	9	14	*Bathypterois perceptor*	**76.5**
0	0	9-10	9	*Tetrosomus concatenatus*	**266.9**
0	0	9-10	9	*Tetrosomus gibbosus*	**266.10**
0	0	9-10	9-10	*Arothron immaculatus*	**268.3**
0	0	9-10	9-10	*Canthigaster coronata*	**268.11**
0	0	9-10	9-10	*Canthigaster janthinoptera*	**268.12**
0	0	9-10	9-10	*Canthigaster rivulata*	**268.13**
0	0	9-10	10-12	*Triodon macropterus*	**267.1**
0	0	9-10	11-12	*Chlorophthalmus punctatus*	**76.9**
0	0	9-10	11-13	*Gonorhynchus gonorhynchus*	**57.1**
0	0	9-10	14-16	*Bathypterois filiferus*	**76.3**
0	0	9-11	11-13	*Lepadichthys coccinotaenia*	**110.6**
0	0	9-11	11-13	*Synodus indicus*	**79.7**
0	0	9-11	12-14	*Cheilopogon cyanopterus*	**116.1**
0	0	9-11	12-14	*Cheilopogon furcatus*	**116.2**
0	0	9-12	11-13	*Saurida undosquamis*	**79.3**
0	0	9-12	12-14	*Cheilopogon pinnatibarbatus altipennis*	**116.4**
0	0	10	9-10	*Pleuroscopus pseudodorsalis*	**230.1**
0	0	10	10	*Acanthostracion quadricornis*	**266.1**
0	0	10	10	*Arothron hispidus*	**268.2**
0	0	10	10	*Strophiurichthys robustus*	**266.8**
0	0	10-11	10-11	*Kentrocapros rosapinto*	**266.2**
0	0	10-11	10-12	*Arothron stellatus*	**268.8**
0	0	10-11	10-12	*Lophodiodon calori*	**269.8**
0	0	10-11	11-13	*Spratelloides delicatulus*	**54.1**
0	0	10-12	9-12	*Parexocoetus mento*	**116.10**
0	0	10-12	10-11	*Arothron nigropunctatus*	**268.7**
0	0	10-12	10-12	*Arothron inconditus*	**268.4**
0	0	10-12	11-13	*Cyclichthys orbicularis*	**269.2**
0	0	10-12	11-13	*Cyclichthys spilostylus*	**269.3**
0	0	10-12	11-13	*Lagocephalus lunaris*	**268.22**
0	0	10-12	12-13	*Lagocephalus inermis*	**268.20**
0	0	10-12	12-13	*Neoscopelus microchir*	**87.2**
0	0	10-12	12-14	*Takifugu oblongus*	**268.26**
0	0	10-12	18-23	*Etrumeus teres*	**54.1**
0	0	10-13	5-8	*Chauliodus sloani*	**68.2**
0	0	11	8	*Argyropelecus hemigymnus*	**75.6**
0	0	11	10-11	*Arothron meleagris*	**268.6**
0	0	11	10-11	*Bathysauropsis gracilis*	**76.7**
0	0	11	10-11	*Nansensia macrolepis*	**61.3**
0	0	11	11-12	*Arothron mappa*	**268.5**
0	0	11	11-12	*Canthigaster amboinensis*	**268.9**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	11	13	*Bathypterois guentheri*	**76.4**
0	0	11-12	10-12	*Hirundichthys rondeletii*	**116.7**
0	0	11-13	6-7	*Chauliodus minimus*	**68.1**
0	0	11-13	10-12	*Hirundichthys speculiger*	**116.8**
0	0	11-13	12-13	*Neoscopelus macrolepidotus*	**87.1**
0	0	11-13	12-14	*Diaphus anderseni*	**86.11**
0	0	11-13	13-15	*Hemiramphus far*	**115.2**
0	0	11-13	13-15	*Lagocephalus lagocephalus*	**268.21**
0	0	11-14	12-14	*Chilomycterus reticulatus*	**269.1**
0	0	11-14	16-19	*Rosaura indica*	**80.2**
0	0	11-14	18-21	*Etrumeus whiteheadi*	**54.2**
0	0	12	9	*Argyropelecus aculeatus*	**75.3**
0	0	12	9	*Argyropelecus sladeni*	**75.7**
0	0	12-13	9	*Argyropelecus affinis*	**75.4**
0	0	12-13	9-10	*Argyropelecus gigas*	**75.5**
0	0	12-13	9-11	*Sternoptyx obscura*	**75.12**
0	0	12-13	9-13	*Sternoptyx pseudodiaphana*	**75.14**
0	0	12-13	11-13	*Taaningichthys minimus*	**86.124**
0	0	12-13	12-14	*Diaphus parri*	**86.31**
0	0	12-13	13-14	*Diaphus aliciae*	**86.10**
0	0	12-13	13-14	*Diaphus fulgens*	**86.18**
0	0	12-13	17	*Bathysaurus ferox*	**79.1**
0	0	12-14	10-12	*Notolychnus valdiviae*	**86.106**
0	0	12-14	11-13	*Scopelengys tristis*	**87.3**
0	0	12-14	11-14	*Taaningichthys bathyphilus*	**86.123**
0	0	12-14	12-13	*Bathytyphlops marionae*	**76.8**
0	0	12-14	12-14	*Bolinichthys indicus*	**86.4**
0	0	12-14	12-14	*Diaphus brachycephalus*	**86.13**
0	0	12-14	12-14	*Diaphus mollis*	**86.28**
0	0	12-14	12-14	*Diaphus richardsoni*	**86.35**
0	0	12-14	12-14	*Exocoetus monocirrhus*	**116.5**
0	0	12-14	12-14	*Lagocephalus ?guentheri*	**268.19**
0	0	12-14	12-14	*Parexocoetus brachypterus brachypterus*	**116.9**
0	0	12-14	13-14	*Bathophilus longipinnis*	**72.4**
0	0	12-14	13-15	*Diaphus hudsoni*	**86.20**
0	0	12-14	13-15	*Diaphus meadi*	**86.26**
0	0	12-14	13-15	*Lampadena chavesi*	**86.66**
0	0	12-14	13-15	*Vinciguerria poweriae*	**73.9**
0	0	12-14	14-16	*Hintonia candens*	**86.59**
0	0	12-14	51-59	*Pterothrissus belloci*	**38.2**
0	0	12-15	8-10	*Bathymicrops regis*	**76.1**
0	0	12-15	11-12	*Argentina euchus*	**61.1**
0	0	12-15	12-14	*Bolinichthys supralateralis*	**86.7**
0	0	12-15	13-15	*Exocoetus volitans*	**116.6**
0	0	12-15	14-15	*Bathophilus nigerrimus*	**72.5**
0	0	12-16	11-17	*Astronesthes indicus*	**69.3**
0	0	12-16	14-17	*Astronesthes niger*	**69.5**
0	0	12-17	9-13	*Borostomias antarcticus*	**69.7**
0	0	12-18	13-17	*Astronesthes boulengeri*	**69.1**
0	0	13	12-14	*Diaphus subtilis*	**86.38**
0	0	13	14	*Cetomimus indagator*	**135.1**
0	0	13-14	13-14	*Lampadena notialis*	**86.69**
0	0	13-14	14-16	*Lampadena anomala*	**86.65**
0	0	13-14	19-22	*Persparsia kopua*	**65.7**
0	0	13-15	9-11	*Sternoptyx pseudobscura*	**75.13**
0	0	13-15	11-13	*Lampanyctus pusillus*	**86.84**
0	0	13-15	11-14	*Bolinichthys longipes*	**86.5**
0	0	13-15	12-14	*Bolinichthys photothorax*	**86.6**
0	0	13-15	12-14	*Hyporhamphus improvisus*	**115.5**
0	0	13-15	13-14	*Diaphus diadematus*	**86.14**
0	0	13-15	13-15	*Ceratoscopelus warmingii*	**86.9**
0	0	13-15	13-15	*Diaphus nielseni*	**86.29**
0	0	13-15	13-15	*Diaphus taaningi*	**86.39**
0	0	13-15	13-15	*Diodon holocanthus*	**269.5**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	13-15	13-15	*Lampadena dea*	**86.67**
0	0	13-15	13-15	*Lampadena speculigera*	**86.71**
0	0	13-15	14-15	*Diaphus jenseni*	**86.21**
0	0	13-15	14-15	*Lampadena luminosa*	**86.68**
0	0	13-15	15-17	*Lobianchia dofleini*	**86.92**
0	0	13-15	15-18	*Herwigia kreffti*	**64.9**
0	0	13-15	16-18	*Lobianchia gemellarii*	**86.93**
0	0	13-16	13-15	*Lepidophanes guentheri*	**86.91**
0	0	13-16	13-15	*Vinciguerria attenuata*	**73.7**
0	0	13-16	13-15	*Vinciguerria nimbaria*	**73.8**
0	0	13-16	13-16	*Rondeletia loricata*	**136.1**
0	0	13-16	17-18	*Bajacalifornia megalops*	**64.5**
0	0	13-16	40-48	*Alepisaurus brevirostris*	**85.1**
0	0	13-18	11-14	*Trachinocephalus myops*	**79.10**
0	0	13-18	32-45	*Alepisaurus ferox*	**85.2**
0	0	13-23*	45-56*	*Istiophorus platypterus*	**252.1**
0	0	14	11-13	*Luvarus imperialis*	**250.1**
0	0	14	12-15	*Bathophilus digitatus*	**72.2**
0	0	14-15	13-14	*Bathophilus indicus*	**72.3**
0	0	14-15	14	*Lampadena pontifex*	**86.70**
0	0	14-15	14-15	*Diaphus dumerilii*	**86.15**
0	0	14-15	14-15	*Diaphus watasei*	**86.41**
0	0	14-15	14-17	*Fistularia petimba*	**144.2**
0	0	14-15	15-16	*Diaphus phillipsi*	**86.33**
0	0	14-16	0	*Anotopterus pharao*	**82.1**
0	0	14-16	9-11	*Sternoptyx diaphana*	**75.11**
0	0	14-16	9-12	*Omosudis lowei*	**84.1**
0	0	14-16	10-11	*Woodsia meyerwaardeni*	**73.10**
0	0	14-16	13-15	*Oxyporhamphus micropterus micropterus*	**115.6**
0	0	14-16	13-16	*Bathophilus ater*	**72.1**
0	0	14-16	14-16	*Diaphus metopoclampus*	**86.27**
0	0	14-16	14-16	*Diodon liturosus*	**269.7**
0	0	14-16	14-17	*Diodon hystrix*	**269.6**
0	0	14-16	15-17	*Diaphus luetkeni*	**86.24**
0	0	14-16	15-17	*Diaphus ostenfeldi*	**86.30**
0	0	14-16	15-17	*Diaphus perspicillatus*	**86.32**
0	0	14-16	15-17	*Diaphus thiollieri*	**86.40**
0	0	14-16	15-17	*Fistularia commersonii*	**144.1**
0	0	14-16	119-124	*Stylephorus chordatus*	**123.1**
0	0	14-17	11-14	*Ichthyococcus polli*	**73.3**
0	0	14-17	12-15	*Stolephorus punctifer*	**55.4**
0	0	14-17	14-15	*Ichthyococcus australis*	**73.1**
0	0	14-17	15-20	*Parataeniophorus brevis*	**125.2**
0	0	14-17	18-20	*Narcetes stomias*	**64.12**
0	0	14-18	12-15	*Echiostoma barbatum*	**72.6**
0	0	14-18	16-21	*Leptochilichthys pinguis*	**66.1**
0	0	15	15-16	*Diaphus signatus*	**86.36**
0	0	15	16	*Sagamichthys schnakenbecki*	**65.8**
0	0	15-16	11-12	*Loweina interrupta*	**86.94**
0	0	15-16	11-12	*Loweina rara*	**86.95**
0	0	15-16	14-17	*Hyporhamphus capensis*	**115.4**
0	0	15-16	15	*Diaphus knappi*	**86.22**
0	0	15-16	15-16	*Diaphus malayanus*	**86.25**
0	0	15-16	15-17	*Diaphus effulgens*	**86.16**
0	0	15-17	10-12	*Diogenichthys panurgus*	**86.43**
0	0	15-17	11-12	*Ichthyococcus ovatus*	**73.2**
0	0	15-17	12	*Lampanyctus steinbecki*	**86.85**
0	0	15-17	13-14	*Macrostomias longibarbatus*	**67.1**
0	0	15-17	13-14	*Polyipnus indicus*	**75.8**
0	0	15-17	13-15	*Lampanyctodes hectoris*	**86.72**
0	0	15-17	14-15	*Diaphus antonbruuni*	**86.12**
0	0	15-17	14-17	*Bathytroctes squamosus*	**64.7**
0	0	15-17	15-17	*Hyporhamphus affinis*	**115.3**
0	0	15-17	18-20	*Holtbyrnia innesi*	**65.1**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	15-17	19-21	*Holtbyrnia laticauda*	**65.2**
0	0	15-18	10-12	*Diogenichthys atlanticus*	**86.42**
0	0	15-18	13-15	*Triphoturus nigrescens*	**86.125**
0	0	15-18	14-16	*Polyipnus polli*	**75.10**
0	0	15-18	16-20	*Eutaeniophorus festivus*	**125.1**
0	0	15-18	17-21	*Maulisia microlepis*	**65.4**
0	0	15-18	18-22	*Narcetes lloydi*	**64.11**
0	0	15-18	19-22	*Barbourisia rufa*	**137.1**
0	0	15-18	22-27	*Elops machnata*	**36.2**
0	0	15-19	9-11	*Ipnops agassizii*	**76.10**
0	0	15-19	12-14	*Borostomias mononema*	**69.8**
0	0	15-19	17-22	*Maulisia mauli*	**65.3**
0	0	15-21	14-17	*Engraulis japonicus*	**55.1**
0	0	15-21	17-21	*Herklotsichthys quadrimaculatus*	**54.4**
0	0	16	14-15	*Polyipnus omphus*	**75.9**
0	0	16	16	*Cetomimus picklei*	**135.2**
0	0	16-17	14-15	*Diaphus splendidus*	**86.37**
0	0	16-17	15-16	*Diaphus garmani*	**86.19**
0	0	16-17	16-17	*Asquamiceps velaris*	**64.4**
0	0	16-18	10-12	*Scopelosaurus ahlstromi*	**78.3**
0	0	16-18	11-13	*Lampanyctus alatus*	**86.74**
0	0	16-18	12-14	*Benthosema suborbitale*	**86.3**
0	0	16-18	12-15	*Lampanyctus photonotus*	**86.83**
0	0	16-18	13-16	*Melanostomias paucilaternatus*	**72.19**
0	0	16-18	15-17	*Diaphus problematicus*	**86.34**
0	0	16-18	15-18	*Gymnoscopelus opisthopterus*	**86.54**
0	0	16-18	16-18	*Diodon eydouxii*	**269.4**
0	0	16-18	17-19	*Diaphus fragilis*	**86.17**
0	0	16-18	17-20	*Sardinella aurita*	**54.9**
0	0	16-18	18-21	*Pellisolus perforatus*	**65.6**
0	0	16-19	10-11	*Centrobranchus nigroocellatus*	**86.8**
0	0	16-19	12-15	*Cyclothone pallida*	**74.6**
0	0	16-19	13-14	*Lampanyctus* sp. B	**86.89**
0	0	16-19	13-15	*Astronesthes caulophorus*	**69.2**
0	0	16-19	14-16	*Lampanyctus macdonaldi*	**86.81**
0	0	16-19	14-19	*Alepocephalus* sp.(cf.*productus*)	**64.2**
0	0	16-19	17-20	*Normichthys yahganorum*	**65.5**
0	0	16-19	17-20	*Trigonolampa miriceps*	**72.25**
0	0	16-19	18-20	*Gymnoscopelus piabilis*	**86.58**
0	0	16-19	18-21	*Rouleina squamilatera*	**64.15**
0	0	16-20	12-16	*Melanostomias bartonbeani*	**72.17**
0	0	16-20	14-16	*Lampanyctus achirus*	**86.73**
0	0	16-20	14-16	*Lampanyctus ater*	**86.75**
0	0	16-20	14-17	*Gymnoscopelus braueri*	**86.52**
0	0	16-23*	42-49*	*Tetrapturus audax*	**252.6**
0	0	16-26*	50-60*	*Tetrapturus pfleugeri*	**252.7**
0	0	17	47	*Xiphias gladius*	**251.1**
0	0	17-19	10-12	*Scopelosaurus herwigi*	**78.5**
0	0	17-19	10-12	*Scopelosaurus smithii*	**78.7**
0	0	17-19	12-14	*Lampanyctus australis*	**86.76**
0	0	17-19	12-14	*Lampanyctus turneri*	**86.87**
0	0	17-19	12-14	*Myctophum selenops*	**86.104**
0	0	17-19	12-16	*Melanostomias valdiviae*	**72.20**
0	0	17-19	14-15	*Lampanyctus tenuiformis*	**86.86**
0	0	17-19	16-18	*Diaphus lucidus*	**86.23**
0	0	17-19	16-19	*Alepocephalus australis*	**64.1**
0	0	17-19	21-23	*Elops lacerta*	**36.1**
0	0	17-20	10-12	*Scopelosaurus meadi*	**78.6**
0	0	17-20	10-13	*Luciosudis normani*	**78.2**
0	0	17-20	12-14	*Krefftichthys anderssoni*	**86.64**
0	0	17-20	12-14	*Myctophum asperum*	**86.98**
0	0	17-20	12-15	*Cyclothone alba*	**74.3**
0	0	17-20	13-15	*Cyclothone microdon*	**74.5**
0	0	17-20	14-16	*Lampanyctus intricarius*	**86.78**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	17-20	14-16	*Nanichthys simulans*	**114.1**
0	0	17-20	15-17	*Melanostomias niger*	**72.18**
0	0	17-20	16-18	*Gymnoscopelus fraseri*	**86.55**
0	0	17-20	17-19	*Gymnoscopelus hintonoides*	**86.56**
0	0	17-20	28-29	*Caristius* sp.	**208.2**
0	0	17-21	10-13	*Astronesthes martensii*	**69.4**
0	0	17-21	12-15	*Cyclothone pseudopallida*	**74.7**
0	0	17-21*	14-18*	*Scomberesox saurus scomberoides*	**114.2**
0	0	17-21	15-18	*Photonectes braueri*	**72.23**
0	0	17-21	17-20	*Sardinella gibbosa*	**54.10**
0	0	17-22	13-14	*Benthosema pterotum*	**86.2**
0	0	17-22	16-20	*Malacosteus* sp.	**71.3**
0	0	17-22	17-23	*Sardinella maderensis*	**54.11**
0	0	17-23	16-19	*Hilsa kelee*	**54.5**
0	0	17-25	9-12	*Bathylagus antarcticus*	**62.1**
0	0	18	14	*Lampanyctus* sp. A	**86.88**
0	0	18	22-23	*Luvarus imperialis*	**250.1**
0	0	18-19	12-14	*Myctophum obtusirostre*	**86.102**
0	0	18-19	13	*Myctophum fissunovi*	**86.100**
0	0	18-19	13-14	*Myctophum spinosum*	**86.105**
0	0	18-19	15-16	*Lampanyctus nobilis*	**86.82**
0	0	18-20	12-14	*Benthosema fibulatum*	**86.1**
0	0	18-20	13-15	*Cyclothone acclinidens*	**74.2**
0	0	18-20	13-15	*Cyclothone braueri*	**74.4**
0	0	18-20	13-15	*Electrona carlsbergi*	**86.45**
0	0	18-20	13-15	*Electrona risso*	**86.47**
0	0	18-20	14-16	*Lampanyctus lepidolychnus*	**86.79**
0	0	18-20	18-20	*Gymnoscopelus microlampas*	**86.57**
0	0	18-20	21-24	*Notoscopelus resplendens*	**86.108**
0	0	18-21	7-9	*Scopelarchus michaelsarsi*	**77.8**
0	0	18-21	10-13	*Scopelosaurus hamiltoni*	**78.4**
0	0	18-21	11-14	*Astronesthes trifibulatus*	**69.6**
0	0	18-21	12-14	*Hygophum proximum*	**86.62**
0	0	18-21	18-21	*Rouleina attrita*	**64.13**
0	0	18-22	15-19	*Lampanyctus lineatus*	**86.80**
0	0	18-22	17-20	*Sardinops ocellatus*	**54.12**
0	0	18-22	17-22	*Stomias boa boa*	**67.2**
0	0	18-22*	52-57*	*Tetrapturus angustirostris*	**252.5**
0	0	18-23	10-12	*Bathylagus bericoides*	**62.2**
0	0	18-23	17-21	*Malacosteus niger*	**71.4**
0	0	18-25*	44-52*	*Tetrapturus albidus*	**252.4**
0	0	18-26	15-20	*Stomias nebulosus*	**67.3**
0	0	19-21	10-11	*Ahliesaurus berryi*	**78.1**
0	0	19-21	13-14	*Myctophum nitidulum*	**86.101**
0	0	19-21	13-16	*Symbolophorus evermanni*	**86.121**
0	0	19-21	15-17	*Stolephorus indicus*	**55.3**
0	0	19-21	17-19	*Gymnoscopelus nicholsi*	**86.53**
0	0	19-21	24-27	*Notoscopelus caudispinosus*	**86.107**
0	0	19-21*	44-49*	*Makaira indica*	**252.2**
0	0	19-22	13-15	*Hygophum hanseni*	**86.60**
0	0	19-22	13-16	*Lampanyctus festivus*	**86.77**
0	0	19-22	14-16	*Electrona antarctica*	**86.44**
0	0	19-22	19-22	*Gymnoscopelus bolini*	**86.51**
0	0	19-22	21-24	*Tylosurus crocodilus crocodilus*	**113.4**
0	0	19-22*	45-53*	*Makaira nigricans*	**252.3**
0	0	19-23	10-11	*Maurolicus muelleri*	**75.1**
0	0	19-23	18-20	*Sardinella albella*	**54.8**
0	0	19-24	17-25	*Alepocephalus* sp.(cf.*rostratus*)	**64.3**
0	0	19-24	25-29	*Diretmus argenteus*	**130.2**
0	0	19-25	20-25	*Talismania longifilis*	**64.17**
0	0	20	14	*Metelectrona herwigi*	**86.96**
0	0	20	14-15	*Gilchristella aestuaria*	**54.3**
0	0	20	18	*Ranzania laevis*	**270.4**
0	0	20-21	13-15	*Electrona paucirastra*	**86.46**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	20-22	12-14	*Myctophum phengodes*	**86.103**
0	0	20-22	13-15	*Electrona subaspera*	**86.48**
0	0	20-22	13-15	*Metelectrona ventralis*	**86.97**
0	0	20-22	14-16	*Symbolophorus rufinus*	**86.122**
0	0	20-22	20-22	*Rouleina maderensis*	**64.14**
0	0	20-23	13-15	*Symbolophorus boops*	**86.120**
0	0	20-23	15-17	*Stolephorus holodon*	**55.2**
0	0	20-23	26-29	*Diretmoides parini*	**130.1**
0	0	20-24	11-12	*Protomyctophum subparallelum*	**86.110**
0	0	20-24	20-25	*Euleptorhamphus viridis*	**115.1**
0	0	20-25	8-9	*Benthalbella infans*	**77.1**
0	0	21-22	34-36	*Caristius groenlandicus*	**208.1**
0	0	21-23	10-13	*Gonichthys cocco*	**86.50**
0	0	21-23	13-15	*Hygophum hygomii*	**86.61**
0	0	21-23	13-15	*Symbolophorus barnardi*	**86.119**
0	0	21-23	16-18	*Lampichthys procerus*	**86.90**
0	0	21-23	16-19	*Petalichthys capensis*	**113.2**
0	0	21-24	8-9	*Neonesthes microcephalus*	**69.10**
0	0	21-24	11-13	*Gonichthys barnesi*	**86.49**
0	0	21-24	12-13	*Protomyctophum normani*	**86.116**
0	0	21-24	12-14	*Protomyctophum luciferum*	**86.115**
0	0	21-24	12-16	*Sudis hyalina*	**81.13**
0	0	21-24	17-29	*Photonectes parvimanus*	**72.24**
0	0	21-25	13-15	*Hygophum reinhardtii*	**86.63**
0	0	21-25	15-19	*Nematalosus nasus*	**54.6**
0	0	21-26	7-9	*Scopelarchus analis*	**77.6**
0	0	21-26	14-17	*Flagellostomias boureei*	**72.14**
0	0	21-26	15-16	*Margrethia obtusirostra*	**74.15**
0	0	21-26	17-22	*Remorina albescens*	**213.6**
0	0	21-26	18-22	*Leptostomias gracilis*	**72.16**
0	0	21-26	22-26	*Remora australis*	**213.3**
0	0	22*	44*	*Xiphias gladius*	**251.1**
0	0	22-24	21-23	*Opostomias micripnus*	**72.21**
0	0	22-24	22-26	*Remora remora*	**213.5**
0	0	22-25	9-11	*Magnisudis prionosa*	**81.7**
0	0	22-25	11-13	*Protomyctophum tenisoni*	**86.117**
0	0	22-25	12-14	*Protomyctophum choriodon*	**86.113**
0	0	22-25	12-14	*Protomyctophum gemmatum*	**86.114**
0	0	22-25	13-14	*Protomyctophum andriashevi*	**86.111**
0	0	22-26	11-15	*Gonostoma bathyphilum*	**74.12**
0	0	22-26	18-21	*Strongylura leiura*	**113.3**
0	0	22-26	31-35	*Taractes asper*	**207.6**
0	0	22-28	8-12	*Neonesthes capensis*	**69.9**
0	0	22-30	10-12	*Pollichthys mauli*	**73.5**
0	0	23-24	13-14	*Myctophum aurolaternatum*	**86.99**
0	0	23-24	50-51	*Bleekeria renniei*	**238.1**
0	0	23-25	8-9	*Rosenblattichthys hubbsi*	**77.3**
0	0	23-25	10-12	*Paralepis elongata*	**81.9**
0	0	23-25	22-24	*Talismania kotlyari*	**64.16**
0	0	23-26	12-13	*Photichthys argenteus*	**73.4**
0	0	23-26	12-14	*Protomyctophum bolini*	**86.112**
0	0	23-27	10-13	*Protomyctophum parallelum*	**86.109**
0	0	23-27	20-25	*Scopelopsis multipunctatus*	**86.118**
0	0	23-28	20-24	*Pachystomias microdon*	**72.22**
0	0	23-29	19-22	*Leptostomias gladiator*	**72.15**
0	0	23-29	28-33	*Parataeniophorus gulosus*	**125.3**
0	0	23-29	52-59	*Coryphaena equiselis*	**211.1**
0	0	24-25	7	*Valenciennellus tripunctulatus*	**75.2**
0	0	24-25	15	*Margrethia valentinae*	**74.16**
0	0	24-27	6-9	*Scopelarchoides danae*	**77.4**
0	0	24-27	24-27	*Bathyprion danae*	**64.6**
0	0	24-27	49-54	*Gymnammodytes capensis*	**238.2**
0	0	24-28	11-14	*Macroparalepis affinis*	**81.5**
0	0	24-29	7-8	*Scopelarchus guentheri*	**77.7**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	24-31	17-20	*Megalops cyprinoides*	**37.1**
0	0	25-27	22-25	*Ablennes hians*	**113.1**
0	0	25-29	38-44	*Pseudoicichthys australis*	**254.5**
0	0	25-30	21-26	*Aristostomias lunifer*	**71.1**
0	0	25-30	58-67	*Coryphaena hippurus*	**211.2**
0	0	25-34	27-34	*Remora brachyptera*	**213.4**
0	0	26-28	22-25	*Limnichthys nitidus*	**232.3**
0	0	26-28	33-37	*Taractichthys steindachneri*	**207.8**
0	0	26-29	9-10	*Scopelarchoides signifer*	**77.5**
0	0	26-30	9-10	*Lestidium atlanticum*	**81.3**
0	0	26-30	11-13	*Coccorella atlantica*	**83.1**
0	0	26-30	22-25	*Aristostomias polydactylus*	**71.2**
0	0	26-30	27-31	*Xenodermichthys copei*	**64.18**
0	0	27	19	*Conocara fiolenti*	**64.8**
0	0	27-28	34-35	*Brama* sp.	**207.3**
0	0	27-30	33-38	*Taractichthys longipinnis*	**207.7**
0	0	27-31	12-13	*Evermannella indica*	**83.3**
0	0	27-31	16-18	*Gonostoma atlanticum*	**74.11**
0	0	28-30	9-10	*Lestidiops similis*	**81.2**
0	0	28-30	32-36	*Brama orcini*	**207.2**
0	0	28-31	14-15	*Gonostoma denudatum*	**74.13**
0	0	28-31	14-17	*Yarrella blackfordi*	**73.11**
0	0	28-31	16-20	*Bonapartia pedaliota*	**74.1**
0	0	28-31	36-37	*Paraliparis micrurus*	**161.5**
0	0	28-32	12-15	*Gonostoma elongatum*	**74.14**
0	0	28-33	9-10	*Notolepis rissoi*	**81.8**
0	0	29-31	9-10	*Lestidiops jayakari*	**81.1**
0	0	29-32	12-13	*Macroparalepis macrogeneion*	**81.6**
0	0	29-32	35-38	*Brama brama*	**207.1**
0	0	29-36	16-19	*Chirocentrus dorab*	**56.1**
0	0	30-34	11-14	*Polymetme corythaeola*	**73.6**
0	0	31-37	20-26	*Eustomias trewavasae*	**72.12**
0	0	31-38	32-38	*Phtheirichthys lineatus*	**213.2**
0	0	32-37	22-26	*Eustomias bulbornatus*	**72.7**
0	0	32-38	34-42	*Echeneis naucrates*	**213.1**
0	0	32-39	14-15	*Thryssa setirostris*	**55.5**
0	0	33-36	36-40	*Apodocreedia vanderhorsti*	**232.1**
0	0	33-37	12-13	*Evermannella balbo*	**83.2**
0	0	33-38	42-50	*Stromateus fiatola*	**254.10**
0	0	33-41	55-65	*Schedophilus huttoni*	**254.6**
0	0	34-37	49-52	*Tubbia tasmanica*	**254.11**
0	0	34-38	37-41	*Parabrotula plagiophthalma*	**95.1**
0	0	34-42	16-19	*Pellona ditchela*	**54.7**
0	0	34-43	13-14	*Thryssa vitrirostris*	**55.6**
0	0	35	65	*Grammonoides opisthodon*	**98.8**
0	0	35-37	8-9	*Stemonosudis macrurus*	**81.12**
0	0	35-38	10	*Stemonosudis elegans*	**81.10**
0	0	35-39	5-6	*Benthalbella macropinna*	**77.2**
0	0	36-38	10	*Stemonosudis gracilis*	**81.11**
0	0	36-40	55-56	*Lampris immaculatus*	**117.2**
0	0	36-41	11-13	*Diplophos maderensis*	**74.8**
0	0	36-43	22-28	*Eustomias schmidti*	**72.11**
0	0	36-54	59-80	*Dermatopsoides talboti*	**98.8**
0	0	37-39	45-47	*Trichonotus marleyi*	**231.1**
0	0	37-40	37-40	*Chalixodytes chameleontoculis*	**232.2**
0	0	37-41	48-55*	*Merluccius capensis*	**89.4**
0	0	37-42	55-63	*Idiacanthus atlanticus*	**70.1**
0	0	37-43	43-52*	*Gaidropsarus capensis*	**88.1**
0	0	37-44	50-56*	*Antimora rostrata*	**90.1**
0	0	38	75	*Bidenichthys capensis*	**98.1**
0	0	38-41	22-25	*Eustomias lipochirus*	**72.10**
0	0	38-41	48-54*	*Merluccius paradoxus*	**89.5**
0	0	38-41	49-55	*Lampris guttatus*	**117.1**
0	0	39-40	48-49	*Pterycombus petersii*	**207.5**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	39-45	22-27	*Eustomias filifer*	**72.8**
0	0	40	26	*Eustomias grandibulbus*	**72.9**
0	0	40-43	9	*Lestrolepis intermedia*	**81.4**
0	0	40-43	45-48	*Paraliparis australis*	**161.3**
0	0	42-46	62-68	*Idiacanthus fasciola*	**70.2**
0	0	42-55	42-56*	*Bregmaceros nectabanus*	**92.3**
0	0	43-49	27-31	*Eustomias* sp.	**72.13**
0	0	45	50	*Careproctus albescens*	**161.1**
0	0	45-50	65-72	*Citharoides macrolepis*	**258.1**
0	0	45-51	67-74	*Parachirus xenicus*	**262.8**
0	0	46	46*	*Laemonema compressicauda*	**90.2**
0	0	46-48	58-61*	*Lepidion capensis*	**90.5**
0	0	46-49	55-60	*Marleyella bicolorata*	**260.1**
0	0	46-50	53-57	*Pteraclis velifera*	**207.4**
0	0	46-59	61-74	*Solea bleekeri*	**262.12**
0	0	47-53	11-13	*Diplophos rebainsi*	**74.9**
0	0	47-54	67-74	*Paralichthodes algoensis*	**260.2**
0	0	47-56	62-70	*Samariscus triocellatus*	**260.5**
0	0	48	55	*Careproctus griseldea*	**161.2**
0	0	48-55	63-74	*Pardachirus marmoratus*	**262.9**
0	0	48-57	62-70	*Monochirus ocellatus*	**262.7**
0	0	49-52	59-65*	*Lepidion natalensis*	**90.6**
0	0	49-60	48-57*	*Bregmaceros atlanticus*	**92.1**
0	0	50-54	62-64*	*Gaidropsarus insularum*	**88.2**
0	0	51-54	60-62	*Poecilopsetta natalensis*	**260.3**
0	0	52-54	67-72	*Melanonus gracilis*	**91.1**
0	0	52-55	68-72	*Pseudorhombus natalensis*	**259.19**
0	0	52-61	67-80	*Melanonus zugmayeri*	**91.2**
0	0	53-57	68-74	*Pseudorhombus elevatus*	**259.18**
0	0	53-62	73-81	*Pardachirus morrowi*	**262.10**
0	0	53-67	10-12	*Triplophos hemingi*	**74.17**
0	0	54-57	80-86	*Samaris cristatus*	**260.4**
0	0	54-60	72-78	*Pseudorhombus arsius*	**259.17**
0	0	54-63	70-76	*Synaptura marginata*	**262.14**
0	0	55-59	60-66	*Paraliparis copei*	**161.4**
0	0	55-63	71-78	*Monochirus luteus*	**262.6**
0	0	56	63	*Paraliparis wilsoni*	**161.6**
0	0	56-60	65-70	*Zebrias regani*	**262.16**
0	0	57-66	76-78	*Barathronus maculatus*	**99.4**
0	0	57-69	9-12	*Diplophos taenia*	**74.10**
0	0	58	72	*Aphyonus brevidorsalis*	**99.1**
0	0	58-69	57-66*	*Bregmaceros macclellandii*	**92.2**
0	0	59-66	69-79	*Aesopia cornuta*	**262.1**
0	0	59-68	79-89	*Engyprosopon grandisquama*	**259.8**
0	0	60-66	65-68*	*Laemonema laureysi*	**90.4**
0	0	60-67	78-85	*Psettina brevirictis*	**259.16**
0	0	60-69	75-81	*Solea fulvomarginata*	**262.13**
0	0	61-62	63-66*	*Physiculus capensis*	**90.7**
0	0	61-70	62-72*	*Laemonema globiceps*	**90.3**
0	0	61-73	77-89	*Pegusa lascaris*	**262.11**
0	0	61-73	84-97	*Bothus pantherinus*	**259.5**
0	0	61-73	87-97	*Bothus myriaster*	**259.4**
0	0	62-65	81-87	*Engyprosopon natalensis*	**259.9**
0	0	63-72	75-92	*Synapturichthys kleini*	**262.15**
0	0	64-75	95-102	*Heteromycteris capensis*	**262.5**
0	0	65-70	70-77*	*Physiculus natalensis*	**90.8**
0	0	65-71	93-118	*Aphyonus gelatinosus*	**99.2**
0	0	65-77	81-89	*Dicologlossa cuneata*	**262.4**
0	0	65-78	82-1	*Austroglossus microlepis*	**262.2**
0	0	66-74	85-91	*Syacium micrurum*	**259.20**
0	0	68-73	82-90	*Melanostigma gelatinosum*	**94.3**
0	0	68-74	86-93	*Crossorhombus valderostratus*	**259.7**
0	0	68-75	87-93	*Luciobrotula bartschi*	**96.16**
0	0	69-77	91-95	*Cataetyx niki*	**98.4**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	0	69-80	11-13	*Guentherus altivela*	**124.3**
0	0	70	120	*Diplacanthopoma nigripinnis*	**98.7**
0	0	71	100	*Dermatopsoides kasougae*	**98.5**
0	0	73-82	96-103	*Arnoglossus capensis*	**259.1**
0	0	74-77	95-98	*Epetriodus freddyi*	**96.8**
0	0	74-82	96-104	*Bothus mancus*	**259.3**
0	0	75	100-101*	*Macruronus capensis*	**89.3**
0	0	75-83	98-107	*Cataetyx laticeps*	**98.3**
0	0	75-86	99-110	*Paraplagusia bilineata*	**261.10**
0	0	76-77	98	*Laeops natalensis*	**259.11**
0	0	77-86	99-108	*Cynoglossus lida*	**261.7**
0	0	78-82	99-103	*Hoplobrotula gnathopus*	**96.13**
0	0	78-83	101-108	*Arnoglossus dalgleishi*	**259.2**
0	0	78-84	98-105	*Cynoglossus durbanensis*	**261.4**
0	0	78-85	9-10	*Ijimaia loppei*	**124.4**
0	0	78-85	57-67	*Leptoderma macrops*	**64.10**
0	0	79-86	99-104	*Monomitopus nigripinnis*	**96.17**
0	0	80-90	95-102	*Symphurus ocellatus*	**261.11**
0	0	80-95	90-110	*Austroglossus pectoralis*	**262.3**
0	0	81-85	104-108	*Engyprosopon smithi*	**259.10**
0	0	81-88	103-110	*Cynoglossus capensis*	**261.3**
0	0	82-85	100-105	*Laeops nigromaculatus*	**259.12**
0	0	82-86	104-110	*Cynoglossus gilchristi*	**261.5**
0	0	82-95	102-115	*Dicrolene multifilis*	**96.6**
0	0	83-86	103-106	*Neobythites analis*	**96.18**
0	0	83-87	106-110	*Neolaeops microphthalmus*	**259.15**
0	0	84	106	*Bassogigas gillii*	**96.1**
0	0	84-89	122-128	*Chascanopsetta lugubris*	**259.6**
0	0	84-91	105-115	*Lamprogrammus niger*	**96.15**
0	0	85-94	10-11	*Ateleopus barnardi*	**124.1**
0	0	85-95	100-114	*Dicrolene intronigra*	**96.5**
0	0	86-87	108-110	*Cynoglossus acaudatus*	**261.1**
0	0	88-91	111-113	*Holcomycteronus aequatoris*	**96.11**
0	0	88-95	93-100	*Symphurus variegatus*	**261.13**
0	0	88-95	110-120	*Cynoglossus attenuatus*	**261.2**
0	0	88-96	108-119	*Lamprogrammus exutus*	**96.14**
0	0	88-100	117-123	*Brotula multibarbata*	**96.3**
0	0	89-94	112-118	*Dicrolene pallidus*	**96.7**
0	0	89-97	113-121	*Selachophidium guentheri*	**96.22**
0	0	90-113	121-148	*Spectrunculus grandis*	**96.23**
0	0	91-96	110-116	*Laeops pectoralis*	**259.13**
0	0	91-102	82-89	*Acanthocepola limbata*	**226.1**
0	0	92-98	113-121	*Cynoglossus lachneri*	**261.6**
0	0	92-103	116-124	*Cynoglossus zanzibarensis*	**261.9**
0	0	94	110	*Lyconodes argenteus*	**89.1**
0	0	94-102	116-123	*Bassozetus robustus*	**96.2**
0	0	95	98	*Ophidion smithi*	**96.19**
0	0	95-104	107-117	*Symphurus strictus*	**261.12**
0	0	98-108	119-134	*Brotulotaenia crassa*	**96.4**
0	0	100	111	*Lycodes agulhensis*	**94.1**
0	0	100	127	*Holcomycteronus digittatus*	**96.12**
0	0	100	130-135	*Glyptophidium longipes*	**96.10**
0	0	100	140	*Cataetyx chthamalorhynchus*	**98.2**
0	0	103-110	52-58*	*Tripterophycis gilchristi*	**90.9**
0	0	104-108	9-10	*Ateleopus natalensis*	**124.2**
0	0	104-124	124-145	*Mancopsetta milfordi*	**259.14**
0	0	105-110	126-130	*Cynoglossus marleyi*	**261.8**
0	0	108-115	117-121	*Lycodonus vermiformis*	**94.2**
0	0	109	139	*Penopus microphthalmus*	**96.20**
0	0	135-140	165-174	*Porogadus miles*	**96.21**
0	1	3-5	13-17	*Melanocetus johnsoni*	**107.1**
0	1	4	3-4	*Ceratias holboelli*	**105.1**
0	1	4	4	*Ceratias tentaculatus*	**105.2**
0	1	4	4-5	*Cryptopsaras couesii*	**105.3**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	1	4	5-6	*Himantolophus groenlandicus*	**108.1**
0	1	4	5-6	*Oneirodes kreffti*	**106.1**
0	1	12	11	*Draculo celetus*	**239.5**
0	1	32	42	*Natalichthys sam*	**227.5**
0	1	36-38	47-49	*Halimuraena shakai*	**227.2**
0	1	39	48	*Natalichthys leptus*	**227.3**
0	1	42-43	52-53	*Natalichthys ori*	**227.4**
0	1	48-52	58-63	*Halidesmus scapularis*	**227.1**
0	1	58-82	4	*Plotosus lineatus*	**60.1**
0	1	88-109	4	*Plotosus nkunga*	**60.2**
0	2*	4	5-7	*Phrynichthys wedli*	**109.1**
0	2	16-18	7	*Ariodes dussumieri*	**59.1**
0	2	17-21	7	*Galeichthys feliceps*	**59.3**
0	2	19-22	7	*Galeichthys ater*	**59.2**
0	2	22-25	25-28	*Paraluteres prionurus*	**264.8**
0	2	22-25	26-29	*Amanses scopas*	**264.3**
0	2	25-28	24-27	*Paramonacanthus barnardi*	**264.9**
0	2	26-28	27-28	*Paramonacanthus cingalensis*	**264.10**
0	2	26-30	29-33	*Pervagor melanocephalus*	**264.11**
0	2	28-35	34-39	*Cantherhines dumerilii*	**264.4**
0	2	29-32	32-35	*Oxymonacanthus longirostris*	**264.7**
0	2	29-32	32-36	*Cantherhines pardalis*	**264.6**
0	2	30-31	31-32	*Thamnaconus arenaceus*	**264.14**
0	2	30-34	28-34	*Stephanolepis auratus*	**264.13**
0	2	31-32	33-35	*Cantherhines fronticinctus*	**264.5**
0	2	31-33	32-34	*Thamnaconus fajardoi*	**264.15**
0	2	35-36	36-38	*Thamnaconus modestoides*	**264.16**
0	2	41-46	43-50	*Pseudalutarius nasicornis*	**264.12**
0	2	46-52	43-49	*Aluterus scriptus*	**264.2**
0	2	47-53	45-51	*Aluterus monoceros*	**264.1**
0	2	90	88-89	*Coelorinchus coelorinchus polli*	**93.6**
0	2	90	92-93	*Coelorinchus acanthiger*	**93.4**
0	2	90	101-103	*Bathygadus* sp. (cf. *favosus)*	**93.3**
0	2	90	119-121	*Coelorinchus fasciatus*	**93.8**
0	2	100	108-109	*Coelorinchus denticulatus*	**93.7**
0	2	105	112-114	*Coelorinchus braueri*	**93.5**
0	2	110	119	*Coryphaenoides striatura*	**93.12**
0	2	110-115	119-125	*Macrourus holotrachys*	**93.15**
0	2	115	123-124	*Coelorinchus flabellispinis*	**93.9**
0	2	130	132-134	*Bathygadus favosus*	**93.1**
0	2	140	144	*Coryphaenoides subserrulatus*	**93.13**
0	2	150	169-170	*Gadomus capensis*	**93.14**
0	2	150	178-180	*Paracetonurus* sp.	**93.26**
0	2	210	229-233	*Malacocephalus laevis*	**93.17**
0	3*	7	11-12	*Antennarius striatus*	**102.7**
0	3*	7	11-13	*Antennarius dorehensis*	**102.3**
0	3*	7	12	*Antennarius nummifer*	**102.5**
0	3*	7	12	*Antennarius tuberosus*	**102.8**
0	3*	7	12-13	*Antennarius coccineus*	**102.1**
0	3*	7	12-13	*Antennarius hispidus*	**102.4**
0	3*	7-8	11-13	*Antennarius pictus*	**102.6**
0	3*	7-8	11-13	*Histrio histrio*	**102.9**
0	3*	8	12-13	*Antennarius commersoni*	**102.2**
0	3	12-13	10-11	*Aeoliscus punctulatus*	**148.1**
0	3	13-15	19	*Perulibatrachus rossignoli*	**100.8**
0	3	14	19	*Batrichthys albofasciatus*	**100.2**
0	3	14-17	16-21	*Perulibatrachus elminensis*	**100.7**
0	3	14-17	18-20	*Batrichthys apiatus*	**100.3**
0	3	14-17	18-21	*Chatrabus melanurus*	**100.6**
0	3	15-17	19-20	*Riekertia ellisi*	**100.9**
0	3	16-17	20-21	*Austrobatrachus foedus*	**100.1**
0	3	17-18	19-22	*Batrichthys felinus*	**100.4**
0	3	17-18	20-23	*Chatrabus hendersoni*	**100.5**
0	3	20-21	22-24	*Rhinecanthus rectangulus*	**263.14**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	3	20-22	23-25	*Canthidermis maculatus*	**263.6**
0	3	20-24	24-27	*Balistapus undulatus*	**263.2**
0	3	21-22	23-26	*Rhinecanthus aculeatus*	**263.13**
0	3	21-22	25-27	*Balistoides conspicillum*	**263.4**
0	3	21-24	24-27	*Pseudobalistes fuscus*	**263.12**
0	3	22-24	24-26	*Pseudobalistes flavimarginatus*	**263.11**
0	3	23-24	24-26	*Balistoides viridescens*	**263.5**
0	3	23-26	26-28	*Sufflamen chrysopterus*	**263.16**
0	3	24-26	25-27	*Abalistes stellatus*	**263.1**
0	3	24-28	27-31	*Sufflamen fraenatus*	**263.17**
0	3	25	27	*Xenobalistes punctatus*	**263.19**
0	3	25-27	27-30	*Sufflamen bursa*	**263.15**
0	3	25-27	28-30	*Xanthichthys lineopunctatus*	**263.18**
0	3	27-29	29-32	*Balistes vetula*	**263.3**
0	3	27-30	30-35	*Melichthys indicus*	**263.7**
0	3	28-30	33-36	*Odonus niger*	**263.10**
0	3	28-31	32-35	*Melichthys niger*	**263.8**
0	3	28-31	32-35	*Melichthys vidua*	**263.9**
0	3-4	30-33	40-45	*Mene maculata*	**200.1**
0	4	6-8	7-8	*Synchiropus marmoratus*	**239.7**
0	4	7	8	*Diplogrammus infulatus*	**239.4**
0	4	7	8	*Synchiropus monacanthus*	**239.8**
0	4	7	8	*Synchiropus stellatus*	**239.10**
0	4	8	9	*Callionymus gardineri*	**239.2**
0	4	8	9	*Callionymus marleyi*	**239.3**
0	4	8	9	*Synchiropus postulus*	**239.9**
0	4*	9	9	*Callionymus filamentosus*	**239.1**
0	4	9	9-10	*Paracallionymus costatus*	**239.6**
0	4	10	10	*Cottunculus spinosus*	**160.1**
0	4-5*	6	8	*Lophiodes mutilus*	**101.2**
0	4-5	13-14	13	*Uranoscopus archionema*	**230.2**
0	4-5	23-25	19-20	*Osopsarson natalensis*	**233.2**
0	5	17-18	19-20	*Champsodon capensis*	**229.1**
0	5	18-20	18-20	*Solenostomus cyanopterus*	**146.1**
0	5-6	9-11	11-12	*Monocentris japonicus*	**128.1**
0	6*	6	8	*Lophiodes insidiator*	**101.1**
0	6*	6	8	*Lophiomus setigerus*	**101.3**
0	6*	6	9	*Dactyloptena peterseni*	**159.2**
0	6	7	7	*Pandaka silvana*	**240.72**
0	6*	9	9-10	*Lophius vomerinus*	**101.5**
0	6*	9	10-11	*Lophius upsicephalus*	**101.4**
0	6	12	11-12	*Croilia mossambica*	**240.29**
0	6	12-13	15-16	*Triacanthodes ethiops*	**265.3**
0	6	12-14	13-15	*Tydemania navigatoris*	**265.4**
0	6	13	15	*Paratriacanthodes retrospinis*	**265.2**
0	6	13-14	14-15	*Austrolethops wardi*	**240.8**
0	6	13-15	13-15	*Macrorhamphosodes uradoi*	**265.1**
0	6	15-16	14-15	*Bembrops platyrhynchus*	**233.1**
0	6	16-18	14-15	*Hoplichthys acanthopleurus*	**156.1**
0	6	25	21-22	*Pteropsarson heemstrai*	**233.3**
0	6	30	27-28	*Taenioides jacksoni*	**240.99**
0	6	45-47	48-51	*Trypauchen microcephalus*	**240.102**
0	6	48-50	48-50	*Taenioides esquivel*	**240.98**
0	6-8	12-14	16-19	*Psychrolutes inermis*	**160.3**
0	6-8	12-14	16-19	*Psychrolutes macrocephalus*	**160.4**
0	6-8	18-20	11-13	*Macrorhamphosus scolopax*	**147.2**
0	7*	6	9	*Dactyloptena orientalis*	**159.1**
0	7	17-18	15-16	*Notopogon xenosoma*	**147.5**
0	7	17-19	14-15	*Notopogon lilliei*	**147.3**
0	7	17-19	15	*Notopogon macrosolen*	**147.4**
0	7	17-21	16-18	*Centriscops obliquus*	**147.1**
0	7	21	22	*Satyrichthys investigatoris*	**158.3**
0	7-8	14-16	13-16	*Satyrichthys adeni*	**158.2**
0	8	12-13	16-17	*Ebinania costaecanarie*	**160.2**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
0	8	20-23	20	*Peristedion weberi*	**158.1**
0	8	27-31	30	*Latimeria chalumnae*	**35.1**
0	8-9	12	11	*Thysanophrys chiltonae*	**155.10**
0	8-9*	12-14	12-14	*Thysanophrys celebica*	**155.9**
0	8-9	14-16	15-17	*Chelidonichthys capensis*	**157.1**
0	8-9	15-16	15-17	*Lepidotrigla faurei*	**157.4**
0	8-9	16-17	15-16	*Lepidotrigla multispinosa*	**157.5**
0	8-11	17-20*	20-24*	*Lepidocybium flavobrunneum*	**247.3**
0	9*	11	11	*Cociella crocodila*	**155.1**
0	9*	11	11	*Onigocia oligolepis*	**155.4**
0	9*	11	11	*Papilloculiceps longiceps*	**155.5**
0	9*	12	11-12	*Thysanophrys arenicola*	**155.8**
0	9*	12	11-12	*Thysanophrys otaitensis*	**155.11**
0	9*	12	12	*Cociella* sp.	**155.2**
0	9*	12	12	*Grammoplites portuguesus*	**155.3**
0	9*	12-13	12	*Sorsogona prionota*	**155.7**
0	9	17-18	18-19	*Chelidonichthys queketti*	**157.3**
0	9-10	14-16	15-16	*Chelidonichthys kumu*	**157.2**
0	9-10	15-16	15-16	*Trigla lyra*	**157.6**
0	10*	13	13	*Platycephalus indicus*	**155.6**
0	10	15-17	15-17	*Trigloporus lastoviza africanus*	**157.7**
0	10-11	19-22*	18-19*	*Auxis rochei*	**249.3**
0	12-14	19-25*	21-26*	*Thunnus albacares*	**249.15**
0	12-14	20-24*	20-25*	*Thunnus alalunga*	**249.14**
0	12-14	20-25*	21-25*	*Thunnus maccoyii*	**249.16**
0	12-14	20-25*	21-25*	*Thunnus thynnus thynnus*	**249.18**
0	13-14	18-25*	22-26*	*Thunnus obesus*	**249.17**
0	13-15	16-19*	17-20*	*Ruvettus pretiosus*	**247.7**
0	13-15	18-19*	18-21*	*Gymnosarda unicolor*	**249.6**
0	15-16	21-22*	22-23*	*Katsuwonus pelamis*	**249.7**
0	15-16	27-32*	27-31*	*Scomberomorus plurilineatus*	**249.13**
0	15-17	20-21*	20-21*	*Euthynnus affinis*	**249.4**
0	15-18	26-29*	25-28*	*Scomberomorus commerson*	**249.12**
0	17-18	17-21*	15-20*	*Gasterochisma melampus*	**249.5**
0	17-18	19-21*	18-21*	*Allothunnus fallai*	**249.2**
0	18-19	20-22*	21-25*	*Sarda orientalis*	**249.9**
0	19-21	9-10	11-14	*Congiopodus spinifer*	**152.1**
0	20-21	7-8	13-15	*Congiopodus torvus*	**152.2**
0	21-23	21-23*	22-27*	*Sarda sarda*	**249.10**
0	23-27	19-23*	19-26*	*Acanthocybium solandri*	**249.1**
1	0	9-10	11	*Acanthochaenus lutkenii*	**133a.1**
1	0	27	10	*Bathyclupea elongata*	**217.1**
1	1	16-18	24-26	*Anisochromis kenyae*	**169.1**
1	1-2	24-25	33-34	*Velifer hypselopterus*	**118.2**
1	1-4	46-53	52-60	*Malacanthus brevirostris*	**197.4**
1	2	7-9	10-11	*Scopelogadus beanii*	**133.12**
1	2	8-9	10-12	*Scopelogadus mizolepis mizolepis*	**133.13**
1	2-3	7-8	11-12	*Scopeloberyx opisthopterus*	**133.10**
1	2-3	7-9	10-13	*Scopeloberyx microlepis*	**133.9**
1	2-3	7-9	10-13	*Scopeloberyx robustus*	**133.11**
1	2-3	8-10	10-12	*Poromitra megalops*	**133.7**
1	2-3	13-14	16-18	*Photoblepharon palpebratus steinitzi*	**129.1**
1	3	8	9-10	*Poromitra oscitans*	**133.8**
1	3	8	14-16	*Melamphaes danae*	**133.1**
1	3	8	14-16	*Melamphaes eulepis*	**133.2**
1	3	8	17-18	*Melamphaes microps*	**133.4**
1	3	8-9	9	*Sio nordenskjoldii*	**133.14**
1	3	8-9	15-18	*Melamphaes longivelis*	**133.3**
1	3	8-11	12-14	*Poromitra crassiceps*	**133.6**
1	3	9-10	15-17	*Melamphaes simus*	**133.5**
1	3	13-14	21-22	*Owstonia weberi*	**226.3**
1	3	14	21	*Owstonia simoterus*	**226.2**
1	3-4	37-40	43-47	*Malacanthus latovittatus*	**197.5**
1	4-7*	21-28	12-17	*Iso natalensis*	**112.1**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
1	5	0	126-148	*Tentoriceps cristatus*	**248.5**
1	5	13	14	*Kraemeria samoensis*	**242.1**
1	5	16	21	*Parapercis hexophthalma*	**234.1**
1	5	17	21	*Parapercis pulchella*	**234.3**
1	5	17	21	*Parapercis punctulata*	**234.4**
1	5	17	21	*Parapercis somaliensis*	**234.7**
1	5	17	21	*Parapercis xanthozona*	**234.8**
1	5	17-18	21-22	*Parapercis schauinslandi*	**234.6**
1	5	18	22	*Parapercis robinsoni*	**234.5**
1	5	19	23	*Parapercis multifasciata*	**234.2**
1	5-6*	16-17	10-12	*Atherion africanus*	**111.4**
1	5-7*	12-13	9-10	*Atherinomorus duodecimalis*	**111.2**
1	5-8*	12-17	8-11	*Atherinomorus lacunosus*	**111.3**
1	6*	10	9	*Sphyraena barracuda*	**224.3**
1	6-7	23-28	25-28	*Zenion hololepis*	**141.1**
1	6-7	28-32	28-31	*Zenion leptolepis*	**141.2**
1	6-8*	11-14	8-10	*Hypoatherina temminckii*	**111.6**
1	6-8*	12-17	8-11	*Hypoatherina barnesi*	**111.5**
1	6-9*	15-18	11-15	*Atherina breviceps*	**111.1**
1	7*	5-7	7-8	*Redigobius dewaali*	**240.93**
1	7*	6	7	*Redigobius balteatops*	**240.91**
1	7*	6	7	*Redigobius bikolanus*	**240.92**
1	7*	6-7	6-7	*Calumia godeffroyi*	**241.3**
1	7*	6-7	9	*Callogobius plumatus*	**240.27**
1	7*	7	8	*Priolepis* sp.	**240.86**
1	7*	7	8-9	*Ophiocara porocephala*	**241.8**
1	7*	7	9	*Callogobius maculipinnis*	**240.26**
1	7*	7	9	*Callogobius sclateri*	**240.28**
1	7*	7-8	7-8	*Mugilogobius durbanensis*	**240.62**
1	7*	7-8	8	*Favonigobius reichei*	**240.38**
1	7*	7-8	9	*Fusigobius longispinus*	**240.40**
1	7*	7-9	7-8	*Pleurosicya muscarum*	**240.82**
1	7*	7-9	8-10	*Glossogobius callidus*	**240.43**
1	7*	8	7-8	*Pleurosicya* sp. 1	**240.83**
1	7*	8	8	*Butis melanostigma*	**241.2**
1	7*	8	8	*Eleotris fusca*	**241.4**
1	7*	8	8	*Eleotris mauritianus*	**241.5**
1	7*	8	8	*Eleotris melanosoma*	**241.6**
1	7*	8	8	*Mugilogobius inhacae*	**240.63**
1	7*	8	8	*Pleurosicya mossambica*	**240.81**
1	7*	8	8	*Prionobutis koilomatodon*	**241.9**
1	7*	8	8-9	*Eviota albolineata*	**240.35**
1	7*	8	9	*Bathygobius albopunctatus*	**240.11**
1	7*	8	9	*Bathygobius cocosensis*	**240.12**
1	7*	8	9	*Bathygobius cotticeps*	**240.13**
1	7*	8	9	*Bathygobius cyclopterus*	**240.14**
1	7*	8	9	*Bathygobius fuscus*	**240.15**
1	7*	8	9	*Bathygobius laddi*	**240.16**
1	7*	8	9	*Bathygobius* sp. 9	**240.18**
1	7*	8	9	*Drombus key*	**240.33**
1	7*	8	9	*Fusigobius duospilus*	**240.39**
1	7*	8	9	*Fusigobius neophytus*	**240.41**
1	7*	8	9	*Glossogobius biocellatus*	**240.42**
1	7*	8	9	*Glossogobius giuris*	**240.44**
1	7*	8	9	*Paragobiodon lacunicolus*	**240.75**
1	7*	8	9-10	*Eviota prasina*	**240.36**
1	7*	8	9-10	*Hetereleotris zanzibarensis*	**240.53**
1	7*	8	9-10	*Priolepis inhaca*	**240.85**
1	7*	8	10	*Bathygobius niger*	**240.17**
1	7*	8	10	*Callogobius flavobrunneus*	**240.25**
1	7*	8	10-11	*Gobiodon rivulatus*	**240.48**
1	7*	8-9	8	*Butis butis*	**241.1**
1	7*	8-9	8-9	*Barbuligobius boehlkei*	**240.10**
1	7*	8-9	8-9	*Favonigobius melanobranchus*	**240.37**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
1	7*	8-9	8-9	*Pleurosicya annandalei*	**240.80**
1	7*	8-9	9-10	*Asterropteryx semipunctatus*	**240.7**
1	7*	8-9	9-10	*Trimma macrophthalma*	**240.101**
1	7*	8-9	10	*Gobiodon citrinus*	**240.47**
1	7*	8-10	9-10	*Trimma corallina*	**240.100**
1	7*	9	8	*Hypseleotris dayi*	**241.7**
1	7*	9	8-9	*Amoya signatus*	**240.6**
1	7*	9	9	*Acentrogobius audax*	**240.1**
1	7*	9	9	*Paragobiodon echinocephalus*	**240.74**
1	7*	9	9	*Paragobiodon modestus*	**240.76**
1	7*	9	9	*Paragobiodon xanthosomus*	**240.77**
1	7*	9	9	*Yongeichthys nebulosus*	**240.107**
1	7*	9	10	*Cryptocentrus cryptocentrus*	**240.30**
1	7*	9	10	*Drombus simulus*	**240.34**
1	7*	9	10	*Istigobius decoratus*	**240.56**
1	7*	9	10	*Istigobius ornatus*	**240.57**
1	7*	9	10	*Istigobius spence*	**240.58**
1	7*	9	10	*Mahidolia mystacina*	**240.59**
1	7*	9	10-11	*Gobiopsis pinto*	**240.49**
1	7*	9	10-11	*Monishia william*	**240.61**
1	7*	9	11	*Priolepis cincta*	**240.84**
1	7*	9	11-12	*Monishia sordida*	**240.60**
1	7*	9-10	9-10	*Caffrogobius natalensis*	**240.22**
1	7*	9-10	9-10	*Cryptocentrus strigilliceps*	**240.32**
1	7*	9-10	9-11	*Caffrogobius saldanha*	**240.24**
1	7*	9-10	9-11	*Parachaeturichthys polynema*	**240.73**
1	7*	9-10	11-12	*Caffrogobius multifasciatus*	**240.21**
1	7*	9-11	9-10	*Psammogobius knysnaensis*	**240.87**
1	7*	9-11	10-12	*Caffrogobius agulhensis*	**240.19**
1	7*	9-11	11-13	*Hetereleotris caminata*	**240.51**
1	7*	9-11	11-13	*Hetereleotris zonata*	**240.54**
1	7*	10	10	*Oplopomus oplopomus*	**240.67**
1	7*	10	11	*Hetereleotris margaretae*	**240.55**
1	7*	10-11	9-11	*Awaous aeneofuscus*	**240.9**
1	7*	10-11	10	*Stenogobius kenyae*	**240.96**
1	7*	10-11	10-11	*Hetereleotris apora*	**240.50**
1	7*	10-11	11-12	*Caffrogobius nudiceps*	**240.23**
1	7*	10-12	12-14	*Caffrogobius caffer*	**240.20**
1	7*	11	10	*Oligolepis acutipennis*	**240.65**
1	7*	11	11	*Cryptocentrus pretoriusi*	**240.31**
1	7*	11	11	*Gnatholepis* sp. 1	**240.45**
1	7*	11	11	*Gnatholepis* sp. 2	**240.46**
1	7*	11	11	*Valenciennea helsdingenii*	**240.103**
1	7*	11	12	*Hetereleotris tenaculata*	**240.52**
1	7*	11	12	*Xenisthmus africanus*	**241.10**
1	7*	12	11	*Oligolepis keiensis*	**240.66**
1	7*	12	12	*Amblyeleotris wheeleri*	**240.3**
1	7*	12	12	*Valenciennea sexguttata*	**240.104**
1	7*	12-13	12-13	*Oxyurichthys ophthalmonema*	**240.70**
1	7*	12-13	12-13	*Sufflogobius bibarbatus*	**240.97**
1	7*	12-14	13-15	*Amblygobius albimaculatus*	**240.4**
1	7*	13	11	*Silhouettea insinuans*	**240.94**
1	7*	13	11	*Silhouettea sibayi*	**240.95**
1	7*	13	12	*Oxyurichthys lemayi*	**240.68**
1	7*	13	12	*Oxyurichthys papuensis*	**240.71**
1	7*	13	12-13	*Oxyurichthys microlepis*	**240.69**
1	7*	13-14	13-14	*Vanderhorstia delagoae*	**240.106**
1	7*	13-15	13-15	*Amblygobius sphynx*	**240.5**
1	7*	14	13	*Amblyeleotris aurora*	**240.2**
1	7*	16-19	17-19	*Valenciennea strigata*	**240.105**
1	7*	23-25	23-25	*Ptereleotris evides*	**240.88**
1	7*	24-30	27-32	*Ptereleotris heteroptera*	**240.89**
1	7*	27-30	28-32	*Nemateleotris magnifica*	**240.64**
1	7*	36	37	*Ptereleotris lineopinnis*	**240.90**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
1	7-8	29-30	28-30	*Cyttopsis roseus*	**138.1**
1	8*	6	8	*Mulloides flavolineatus*	**196.1**
1	8*	6	8	*Mulloides vanicolensis*	**196.2**
1	8-16*	9-10	10-12	*Periophthalmus koelreuteri africanus*	**240.78**
1	9*	6	8	*Parupeneus* spp.	**196.3-10**
1	9*	6	8	*Upeneus tragula*	**196.12**
1	9*	7	8	*Upeneus sulphureus*	**196.11**
1	9*	7	8	*Upeneus vittatus*	**196.13**
1-3*	9*	18-20	23-24	*Selene dorsalis*	**210.42**
1	9-10	17*	17*	*Scomber japonicus*	**249.11**
1	9-10	17-20	18-21	*Kali macrura*	**228.7**
1	9-11	17*	17*	*Rastrelliger kanagurta*	**249.8**
1	9-11	33-42	38-45	*Psettodes erumei*	**257.1**
1	10-11	10-12	10-12	*Tetragonurus pacificus*	**256.3**
1	10-11	26-28	26-28	*Dysalotus alcocki*	**228.3**
1	10-12	24-27	24-26	*Dysalotus oligoscolus*	**228.4**
1	10-12	27-32	22-27	*Amarsipus carlsbergi*	**253.1**
1	10-13*	24-29	24-28	*Nomeus gronovii*	**255.7**
1	11-12	19-25	18-21	*Laiphognathus multimaculatus*	**235.23**
1	11-12	20-22	19-21	*Kali parri*	**228.9**
1	11-13	21-25	22-24	*Kali indica*	**228.5**
1	11-13	22-25	22-25	*Kali macrodon*	**228.6**
1	11-13	26-29	26-29	*Chiasmodon bolangeri*	**228.1**
1	11-13	26-29	26-29	*Chiasmodon niger*	**228.2**
1	12-13	7-8	9-10	*Cocotropus monacanthus*	**151.1**
1	12-13	23-26	24-26	*Kali normani*	**228.8**
1	14-15*	16-17	8-10	*Enneapterygius clarkae*	**236.3**
1	14-16*	17-18	8-10	*Enneapterygius abeli*	**236.2**
1	14-16*	18-19	9-10	*Enneapterygius ventermaculus*	**236.6**
1	14-17	9-12	10-13	*Tetragonurus atlanticus*	**256.1**
1	15-16*	16-17	8-10	*Enneapterygius elegans*	**236.4**
1	15-17*	19-22	10-11	*Enneapterygius pusillus*	**236.5**
1	15-18	9-10	10	*Periophthalmus sobrinus*	**240.79**
1	15-21	10-15	10-17	*Tetragonurus cuvieri*	**256.2**
1	16-17*	17-20	9-11	*Helcogramma obtusirostre*	**236.8**
1	17-18*	19-21	10-11	*Helcogramma fuscopinna*	**236.7**
1	17-20*	15-18*	16-18*	*Rexea prometheoides*	**247.6**
2	2-3	13-14	16-18	*Photoblepharon palpebratus steinitzi*	**129.1**
2	3	105-108	124-138	*Trichiurus lepturus*	**248.6**
2	4	27-29	28-30	*Naso thynnoides*	**243.28**
2	4-5	8-10	13-16	*Hoplostethus melanopus*	**127.6**
2	4-5	27-28	28-30	*Naso brachycentron*	**243.21**
2	4-6	8-10	12-13	*Hoplostethus cadenati*	**127.3**
2	4-6	9-10	13-14	*Hoplostethus melanopterus*	**127.5**
2	4-6	26-29	30-32	*Allocyttus guineensis*	**139.1**
2	5*	8	9	*Cheilodipterus lineatus*	**175.36**
2	5	23-25	24-26	*Naso fageni*	**243.23**
2	5	26-27	27-29	*Naso tuberosus*	**243.29**
2	5	27-28	28-29	*Naso annulatus*	**243.20**
2	5	27-29	27-30	*Xenolepidichthys dalgleishi*	**140.2**
2	5	28	28	*Naso minor*	**243.26**
2	5-6	31-34	34-36	*Pseudocyttus maculatus*	**139.5**
2	5-7	25-28	26-29	*Psenopsis obscura*	**254.4**
2	5-7	27-31	29-33	*Allocyttus verrucosus*	**139.2**
2	6*	8	8	*Sphyraena acutipinnis*	**224.1**
2	6*	8	9	*Sphyraena jello*	**224.7**
2	6*	8	9	*Sphyraena novaehollandiae*	**224.8**
2	6*	8	9	*Sphyraena putnamiae*	**224.9**
2	6*	8	9	*Sphyraena qenie*	**224.10**
2	6*	9	9	*Sphyraena afra*	**224.2**
2	6*	9	9	*Sphyraena chrysotaenia*	**224.4**
2	6*	9	9	*Sphyraena flavicauda*	**224.5**
2	6*	9	9	*Sphyraena forsteri*	**224.6**
2	6	27	27	*Naso thorpei*	**243.27**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
2	6	27-29	26-27	*Naso vlamingii*	**243.31**
2	6	27-29	27-29	*Naso brevirostris*	**243.22**
2	6	27-30	26-29	*Naso hexacanthus*	**243.24**
2	6	27-30	27-30	*Naso unicornis*	**243.30**
2	6	28-30	27-30	*Naso lituratus*	**243.25**
2	6-7	28-31	29-31	*Oreosoma atlanticum*	**139.4**
2	6-7	33-35	32-34	*Grammicolepis brachiusculus*	**140.1**
2	7*	8	8	*Apogon nigripes*	**175.17**
2	7*	8	9	*Apogon coccineus*	**175.4**
2	7*	8	9	*Apogon kiensis*	**175.13**
2	7*	8	9	*Apogon lateralis*	**175.14**
2	7*	8	9	*Apogon semiornatus*	**175.23**
2	7*	8	9	*Apogon thermalis*	**175.26**
2	7*	8	9	*Cheilodipterus artus*	**175.33**
2	7*	8	9	*Cheilodipterus caninus*	**175.34**
2	7*	8	9	*Cheilodipterus lachneri*	**175.35**
2	7*	8	9	*Cheilodipterus quinquelineatus*	**175.37**
2	7*	8	9	*Gymnapogon africanus*	**175.51**
2	7*	8	9	*Sphaeramia orbicularis*	**175.43**
2	7*	8-9	8-9	*Pseudamia gelatinosa*	**175.52**
2	7*	9	8	*Pseudamiops pellucidus*	**175.53**
2	7	9	13-14	*Grammistes sexlineatus*	**167.3**
2	7*	9	9	*Apogon leptacanthus*	**175.15**
2	7*	9-10	9	*Apogon fragilis*	**175.10**
2	7	12	15	*Branchiostegus sawakinensis*	**197.2**
2	7	12	16	*Branchiostegus doliatus*	**197.1**
2	7*	12-13	9	*Rhabdamia gracilis*	**175.41**
2	7*	13-14	9	*Archamia lineolata*	**175.31**
2	7*	13-15	9	*Archamia mozambiquensis*	**175.32**
2	7*	15-17	9	*Archamia fucata*	**175.30**
2*	7*	20-22*	27-30*	*Elagatis bipinnulata*	**210.31**
2	7-8	11-12	12-13	*Caracanthus madagascariensis*	**153.1**
2	7-8	11-12	12-13	*Caracanthus unipinna*	**153.2**
2	7-8	29-30	28-30	*Cyttopsis roseus*	**138.1**
2	7-9	28-33	34-39	*Plagiotremus tapeinosoma*	**235.38**
2	8*	8	8	*Florenciella lugubris*	**175.49**
2	8*	8	8	*Rosenblattia robusta*	**175.50**
2	8*	8	9	*Apogon angustatus*	**175.1**
2	8*	8	9	*Apogon apogonides*	**175.2**
2	8*	8	9	*Apogon aureus*	**175.3**
2	8*	8	9	*Apogon cookii*	**175.5**
2	8*	8	9	*Apogon cyanosoma*	**175.6**
2	8*	8	9	*Apogon enigmaticus*	**175.7**
2	8*	8	9	*Apogon flagelliferus*	**175.8**
2	8*	8	9	*Apogon fraenatus*	**175.9**
2	8*	8	9	*Apogon guamensis*	**175.11**
2	8*	8	9	*Apogon kallopterus*	**175.12**
2	8*	8	9	*Apogon multitaeniatus*	**175.16**
2	8*	8	9	*Apogon nigripinnis*	**175.18**
2	8*	8	9	*Apogon nitidus*	**175.19**
2	8*	8	9	*Apogon quadrifasciatus*	**175.20**
2	8*	8	9	*Apogon queketti*	**175.21**
2	8*	8	9	*Apogon savayensis*	**175.22**
2	8*	8	9	*Apogon taeniatus*	**175.24**
2	8*	8	9	*Apogon taeniophorus*	**175.25**
2	8*	8	9	*Apogon timorensis*	**175.27**
2	8*	8	9	*Apogonichthys ocellatus*	**175.28**
2	8*	8	9	*Apogonichthys perdix*	**175.29**
2	8*	8	9	*Foa brachygramma*	**175.38**
2	8*	8	9	*Fowleria aurita*	**175.39**
2	8*	8	9	*Siphamia mossambica*	**175.42**
2	8*	9	9	*Epigonus constanciae*	**175.44**
2	8*	9	9	*Epigonus robustus*	**175.47**
2	8*	9	10	*Epigonus denticulatus*	**175.45**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
2	8*	9	10	*Epigonus pandionis*	**175.46**
2	8*	15-17	9	*Archamia fucata*	**175.30**
2*	8-9*	15-18	30-37	*Seriolina nigrofasciata*	**210.46**
2	8-9*	23-27	23-28	*Pomatomus saltatrix*	**178.1**
2	8-10	12-14	17-20	*Amphiprion akallopisos*	**219.8**
2	8-10*	22-28	33-36	*Rachycentron canadum*	**212.1**
2	9*	8	9	*Neamia octospina*	**175.40**
2	9*	8	10	*Belonoperca chabanaudi*	**167.2**
2	9*	9	10	*Epigonus telescopus*	**175.48**
2	9*	11-12	13	*Polydactylus plebeius*	**223.2**
2	9*	11-12	13-14	*Polydactylus indicus*	**223.1**
2	9*	12-13	12-13	*Polydactylus sextarius*	**223.3**
2*	9*	18-20	23-24	*Selene dorsalis*	**210.42**
2	9	61-64	88-100	*Lepidopus caudatus*	**248.4**
2	9-10*	7-8	9-10	*Synagrops japonicus*	**176.5**
2	9-10	36-38	35-37	*Cyttus traversi*	**138.2**
2	9-11	25-30	28-34	*Aspidontus dussumieri*	**235.4**
2	10	8-9	15-16	*Luzonichthys microlepis*	**166.14**
2	10*	9	9	*Synagrops microlepis*	**176.6**
2	10	10-11	11-12	*Pristigenys niphonia*	**174.4**
2	10	12	13	*Hoplolatilus fronticinctus*	**197.3**
2	10-11*	7-8	27-30	*Johnius dussumieri*	**199.6**
2	10-11*	7-8	27-30	*Otolithes ruber*	**199.7**
2	10-11	9-10	11-12	*Minous coccineus*	**149.3**
2	10-11	13-15	15-17	*Amphiprion allardi*	**219.9**
2	10-11	14-16	14-17	*Petroscirtes mitratus*	**235.36**
2	10-11	18-20	18-21	*Petroscirtes breviceps*	**235.35**
2	10-12*	7	23-27	*Johnius amblycephalus*	**199.5**
2	10-12	25-28	26-28	*Aspidontus taeniatus tractus*	**235.5**
2	10-12	29-33	31-37	*Plagiotremus rhinorhynchos*	**235.37**
2	10-13*	24-29	24-28	*Nomeus gronovii*	**255.7**
2	11*	6-7	26-28	*Argyrosomus thorpei*	**199.2**
2	11*	7	23-26	*Umbrina ronchus*	**199.9**
2	11*	7	25-29	*Umbrina canariensis*	**199.8**
2	11*	7	26-29	*Argyrosomus hololepidotus*	**199.1**
2	11*	7	27-31	*Atrobucca nibe*	**199.4**
2	11*	8-9	27-31	*Atractoscion aequidens*	**199.3**
2	11	97-104	99-104	*Xiphasia matsubarai*	**235.41**
2	11-12	12-14	11-12	*Pereulixia kosiensis*	**235.34**
2	11-12*	14-16	15-17	*Cubiceps pauciradiatus*	**255.6**
2	11-12	16-23	16-20	*Parablennius cornutus*	**235.31**
2	11-12	17-18	14-16	*Parablennius lodosus*	**235.32**
2	11-12	20-22	18-19	*Omobranchus fasciolatus*	**235.27**
2	11-12	20-25	18-24	*Parablennius pilicornis*	**235.33**
2	11-13	14-17	12-15	*Ecsenius nalolo*	**235.11**
2	11-13	14-18	12-16	*Scartella emarginata*	**235.40**
2	11-13*	17-20	17-21	*Psenes whiteleggii*	**255.12**
2	11-13	17-21	17-20	*Antennablennius bifilum*	**235.3**
2	11-13	20-22	19-21	*Omobranchus woodi*	**235.30**
2	11-13	21-23	19-21	*Omobranchus banditus*	**235.25**
2	11-13	21-24	19-22	*Omobranchus punctatus*	**235.29**
2	11-13	22-26	20-23	*Omobranchus ferox*	**235.28**
2	12	9-11	9-11	*Chromis caerulea*	**219.12**
2	12	10-12	10-12	*Chromis ternatensis*	**219.18**
2	12	11	10-11	*Chromis nigrura*	**219.16**
2	12	11-12	11-12	*Chromis lepidolepis*	**219.15**
2	12	11-12	14-15	*Plectroglyphidodon imparipennis*	**219.34**
2	12	11-13	11-13	*Dascyllus aruanus*	**219.25**
2	12	12-13	12-13	*Chromis dimidiata*	**219.14**
2	12	12-13	15-17	*Plectroglyphidodon leucozonus*	**219.37**
2	12	12-14	12-14	*Chromis agilis*	**219.10**
2	12	12-14	15-17	*Stegastes nigricans*	**219.44**
2	12	13-14	14-16	*Dascyllus carneus*	**219.26**
2	12	13-14	16-17	*Plectroglyphidodon phoenixensis*	**219.38**

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2	12	13-14	16-18	*Plectroglyphidodon lacrymatus*	**219.36**
2	12	14	12-13	*Exallias brevis*	**235.14**
2	12	14-15	14-15	*Cirripectes castaneus*	**235.9**
2	12	14-15	14-16	*Dascyllus trimaculatus*	**219.27**
2	12	14-16	16-18	*Plectroglyphidodon dickii*	**219.33**
2	12	15-16	14-15	*Lepidozygus tapeinosoma*	**219.28**
2	12	16-18	15-16	*Scombrolabrax heterolepis*	**246.1**
2	12	16-18	15-18	*Cirripectes auritus*	**235.8**
2	12	16-18	17-19	*Plectroglyphidodon johnstonianus*	**219.35**
2	12*	17-20	18-21	*Sillago maculata*	**198.2**
2	12	19-21	18-20	*Salarias fasciatus*	**235.39**
2	12	20-21	18-20	*Alloblennius parvus*	**235.1**
2	12	20-23	18-21	*Hirculops cornifer*	**235.15**
2	12*	21-23	20-23	*Sillago sihama*	**198.3**
2	12*	21-24	23-27	*Cubiceps caeruleus*	**255.4**
2	12-13	12-13	12-13	*Abudefduf natalensis*	**219.1**
2	12-13	17-18	14-18	*Antennablennius australis*	**235.2**
2	12-13	18-20	18-20	*Istiblennius gibbifrons*	**235.20**
2	12-13	18-22	19-22	*Istiblennius dussumieri*	**235.17**
2	12-13	20-21	17-18	*Mimoblennius rusi*	**235.24**
2	12-13	21-22	19-21	*Chalaroderma ocellata*	**235.7**
2	12-13*	22-28	20-22	*Sillago chondropus*	**198.1**
2	12-14	11-12	11-12	*Chromis weberi*	**219.19**
2	12-14	15-18	14-16	*Entomacrodus striatus*	**235.13**
2	12-14	21-23	17-20	*Omobranchus elongatus*	**235.26**
2	12-14	21-23	17-21	*Chalaroderma capito*	**235.6**
2	13	7-8	9	*Parapterois heterurus*	**149.6**
2	13	10-12	11-12	*Chromis opercularis*	**219.17**
2	13	10-12	11-12	*Neopomacentrus cyanomos*	**219.29**
2	13	11-12	11	*Neopomacentrus fallax*	**219.30**
2	13	11-12	11	*Neopomacentrus fuliginosus*	**219.31**
2	13	11-13	12-13	*Abudefduf vaigiensis*	**219.7**
2	13	11-13	12-13	*Chrysiptera glauca*	**219.22**
2	13	11-13	12-13	*Chrysiptera leucopoma*	**219.23**
2	13	12	13	*Abudefduf sparoides*	**219.6**
2	13	12	13	*Teixeirichthys jordani*	**219.45**
2	13	12-13	12-13	*Abudefduf septemfasciatus*	**219.3**
2	13	12-13	12-13	*Chromis dasygenys*	**219.13**
2	13	12-13	12-13	*Chrysiptera annulata*	**219.21**
2	13	12-14	12-14	*Abudefduf sexfasciatus*	**219.4**
2	13	12-14	13-14	*Chrysiptera unimaculata*	**219.24**
2	13	12-14	13-14	*Pomacentrus pavo*	**219.40**
2	13	12-15	13-15	*Paraglyphidodon melas*	**219.32**
2	13	13-14	13-14	*Abudefduf notatus*	**219.2**
2	13	14-15	14-16	*Abudefduf sordidus*	**219.5**
2	13	14-16	14-15	*Pomacentrus trilineatus*	**219.42**
2	13	15-16	14-15	*Pomacentrus caeruleus*	**219.39**
2	13	15-17	14-16	*Entomacrodus epalzeocheilus*	**235.12**
2	13	16-19	17-19	*Istiblennius flaviumbrinus*	**235.19**
2	13	20-22	19-21	*Istiblennius periophthalmus*	**235.22**
2	13	20-22	20-21	*Istiblennius impudens*	**235.21**
2	13	21-23	20-21	*Istiblennius edentulus*	**235.18**
2	13-14	13-14	15-17	*Stegastes fasciolatus*	**219.43**
2	13-14	20-21	20-21	*Istiblennius andamensis*	**235.16**
2	13-14	20-23	19-21	*Ecsenius midas*	**235.10**
2	13-14	107-119	105-119	*Xiphasia setifer*	**235.42**
2	13-15	8-10	8-10	*Choridactylus natalensis*	**149.2**
2	14	12-13	11-12	*Chromis woodsi*	**219.20**
2	14	12-13	13-14	*Chromis axillaris*	**219.11**
2	14	15-17	14-16	*Pomacentrus trichourus*	**219.41**
2	14-16	6-7	7-9	*Ptarmus jubatus*	**151.2**
2	17-18*	18-19	9-11	*Norfolkia springeri*	**236.9**
2	18-19*	21-22	10-11	*Cremnochorites capensis*	**236.1**
2	18-20*	15-18*	16-19*	*Thyrsitoides marleyi*	**247.9**

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2	18-21	13-18*	15-19*	*Thyrsites atun*	**247.8**
2	24-28	19-21	6-7	*Blennioclinus stella*	**237.2**
2	25-28*	14-18	2-4	*Fucomimus mus*	**237.26**
2	26-30	19-25	8-11	*Blennioclinus brachycephalus*	**237.1**
2	27-30	18-19	3-5	*Pavoclinus myae*	**237.33**
2	27-31	21-24	4-6	*Clinus woodi*	**237.25**
2	28-31	19-21	4-6	*Smithichthys fucorum*	**237.36**
2	29-32	20-23	7-8	*Pavoclinus litorafontis*	**237.31**
2	29-33	20-22	4-5	*Pavoclinus laurentii*	**237.30**
2	30-32	20-22	6-7	*Clinus heterodon*	**237.16**
2	30-32	22-24	8-9	*Clinus rotundifrons*	**237.20**
2	30-33	20-23	3-4	*Pavoclinus profundus*	**237.35**
2	30-34	20-24	5-7	*Clinus acuminatus*	**237.10**
2	30-35	21-24	4-6	*Pavoclinus graminis*	**237.28**
2	30-36	20-23	2-4	*Pavoclinus pavo*	**237.34**
2	30-36	20-24	5-6	*Clinus taurus*	**237.23**
2	30-36	28-34	35-42	*Diplospinus multistriatus*	**247.1**
2	31-34	20-23	5-7	*Clinus nematopterus*	**237.18**
2	31-36	21-25	4-6	*Clinus cottoides*	**237.14**
2	31-36	28-34	7-12	*Xenopoclinus leprosus*	**237.38**
2	31-42	21-30	5-10	*Clinus superciliosus*	**237.22**
2	32-34	26-28	9-14	*Clinus robustus*	**237.19**
2	32-35	23-25	6-8	*Clinus spatulatus*	**237.21**
2	32-38	20-25	2-4	*Clinus agilis*	**237.11**
2	33-36	21-24	4-7	*Clinus brevicristatus*	**237.13**
2	33-36	22-25	5-6	*Clinus berrisfordi*	**237.12**
2	33-36	23-26	8-9	*Clinus latipennis*	**237.17**
2	33-37	29-31	7-11	*Xenopoclinus kochi*	**237.37**
2	33-38	22-24	0-1	*Climacoporus navalis*	**237.8**
2	33-39	38-43	10-14	*Cancelloxus burrelli*	**237.5**
2	34-37	22-25	5-7	*Clinus helenae*	**237.15**
2	36-38	25-27	2-3	*Pavoclinus smalei*	**237.29**
2	36-39	25-31	28-33	*Paradiplospinus gracilis*	**247.5**
2	37-41	23-28	2-3	*Clinus venustris*	**237.24**
2	37-43*	27-32	6-8	*Pavoclinus mentalis*	**237.32**
2	37-44	26-34	5-9	*Cirrhibarbis capensis*	**237.7**
2	38-41	27-29	2-3	*Clinoporus biporosus*	**237.9**
2	38-43	27-32	3-4	*Cancelloxus elongatus*	**237.6**
2	40-45	28-31	2-4	*Blennophis striatus*	**237.4**
2	41-43	43-46	52-54	*Aphanopus microphthalmus*	**248.1**
2	41-48	25-31	1	*Muraenoclinus dorsalis*	**237.27**
2	43-45	51-54	61-65	*Aphanopus mikhailini*	**248.2**
2	44-46	93-101	98-100	*Benthodesmus elongatus elongatus*	**248.3**
2	46-50	33-37	2-4	*Blennophis anguillaris*	**237.3**
3	0	20-24	37-41	*Centrolophus niger*	**254.1**
3	2	13-14	22-23	*Chlidichthys johnvoelckeri*	**169.3**
3	2	14-15	23-25	*Chlidichthys bibulus*	**169.2**
3	3	13-18	25-27	*Pseudochromis natalensis*	**169.6**
3	3	14-15	26-28	*Pseudochromis pesi*	**169.7**
3	3	15	26	*Pseudochromis melas*	**169.5**
3	3	15-17	28-30	*Pseudochromis tauberae*	**169.8**
3	3	16-19	28-33	*Pseudochromis dutoiti*	**169.4**
3	4	8-10	25-27	*Histiopterus typus*	**203.1**
3	4	9	14	*Hoplostethus tenebricus*	**127.7**
3	4	22-24	27-31	*Zebrasoma veliferum*	**243.19**
3	4	24-25	27-28	*Zebrasoma gemmatum*	**243.17**
3	4-5	8-10	13-16	*Hoplostethus melanopus*	**127.6**
3	4-5	19-21	23-25	*Zebrasoma scopas*	**243.18**
3	4-6	8-10	12-13	*Hoplostethus cadenati*	**127.3**
3	4-6	9-10	13-14	*Hoplostethus melanopterus*	**127.5**
3	4-6	10-12	16-19	*Hoplostethus atlanticus*	**127.2**
3	5*	8	6-8	*Mugil cephalus*	**222.10**
3	5*	8	7	*Liza luciae*	**222.4**
3	5*	8	8	*Liza vaigiensis*	**222.9**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	5*	9	8	*Crenimugil crenilabis*	**222.1**
3	5*	9	8	*Liza alata*	**222.2**
3	5*	9	8	*Liza dumerilii*	**222.3**
3	5*	9	8	*Liza macrolepis*	**222.5**
3	5*	9	8	*Liza melinoptera*	**222.6**
3	5*	9	8	*Liza tricuspidens*	**222.8**
3	5*	9	8	*Myxus capensis*	**222.11**
3	5*	9	8	*Valamugil buchanani*	**222.12**
3	5*	9	8	*Valamugil cunnesius*	**222.13**
3	5*	9	8	*Valamugil robustus*	**222.14**
3	5*	9	8	*Valamugil seheli*	**222.15**
3	5*	9	8-9	*Liza richardsonii*	**222.7**
3	5	20-23	9	*Parapriacanthus ransonneti*	**216.1**
3	5	26-27	36-37	*Platax orbicularis*	**192.1**
3	5	26-28	35-37	*Platax pinnatus*	**192.2**
3*	5-6*	15-17	25-29	*Naucrates ductor*	**210.35**
3	5-6	22-28	28-34	*Platax teira*	**192.3**
3	5-6	31-34	34-36	*Pseudocyttus maculatus*	**139.5**
3*	5-6*	35-39	41-44	*Parastromateus niger*	**210.36**
3	5-7	25-28	26-29	*Psenopsis obscura*	**254.4**
3	5-7	27-31	29-33	*Allocyttus verrucosus*	**139.2**
3	5-8	16-18	23-26	*Schedophilus pemarco*	**254.9**
3	6	18-20	23-25	*Hyperoglyphe moselii*	**254.3**
3	6	35-40	8-9	*Pempheris schwenkii*	**216.4**
3	6	37-43	9	*Pempheris adusta*	**216.2**
3	6	40-44	9	*Pempheris mangula*	**216.3**
3	6-7	10	12-14	*Hoplostethus mediterraneus*	**127.4**
3	6-7	20-21	23-25	*Aporops allfreei*	**171.1**
3	6-7	28-31	29-31	*Oreosoma atlanticum*	**139.4**
3	6-7	31-37	39-42	*Zanclus canescens*	**244.1**
3	6-8	18-24	29-33	*Schedophilus ovalis*	**254.8**
3	6-8	23-26	20-25	*Neoscorpis lithophilus*	**190.1**
3	6-9	23-24	25-27	*Acanthurus nubilus*	**243.8**
3	7	9	12-13	*Grammistops ocellatus*	**167.4**
3*	7*	16-18	18-20	*Trachinotus blochii*	**210.49**
3*	7*	18-20	18-20	*Alectis indicus*	**210.2**
3*	7*	19-21	21-23	*Trachinotus africanus*	**210.47**
3*	7*	19-22	22-24	*Trachinotus botla*	**210.50**
3*	7*	20-24	20-24	*Trachinotus baillonii*	**210.48**
3	7	30-33	33-35	*Neocyttus rhomboidalis*	**139.3**
3	7-8*	8-10	8-10	*Ambassis gymnocephalus*	**163.1**
3	7-8	11-12	13-14	*Gephyroberyx darwini*	**127.1**
3	7-8	13-14	15-17	*Gazza minuta*	**201.1**
3	7-8	15-17	19-21	*Hyperoglyphe antarctica*	**254.2**
3	7-8	15-18	19-22	*Pseudogramma polyacantha*	**171.2**
3*	7-8*	16-19	19-21	*Scomberoides commersonnianus*	**210.38**
3*	7-8*	17-19	19-21	*Scomberoides lysan*	**210.39**
3*	7-8*	18-20	19-21	*Scomberoides tol*	**210.40**
3	8	8	10-11	*Plectropomus punctatus*	**166.73**
3	8	8	11	*Plectropomus areolatus*	**166.70**
3	8	8	11	*Plectropomus laevis*	**166.71**
3	8	8	11	*Plectropomus pessuliferus*	**166.72**
3	8*	9-11	9-10	*Ambassis productus*	**163.3**
3	8*	9-11	9-11	*Ambassis natalensis*	**163.2**
3	8	11	13	*Gomphosus caeruleus*	**220.27**
3	8	11	13	*Thalassoma* spp.	**220.58-65**
3	8	14	16	*Leiognathus elongatus*	**201.2**
3	8	14-15	15-16	*Leiognathus equula*	**201.3**
3*	8*	15-17	18-20	*Gnathanodon speciosus*	**210.32**
3*	8*	17-21	19-21	*Lichia amia*	**210.33**
3*	8*	18-20	18-22	*Alectis ciliaris*	**210.1**
3*	8*	18-22	27-33	*Seriola rivoliana*	**210.45**
3*	8*	18-22	29-35	*Seriola dumerili*	**210.43**
3*	8*	19-22	30-35	*Seriola lalandi*	**210.44**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	8	22-25	24-27	*Ctenochaetus binotatus*	**243.13**
3	8	22-25	25-27	*Ctenochaetus strigosus*	**243.15**
3	8	24-28	27-31	*Ctenochaetus striatus*	**243.14**
3	8	25-29	25-30	*Monodactylus falciformis*	**193.2**
3	8	27-30	27-30	*Monodactylus argenteus*	**193.1**
3	8-9	14	15-17	*Secutor insidiator*	**201.4**
3	8-9	14	16-17	*Secutor ruconius*	**201.5**
3	8-9	17-19	19-22	*Drepane longimanus*	**195.1**
3	8-9	23-25	27-29	*Schedophilus maculatus*	**254.7**
3	8-10*	22-28	33-36	*Rachycentron canadum*	**212.1**
3	9	7	10	*Gerres filamentosus*	**194.2**
3	9	7	10	*Gerres oblongus*	**194.3**
3	9	7	10	*Gerres oyena*	**194.4**
3	9	7	10-11	*Gerres rappi*	**194.5**
3	9*	7-8	9-10	*Howella sherborni*	**176.2**
3	9	7-8	15-17	*Cephalopholis formosa*	**166.24**
3	9	8	9-11	*Cheilinus bimaculatus*	**220.11**
3	9	8	10	*Cheilinus digrammus*	**220.13**
3	9	8	10	*Cheilinus oxycephalus*	**220.14**
3	9	8	10	*Cheilinus trilobatus*	**220.15**
3	9	8	10	*Cheilinus undulatus*	**220.16**
3	9	8	13-15	*Variola louti*	**166.75**
3	9	8	14	*Variola albimarginata*	**166.74**
3	9	8	15-17	*Cephalopholis boenack*	**166.23**
3	9	8-9	17-18	*Aethaloperca rogaa*	**166.19**
3	9	9	10	Scaridae	**221.1-19**
3	9	9	10-12	*Pteragogus flagellifer*	**220.52**
3	9	9	11	*Pseudocheilinus evanidus*	**220.47**
3	9	9	11	*Pseudocheilinus hexataenia*	**220.48**
3	9	9	11	*Pseudocheilinus octotaenia*	**220.49**
3	9	9	12	*Aulacocephalus temmincki*	**167.1**
3	9	9	14	*Gracila polleni*	**166.69**
3	9	9	14-15	*Cephalopholis aurantia*	**166.22**
3	9	9	14-15	*Gracila albomarginata*	**166.68**
3	9	9	14-16	*Cephalopholis miniata*	**166.26**
3	9	9	14-16	*Cephalopholis nigripinnis*	**166.27**
3	9	9	14-16	*Cephalopholis sexmaculata*	**166.28**
3	9	9	14-16	*Cephalopholis sonnerati*	**166.29**
3	9	9	15-17	*Cephalopholis argus*	**166.21**
3	9	9-10	14-15	*Cephalopholis leopardus*	**166.25**
3	9	9-10	15-16	*Cephalopholis spiloparaea*	**166.30**
3	9	10	11	*Labroides bicolor*	**220.40**
3	9	10	11	*Labroides dimidiatus*	**220.41**
3	9	10-11	11-12	*Labrichthys unilineatus*	**220.39**
3	9	11	11	*Halichoeres cosmetus*	**220.28**
3	9	11	11	*Halichoeres hortulanus*	**220.30**
3	9	11	11	*Halichoeres lapillus*	**220.32**
3	9	11	11	*Halichoeres scapularis*	**220.35**
3	9	11	11	*Hemigymnus fasciatus*	**220.36**
3	9	11	11	*Hemigymnus melapterus*	**220.37**
3	9	11	11	*Macropharyngodon bipartitus*	**220.42**
3	9	11	11	*Macropharyngodon cyanoguttatus*	**220.43**
3	9	11	11	*Macropharyngodon vivienae*	**220.44**
3	9	11	11	*Stethojulis albovittata*	**220.55**
3	9	11	11	*Stethojulis interrupta*	**220.56**
3	9	11	11	*Stethojulis strigiventer*	**220.57**
3	9	11	11-12	*Halichoeres nebulosus*	**220.34**
3	9	11-12	12-14	*Cheilio inermis*	**220.17**
3	9	11-12	13-14	*Polydactylus indicus*	**223.1**
3	9	12	11	*Pseudojuloides cerasinus*	**220.51**
3	9	12	12	*Anampses caeruleopunctatus*	**220.1**
3	9	12	12	*Anampses lineatus*	**220.2**
3	9	12	12	*Anampses meleagrides*	**220.3**
3	9	12	12	*Coris aygula*	**220.20**

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3	9	12	12	*Coris caudimacula*	**220.21**
3	9	12	12	*Coris formosa*	**220.22**
3	9	12	12	*Coris gaimard africana*	**220.23**
3	9	12	12	*Halichoeres dussumieri*	**220.29**
3	9	12	12	*Hologymnosus doliatus*	**220.38**
3	9	12	12	*Xyrichtys novacula*	**220.66**
3	9*	12	12	*Xyrichtys pavo*	**220.67**
3	9	12	12	*Xyrichtys pentadactylus*	**220.68**
3	9	12	12-13	*Halichoeres iridis*	**220.31**
3	9	12	13	*Cymolutes praetextatus*	**220.24**
3	9	12-13	12-13	*Novaculichthys taeniourus*	**220.46**
3	9	12-13	12-13	*Polydactylus sextarius*	**223.3**
3	9	12-13	13-14	*Halichoeres marginatus*	**220.33**
3	9	12-14	12-14	*Novaculichthys macrolepidotus*	**220.45**
3*	9*	14-17	18-20	*Carangoides chrysophrys*	**210.7**
3*	9*	14-17	19-22	*Caranx sexfasciatus*	**210.22**
3*	9*	15-17	17-19	*Carangoides dinema*	**210.8**
3*	9*	15-17	18-21	*Caranx ignobilis*	**210.17**
3*	9*	15-17	19-21	*Caranx sem*	**210.21**
3	9	15-17	19-21	*Tripterodon orbis*	**192.4**
3*	9*	16-17	18-20	*Megalaspis cordyla*	**210.34**
3*	9*	16-18	19-22	*Carangoides armatus*	**210.5**
3*	9*	16-18	20-22	*Carangoides hedlandensis*	**210.13**
3*	9*	16-18	20-22	*Caranx tille*	**210.23**
3*	9*	16-19	20-22	*Caranx lugubris*	**210.18**
3*	9*	16-19	21-23	*Caranx papuensis*	**210.20**
3*	9*	16-20	20-23	*Carangoides caeruleopinnatus*	**210.6**
3*	9*	17-18	21-22	*Ulua mentalis*	**210.53**
3*	9*	17-19	20-23	*Carangoides malabaricus*	**210.14**
3*	9*	17-20	21-24	*Caranx melampygus*	**210.19**
3	9	18-19	19-20	*Paracanthurus hepatus*	**243.16**
3*	9*	18-19	20-22	*Carangoides oblongus*	**210.15**
3*	9*	18-20	22-24	*Carangoides plagiotaenia*	**210.16**
3*	9*	18-20	23-24	*Selene dorsalis*	**210.42**
3*	9*	18-20	23-25	*Alepes djedaba*	**210.3**
3*	9*	18-21	22-25	*Atule mate*	**210.4**
3	9	19-22	22-24	*Acanthurus triostegus*	**243.11**
3*	9*	19-23	27-32	*Uraspis secunda*	**210.54**
3*	9*	21-22	25-26	*Pseudocaranx dentex*	**210.37**
3*	9*	21-23	24-27	*Selar crumenophthalmus*	**210.41**
3*	9*	21-24	23-25	*Carangoides equula*	**210.9**
3*	9*	21-26	25-30	*Carangoides fulvoguttatus*	**210.11**
3*	9*	21-26	26-34	*Carangoides ferdau*	**210.10**
3	9	22-23	23-24	*Acanthurus tennenti*	**243.9**
3	9	22-24	24-27	*Acanthurus nigrofuscus*	**243.7**
3	9	23-24	24-26	*Acanthurus mata*	**243.5**
3	9	23-25	25-27	*Acanthurus blochii*	**243.1**
3	9	23-25	25-27	*Acanthurus xanthopterus*	**243.12**
3	9	23-26	23-26	*Acanthurus thompsoni*	**243.10**
3	9	23-26	25-28	*Acanthurus nigricauda*	**243.6**
3	9	23-26	28-30	*Acanthurus leucosternon*	**243.3**
3*	9*	23-26*	29-30*	*Decapterus kurroides*	**210.25**
3	9	24-26	25-27	*Acanthurus dussumieri*	**243.2**
3*	9*	24-26	28-32	*Carangoides gymnostethus*	**210.12**
3*	9*	24-28	28-32	*Trachurus delagoa*	**210.51**
3*	9*	24-32	30-36	*Trachurus trachurus*	**210.52**
3*	9*	25-26*	31-32*	*Decapterus tabl*	**210.30**
3	9	25-27	26-30	*Antigonia rubescens*	**162.1**
3*	9*	25-28	25-28	*Chloroscombrus chrysurus*	**210.24**
3	9	25-28	27-29	*Acanthurus lineatus*	**243.4**
3*	9*	26-29*	29-32*	*Decapterus russelli*	**210.29**
3*	9*	27-30*	31-35*	*Decapterus punctatus*	**210.28**
3*	9*	28-31*	32-37*	*Decapterus macarellus*	**210.26**
3*	9*	28-31*	34-39*	*Decapterus macrosoma*	**210.27**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	9-10	7	9-11	*Gerres acinaces*	**194.1**
3	9-10*	7	10	*Acropoma japonicum*	**176.1**
3	9-10	7	22-25	*Diagramma pictum*	**179.1**
3	9-10	8-9	9-11	*Epibulus insidiator*	**220.26**
3	9-10*	12-13	13-14	*Scombrops boops*	**177.1**
3	9-10	24-26	24-26	*Zenopsis conchifer*	**138.3**
3	9-11	12-14	18-20	*Dinoperca petersi*	**180.1**
3	10	6	11	*Cirrhitus pinnulatus*	**214.3**
3	10	6	11	*Cirrhitus punctatus*	**214.4**
3	10	6	11	*Paracirrhites arcatus*	**214.6**
3	10	6	11	*Paracirrhites forsteri*	**214.7**
3	10	6	12	*Amblycirrhitus bimacula*	**214.1**
3	10	6	12-13	*Cirrhitichthys oxycephalus*	**214.2**
3	10	6-7	9	*Scolopsis bimaculatus*	**186.4**
3	10	6-7	13-14	*Plectranthias longimanus*	**166.16**
3	10	6-7	15-17	*Anthias squamipinnis*	**166.9**
3	10	6-7	16-17	*Cyprinocirrhites polyactis*	**214.5**
3	10	6-8	15-17	*Anthias connelli*	**166.4**
3	10	7	9	*Nemipterus bipunctatus*	**186.1**
3	10	7	9	*Nemipterus peronii*	**186.2**
3	10	7	9	*Parascolopsis eriomma*	**186.3**
3	10	7	9	*Scolopsis vosmeri*	**186.6**
3	10	7	9-10	*Scolopsis ghanam*	**186.5**
3	10*	7	10	*Neoscombrops cynodon*	**176.4**
3	10	7	13-15	*Plectranthias morgansi*	**166.17**
3	10	7	15-16	*Anthias lunulatus*	**166.7**
3	10	7	15-16	*Anthias pulcherrimus*	**166.8**
3	10	7	15-16	*Luzonichthys addisi*	**166.13**
3	10	7	16-17	*Plectranthias winniensis*	**166.18**
3	10	7	17-18	*Holanthias borbonius*	**166.10**
3	10	7-8	13-14	*Lutjanus argentimaculatus*	**181.5**
3	10	7-8	13-14	*Lutjanus ehrenbergii*	**181.7**
3	10	7-8	13-15	*Serranus cabrilla*	**166.76**
3	10	7-8	14	*Holanthias caudicinctus*	**166.11**
3	10	7-8	14-15	*Lutjanus kasmira*	**181.11**
3	10	7-8	15-17	*Anthias cooperi*	**166.5**
3	10	7-8	16	*Anthias bimaculatus*	**166.3**
3	10	8	9	*Cheilinus chlorourus*	**220.12**
3	10	8	9	*Lethrinus* spp.	**185.4-18**
3	10	8	10	*Paracaesio xanthura*	**181.21**
3	10	8	10-11	*Aphareus rutilans*	**181.2**
3	10	8	10-11	*Pristipomoides zonatus*	**181.24**
3	10	8	11	*Aphareus furca*	**181.1**
3	10	8	11	*Aprion virescens*	**181.3**
3	10	8	11	*Etelis coruscans*	**181.4**
3	10	8	11	*Pristipomoides filamentosus*	**181.22**
3	10	8	11	*Pristipomoides multidens*	**181.23**
3	10	8	12-14	*Lutjanus monostigma*	**181.14**
3	10	8	13-14	*Lutjanus bohar*	**181.6**
3	10	8	13-14	*Lutjanus fulvus*	**181.9**
3	10	8	13-14	*Lutjanus gibbus*	**181.10**
3	10	8	13-14	*Lutjanus lemniscatus*	**181.12**
3	10	8	14	*Lutjanus russellii*	**181.17**
3	10	8-9	10	*Gnathodentex aureolineatus*	**185.1**
3	10	8-9	15-16	*Lutjanus rivulatus*	**181.16**
3	10	8-9	15-16	*Luzonichthys microlepis*	**166.14**
3	10	8-9	17-19	*Holanthias natalensis*	**166.12**
3	10	9	10	*Monotaxis grandoculis*	**185.19**
3	10	9	10	*Pteragogus taeniops*	**220.54**
3	10	9-10	9-10	*Gymnocranius griseus*	**185.2**
3	10	9-10	10-11	*Gymnocranius robinsoni*	**185.3**
3	10	9-10	10-12	*Kuhlia rupestris*	**164.2**
3	10	9-10	11-12	*Gymnocrotaphus curvidens*	**183.18**
3	10	9-11	9-11	*Kuhlia mugil*	**164.1**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	10	10	10	*Wattsia mossambica*	**185.20**
3	10	10	17-19	*Cromileptes altivelis*	**166.31**
3	10	10-11	13-14	*Macolor niger*	**181.20**
3	10	11-13	14-15	*Caesio caerulaureus*	**182.1**
3	10	12	15	*Caesio teres*	**182.2**
3	10	12	15	*Pterocaesio capricornis*	**182.3**
3	10	12-13	12-13	*Cookeolus boops*	**174.1**
3	10	13-14	18-19	*Coracinus capensis*	**187.1**
3	10	13-14	21-23	*Coracinus multifasciatus*	**187.2**
3	10	13-15	13-14	*Priacanthus cruentatus*	**174.2**
3	10	13-16	13-15	*Priacanthus hamrur*	**174.3**
3	10-11*	7	9-10	*Neoscombrops annectens*	**176.3**
3	10-11	8	12-14	*Lutjanus fulviflamma*	**181.8**
3	10-11	8	16-18	*Anthias evansi*	**166.6**
3	10-11	10	11-12	*Pachymetopon blochii*	**183.23**
3	10-11	10	11-13	*Pachymetopon aeneum*	**183.22**
3	10-11	12-14	14	*Kyphosus vaigiensis*	**189.3**
3	10-12	8	6-8	*Plesiops coeruleolineatus*	**172.2**
3	10-12*	21-23	22-24	*Psenes maculatus*	**255.10**
3	10-12*	23-28	23-28	*Psenes cyanophrys*	**255.9**
3	10-14*	26-31	27-31	*Psenes pellucidus*	**255.11**
3	11	7	14-15	*Serranus novemcinctus*	**166.77**
3	11	7	16-17	*Nemanthias carberryi*	**166.15**
3	11	7-8	14-15	*Epinephelus morrhua*	**166.53**
3	11	7-9	14-15	*Epinephelus tukula*	**166.66**
3	11	8	10	*Lithognathus lithognathus*	**183.20**
3	11	8	10-11	*Petrus rupestris*	**183.26**
3	11	8	13-15	*Epinephelus andersoni*	**166.34**
3	11	8	13-15	*Epinephelus radiatus*	**166.58**
3	11	8	14	*Epinephelus albomarginatus*	**166.33**
3	11	8	14	*Epinephelus* sp.	**166.62**
3	11	8	14-15	*Epinephelus fuscoguttatus*	**166.42**
3	11	8	14-15	*Epinephelus magniscuttis*	**166.47**
3	11	8	14-15	*Epinephelus microdon*	**166.51**
3	11	8	14-15	*Epinephelus poecilonotus*	**166.56**
3	11	8	14-16	*Epinephelus lanceolatus*	**166.45**
3	11	8	14-16	*Epinephelus malabaricus*	**166.48**
3	11	8	14-16	*Epinephelus melanostigma*	**166.49**
3	11	8	14-16	*Epinephelus suillus*	**166.64**
3	11	8	14-16	*Epinephelus tauvina*	**166.65**
3	11	8	15	*Epinephelus spilotoceps*	**166.63**
3	11	8	15-16	*Epinephelus guaza*	**166.43**
3	11	8	15-16	*Epinephelus hexagonatus*	**166.44**
3	11	8	15-16	*Epinephelus ongus*	**166.55**
3	11	8	15-17	*Epinephelus areolatus*	**166.35**
3	11	8	15-17	*Epinephelus caeruleopunctatus*	**166.36**
3	11	8	15-17	*Epinephelus fasciatus*	**166.39**
3	11	8	15-17	*Epinephelus faveatus*	**166.40**
3	11	8	15-17	*Epinephelus flavocaeruleus*	**166.41**
3	11	8	15-17	*Epinephelus merra*	**166.50**
3	11	8	15-17	*Epinephelus multinotatus*	**166.54**
3	11	8	16-17	*Epinephelus longispinis*	**166.46**
3	11	8	16-17	*Epinephelus retouti*	**166.59**
3	11	8	16-18	*Epinephelus chlorostigma*	**166.38**
3	11	8	16-18	*Epinephelus miliaris*	**166.52**
3	11	8	16-18	*Epinephelus rivulatus*	**166.60**
3	11	8	17-19	*Epinephelus undulosus*	**166.67**
3	11	8-9	9-10	*Lithognathus aureti*	**183.19**
3	11	8-9	12-14	*Lutjanus sanguineus*	**181.18**
3	11	8-9	14-16	*Anyperodon leucogrammicus*	**166.20**
3	11	9	8-9	*Callopleisops altivelis*	**172.1**
3	11	9	8-9	*Cirrhilabrus exquisitus*	**220.19**
3	11	9	9	*Pteragogus pelycus*	**220.53**
3	11	9	10	*Chrysoblephus lophus*	**183.12**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	11	9	13-15	*Epinephelus chabaudi*	**166.37**
3	11	9	15-17	*Pomadasys jubelini*	**179.12**
3	11	9	16	*Epinephelus posteli*	**166.57**
3	11*	9-10	10-12	*Erythrocles schlegelii*	**209.2**
3	11	9-10	13-15	*Epinephelus septemfasciatus*	**166.61**
3	11	9-10	14-15	*Pomadasys commersonnii*	**179.10**
3	11	9-10	17-19	*Dermatolepis striolatus*	**166.32**
3	11	10	9	*Decodon grandisquamis*	**220.25**
3	11	10	10-11	*Callanthias legras*	**168.1**
3	11	10	11	*Crenidens crenidens*	**183.14**
3	11	10	11-12	*Sparodon durbanensis*	**183.40**
3	11	10	11-13	*Spondyliosoma emarginatum*	**183.41**
3	11	10	15-16	*Lutjanus sebae*	**181.19**
3	11	10-11	11	*Pachymetopon grande*	**183.24**
3	11	10-11	11-12	*Polyamblyodon germanum*	**183.27**
3	11	10-11	11-13	*Rhabdosargus globiceps*	**183.35**
3	11	10-11	12-13	*Lithognathus mormyrus*	**183.21**
3	11	10-11	12-13	*Rhabdosargus holubi*	**183.36**
3	11	10-11	13	*Polyamblyodon gibbosum*	**183.28**
3	11	10-12	12-15	*Acanthopagrus bifasciatus*	**183.2**
3	11	11	10-11	*Boopsoidea inornata*	**183.6**
3	11	11	12	*Kyphosus bigibbus*	**189.1**
3	11	11	12	*Kyphosus cinerascens*	**189.2**
3	11	11	12-13	*Diplodus cervinus hottentotus*	**183.16**
3	11	11	12-13	*Rhabdosargus sarba*	**183.37**
3	11	11-12	12-13	*Spicara axillaris*	**184.2**
3	11	12	13	*Rhabdosargus thorpei*	**183.38**
3	11	13-14	13-14	*Opistognathus margaretae*	**225.1**
3	11	13-15	14-16	*Sarpa salpa*	**183.39**
3	11	14	12	*Pseudodax moluccanus*	**220.50**
3	11	14-15	14-15	*Opistognathus nigromarginatus*	**225.3**
3	11	14-17	20-24	*Oplegnathus robinsoni*	**206.3**
3	11	15	15	*Opistognathus muscatenis*	**225.2**
3	11	16	20-21	*Oplegnathus peaolopesi*	**206.2**
3	11	18-19	22-25	*Chaetodon marleyi*	**205.11**
3	11-12*	5	8-9	*Parabembras robinsoni*	**154.1**
3	11-12	7-8	12-13	*Lutjanus notatus*	**181.15**
3	11-12	7-8	16-17	*Plectorhinchus chubbi*	**179.2**
3	11-12	7-9	9-11	*Terapon theraps*	**173.3**
3	11-12	7-9	10-11	*Chrysoblephus gibbiceps*	**183.10**
3	11-12	7-9	10-11	*Chrysoblephus laticeps*	**183.11**
3	11-12	7-10	9-11	*Terapon jarbua*	**173.2**
3	11-12	8	8-10	*Argyrops filamentosus*	**183.3**
3	11-12	8	10-11	*Argyrops spinifer*	**183.4**
3	11-12	8	10-11	*Cheimerius nufar*	**183.7**
3	11-12	8	10-11	*Polysteganus macrophthalmus*	**183.30**
3	11-12	8	12	*Lutjanus lutjanus*	**181.13**
3	11-12	8-9	10-13	*Acanthopagrus berda*	**183.1**
3	11-12	9-10	11-12	*Polyprion americanus*	**165.1**
3	11-12	11-12	15-16	*Lobotes surinamensis*	**202.1**
3	11-12	13-15	15-17	*Parascorpis typus*	**188.1**
3	11-12*	14-16	13-16	*Ariomma indica*	**255.1**
3	11-12	17-19	23-26	*Heniochus acuminatus*	**205.22**
3	11-12	17-19	24-26	*Heniochus monoceros*	**205.24**
3	11-12	20-21	24-25	*Hemitaurichthys zoster*	**205.21**
3	11-12	21-23	22-25	*Pomacanthus striatus*	**204.12**
3	11-13	7-8	15-17	*Acanthistius sebastoides*	**166.1**
3	11-13*	17-20	17-21	*Psenes whiteleggii*	**255.12**
3	11-13*	21-23	18-22	*Psenes arafurensis*	**255.8**
3	11-16*	23-26	23-27	*Aulostomus chinensis*	**143.1**
3	12	4-5	9	*Pontinus leda*	**149.18**
3	12	5	8-9	*Sebastapistes strongia*	**149.39**
3	12	5	9	*Iracundus signifer*	**149.12**
3	12	5	9	*Parascorpaena mcadamsi*	**149.15**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	12	5	9	*Parascorpaena mossambica*	**149.16**
3	12	5	9	*Phenacoscorpius adenensis*	**149.17**
3	12	5	9	*Pontinus nigerimum*	**149.19**
3	12	5	9	*Rhinopias frondosa*	**149.20**
3	12	5	9	*Scorpaena scrofa*	**149.21**
3	12	5	9	*Scorpaenopsis brevifrons*	**149.30**
3	12	5	9	*Scorpaenopsis diabolus*	**149.31**
3	12	5	9	*Scorpaenopsis gibbosa*	**149.32**
3	12	5	9	*Scorpaenopsis gilchristi*	**149.33**
3	12	5	9	*Scorpaenopsis oxycephala*	**149.34**
3	12	5	9	*Scorpaenopsis* sp.	**149.35**
3	12	5	9	*Scorpaenopsis venosa*	**149.36**
3	12	5	9	*Sebastapistes mauritiana*	**149.38**
3	12	5	9	*Sebastapistes tinkhami*	**149.40**
3	12	5	9-10	*Neomerinthe nielseni*	**149.14**
3	12	5	9-10	*Setarches guentheri*	**149.45**
3	12	5	11	*Neomerinthe folgori*	**149.13**
3	12	5	12-13	*Helicolenus dactylopterus*	**149.42**
3	12	5-6	9	*Sebastapistes cyanostigma*	**149.37**
3	12	5-6	10-11	*Taenianotus triacanthus*	**149.41**
3	12	6	11-12	*Pterois antennata*	**149.7**
3	12	6-7	13-14	*Pomadasys striatum*	**179.18**
3	12	7	13	*Pomadasys multimaculatum*	**179.16**
3	12	7	14	*Pomadasys maculatum*	**179.15**
3	12	7	14-15	*Pomadasys furcatum*	**179.11**
3	12	7	15	*Acanthistius* sp.	**166.2**
3	12	7	15	*Pomadasys laurentino*	**179.14**
3	12	7	18-21	*Plectorhinchus schotaf*	**179.8**
3	12	7	19-20	*Plectorhinchus playfairi*	**179.7**
3	12	7-8	9-10	*Spicara australis*	**184.1**
3	12	7-8	13-14	*Pomadasys stridens*	**179.19**
3	12	7-8	13-15	*Pomadasys kaakan*	**179.13**
3	12	7-8	17-18	*Plectorhinchus sordidus*	**179.9**
3	12	8	7	*Plesiops multisquamatus*	**172.3**
3	12	8	10	*Argyrozona argyrozona*	**183.5**
3	12	8	10	*Chrysoblephus cristiceps*	**183.9**
3	12	8	10	*Chrysoblephus puniceus*	**183.13**
3	12	8	10	*Chrysoblephus anglicus*	**183.8**
3	12	8	10	*Cymatoceps nasutus*	**183.15**
3	12	8	10	*Polysteganus coeruleopunctatus*	**183.29**
3	12	8	10	*Polysteganus praeorbitalis*	**183.31**
3	12	8	10	*Pterogymnus laniarius*	**183.34**
3	12	8-9	10	*Polysteganus undulosus*	**183.32**
3	12	10	8	*Choerodon gymnogenys*	**220.18**
3	12	10	10-11	*Pagellus bellottii natalensis*	**183.25**
3	12	10	10-12	*Plagiogeneion rubiginosus*	**209.3**
3	12	10-12	9-10	*Bodianus anthioides*	**220.5**
3	12	11-13	11-14	*Oplegnathus conwayi*	**206.1**
3	12	11-13	15-17	*Pomadasys olivaceum*	**179.17**
3	12	12	10	*Bodianus diana*	**220.8**
3	12	12	10	*Bodianus leucostictus*	**220.9**
3	12	12	10	*Bodianus perditio*	**220.10**
3	12	12-13	10	*Bodianus axillaris*	**220.6**
3	12	12-13	10	*Bodianus bilunulatus*	**220.7**
3	12	13-14	14-15	*Diplodus sargus capensis*	**183.17**
3	12*	13-16	14-17	*Ariomma melanum*	**255.2**
3	12	16-18	15-16	*Scombrolabrax heterolepis*	**246.1**
3	12	16-18	18-20	*Chaetodon melannotus*	**205.12**
3	12	17-18	22-24	*Forcipiger flavissimus*	**205.20**
3	12	17-19	23-25	*Heniochus diphreutes*	**205.23**
3	12	18-20	23-24	*Chaetodon meyeri*	**205.13**
3	12*	19-22	20-24	*Cubiceps baxteri*	**255.3**
3	12*	20-21	20-23	*Cubiceps capensis*	**255.5**
3	12	20-22	24-26	*Chaetodon falcula*	**205.5**

A-SPINE	D-SPINE	A-RAY	D-RAY	SPECIES	NUMBER
3	12	20-22	25-28	*Chaetodon lineolatus*	**205.8**
3	12	21	21	*Pomacanthus maculosus*	**204.10**
3	12-13	5-6	5-7	*Synanceia verrucosa*	**149.46**
3	12-13	5-6	11	*Pterois radiata*	**149.10**
3	12-13	9-11	9-11	*Pelates quadrilineatus*	**173.1**
3	12-13	17-19	23-25	*Chaetodon lunula*	**205.9**
3	12-13	18-19	21-22	*Chaetodon dolosus*	**205.4**
3	12-14	5	7-9	*Scorpaenodes minor*	**149.27**
3	13	4-5	8-9	*Scorpaenodes guamensis*	**149.23**
3	13	5	7-8	*Scorpaenodes kelloggi*	**149.25**
3	13	5	8	*Scorpaenodes varipinnis*	**149.29**
3	13	5	8-9	*Scorpaenodes hirsutus*	**149.24**
3	13	5	8-9	*Trachyscorpia capensis*	**149.44**
3	13	5	9	*Scorpaenodes littoralis*	**149.26**
3	13	5	9	*Scorpaenodes parvipinnis*	**149.28**
3	13	5	9-10	*Dendrochirus brachypterus*	**149.4**
3	13	6	9-11	*Pterois miles*	**149.8**
3	13	6-7	10	*Pterois mombasae*	**149.9**
3	13	6-7	10-11	*Dendrochirus zebra*	**149.5**
3	13	6-7	10-11	*Pterois russellii*	**149.11**
3	13	7	19-20	*Plectorhinchus gaterinus*	**179.4**
3	13	8-9	10-11	*Porcostoma dentata*	**183.33**
3	13*	10	9-11	*Emmelichthys nitidus nitidus*	**209.1**
3	13	10-11	9	*Anchichoerops natalensis*	**220.4**
3	13	16-18	21-23	*Chaetodon guttatissimus*	**205.6**
3	13	17-20	21-23	*Chaetodon unimaculatus*	**205.16**
3	13	18-19	20-23	*Chaetodon kleinii*	**205.7**
3	13	19-21	23-26	*Chaetodon vagabundus*	**205.17**
3	13	20	20-21	*Pomacanthus annularis*	**204.7**
3	13	20-21	23-24	*Chaetodon auriga*	**205.1**
3	13	20-22	21-23	*Pomacanthus semicirculatus*	**204.11**
3	13-14	5	9-10	*Scorpaenodes albaiensis*	**149.22**
3	13-14	6	13-14	*Sebastes capensis*	**149.43**
3	13-14	7	15-16	*Plectorhinchus plagiodesmus*	**179.6**
3	13-14	7	20-22	*Plectorhinchus flavomaculatus*	**179.3**
3	13-14	15-17	15-17	*Chaetodon zanzibarensis*	**205.19**
3	13-14	16-17	20-21	*Chaetodon madagaskariensis*	**205.10**
3	13-14	18-19	17-19	*Pomacanthus chrysurus*	**204.8**
3	13-14	18-20	20-22	*Chaetodon trifasciatus*	**205.15**
3	13-14	21-23	23-25	*Chaetodon xanthocephalus*	**205.18**
3	14	7	15-16	*Plectorhinchus gibbosus*	**179.5**
3	14	15-17	16-18	*Chaetodon bennetti*	**205.2**
3	14	16-17	15-17	*Centropyge multispinis*	**204.5**
3	14	16-18	16-17	*Centropyge acanthops*	**204.3**
3	14	17-19	16-18	*Apolemichthys trimaculatus*	**204.2**
3	14	17-19	16-18	*Centropyge bispinosus*	**204.4**
3	14	18-19	18-19	*Pygoplites diacanthus*	**204.13**
3	14	19-20	19-21	*Pomacanthus imperator*	**204.9**
3	14-16	3-6	5-6	*Coccotropsis gymnoderma*	**150.2**
3	14-16	6-8	8-10	*Apistus carinatus*	**149.1**
3	15	5	8-9	*Ablabys binotatus*	**150.1**
3	15	17-19	15-17	*Genicanthus caudovittatus*	**204.6**
3	15-17	7-10	10-13	*Oreochromis mossambicus*	**218.1**
3	16-17	16-18	21-23	*Chaetodon blackburnii*	**205.3**
3	17*	19	17-20	*Neoepinnula orientalis*	**247.4**
3	17-18	7-8	26-27	*Chirodactylus jessicalenorum*	**215.5**
3	17-18	8	22-24	*Chirodactylus grandis*	**215.4**
3	17-18	8-10	28-31	*Chirodactylus brachydactylus*	**215.3**
3	17-19	9-11	23-25	*Cheilodactylus fasciatus*	**215.1**
3	18-20	9-11	19-23	*Cheilodactylus pixi*	**215.2**
3	18-21	13-18	15-19	*Thyrsites atun*	**247.8**
3	27-34*	15-19*	15-20*	*Gempylus serpens*	**247.2**
3-4	15	17-18	16-17	*Apolemichthys kingi*	**204.1**
4	4	25-29	16-20	*Beryx decadactylus*	**126.1**

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4	4	25-30	13-15	*Beryx splendens*	**126.2**
4	4-5	14-16	18-31	*Polymixia berndti*	**134.1**
4	5	15-16	35-37	*Polymixia nobilis*	**134.2**
4	5-6	14-16	14-15	*Centroberyx spinosus*	**126.3**
4	7	30-33	33-35	*Neocyttus rhomboidalis*	**139.3**
4	9-10	20-22	22-24	*Zeus capensis*	**138.4**
4	9-11	20-23	22-24	*Zeus faber*	**138.5**
4	11	7-9	11-13	*Neoniphon argenteus*	**132.1**
4	11	8	11-13	*Neoniphon sammara*	**132.4**
4	11	8-9	12-13	*Sargocentron praslin*	**132.12**
4	11	8-9	12-14	*Neoniphon aurolineatus*	**132.2**
4	11	8-9	12-14	*Neoniphon opercularis*	**132.3**
4	11	8-10	12-13	*Sargocentron seychellense*	**132.15**
4	11	8-10	12-14	*Sargocentron diadema*	**132.6**
4	11	8-10	12-14	*Sargocentron rubrum*	**132.14**
4	11	8-10	13-14	*Sargocentron ittodai*	**132.8**
4	11	9	12-14	*Sargocentron punctatissimum*	**132.13**
4	11	9	12-14	*Sargocentron violaceum*	**132.19**
4	11*	9	13	*Sargocentron inaequalis*	**132.7**
4	11	9	13-15	*Sargocentron caudimaculatum*	**132.5**
4	11	9	13-15	*Sargocentron tiere*	**132.17**
4	11	9-10	12-14	*Sargocentron melanospilos*	**132.10**
4	11	9-10	12-14	*Sargocentron microstoma*	**132.11**
4	11	9-10	12-14	*Sargocentron tiereoides*	**132.18**
4	11	9-10	13-14	*Sargocentron macrosquamis*	**132.9**
4	11	9-10	14-16	*Sargocentron spiniferum*	**132.16**
4	11	10-11	13-14	*Ostichthys delta*	**132.32**
4	11*	11-12	13-15	*Myripristis melanosticta*	**132.25**
4	11	11-12	13-15	*Myripristis vittata*	**132.30**
4	11*	11-13	13-15	*Myripristis berndti*	**132.21**
4	11*	11-13	13-15	*Myripristis chryseres*	**132.22**
4	11*	11-13	13-15	*Myripristis murdjan*	**132.26**
4	11*	12-13	13-15	*Myripristis hexagona*	**132.23**
4	11*	12-14	14-15	*Myripristis adusta*	**132.20**
4	11	12-14	14-16	*Myripristis violacea*	**132.29**
4	11	13	14-15	*Myripristis seychellensis*	**132.28**
4	11	13-15	14-16	*Myripristis pralinia*	**132.27**
4	11*	14-15	15-18	*Scatophagus tetracanthus*	**191.1**
4	11*	14-16	15-17	*Myripristis kuntee*	**132.24**
4	12	10-12	14-16	*Plectrypops lima*	**132.34**
4	12	11	13	*Ostichthys kaianus*	**132.33**
4	12	11-12	13-15	*Ostichthys archiepiscopus*	**132.31**
4	12	11-12	14-15	*Pristilepis oligolepis*	**132.35**
4	13-14	14-15	14-16	*Chaetodon trifascialis*	**205.14**
4	14-16	6-8	8-10	*Apistus carinatus*	**149.1**
4-5	14-15	7-8	8-10	*Pseudopentaceros richardsoni*	**203.3**
4-6	12-13	7-9	12-13	*Pentaceros capensis*	**203.2**
4	15	17-18	16-17	*Apolemichthys kingi*	**204.2**
5	14-15	7-8	8-10	*Pseudopentaceros richardsoni*	**203.3**
6	12-13	7-9	12-13	*Pentaceros capensis*	**203.2**
7	13	9	10	*Siganus stellatus*	**245.1**
7	13	9	10	*Siganus sutor*	**245.2**
8-10	18-20	3-5	3-5	*Acanthoplesiops indicus*	**170.1**
17-18	21-22	16-18	20-23	*Metavelifer multiradiatus*	**118.1**

Glossary

Abdominal — on or pertaining to the belly or abdomen.
Abyssal plain — that part of the ocean bottom from 4 000 to 6 000 m.
Abyssopelagic — that part of the oceanic zone from 4 000 m to the bottom.
Acronurus — the specialised larva of a surgeonfish (Family Acanthuridae).
Acuminate — tapering to a point.
Acute — sharply pointed.
Adipose eyelid — more or less transparent tissue that partially covers the eye of some fishes (e.g. *Mugil cephalus*).
Adipose fin — a fleshy, rayless, median fin located between the dorsal and caudal fins.
Adnate — joined together.
Air bladder — *see* swimbladder.
Alar spines — specialised prehensile spines near the disc edge in all male skates (Rajoidea).
Allopatric — populations or species occupying mutually exclusive geographic areas.
Amphipods — a group of bilaterally compressed, scavenging crustaceans.
Anal fin — the median, unpaired fin located on the ventral surface in front of the caudal fin.
Anal papilla — see genital papilla.
Anterior — on or towards the front (head) end of the fish.
Antrorse — pointing or turned anteriorly.
Anus — the exterior opening to the intestine; vent.
Ascidians — tunicate animals, including sea-squirts and red bait.
Auxiliary scales — small scales superimposed on the surface of larger scales.
Axil — the inner or posterior part of the base of a fin.
Axillary process (or scale) — enlarged, usually elongated scale or group of scales at the base of the pectoral or pelvic fins of some fishes.

Barbel — fleshy, tentacle-like process near the mouth of some fishes.
Basal — at or towards the base.
Basibranchial — median ventral cartilage or bony element in a branchial arch, behind the tongue.
Basipterygium — pelvic bone or cartilage to which the pelvic fin is attached.
Bathyal — the benthic habitat from 200 to 4 000 m.
Bathypelagic — the deep part of the oceanic zone from 1 000 to 4 000 m.
Batoid — a flat elasmobranch fish, e.g. skate or ray, with the pectoral fins fused to the sides of the head and the gill openings on the ventral surface.
Benthic — living on or close to the bottom.
Benthopelagic — occurring near or just above the bottom.
Bicuspid — a tooth with two cusps or points.
Bifurcate — split or divided into two parts; bifid.
Bilobate — having two lobes.
Bioluminescence — the ability to produce light.
Biserial — arranged in two rows or series.
Branched ray — a soft or segmented fin ray that is split into two or more parts distally.
Branchial — pertaining to the gills.
Branchiostegals — bony "rays" supporting the branchiostegal membrane on the underside of the head.
Buccal — pertaining to the mouth cavity.
Buckler — bony plates located at the base of certain fins or on the belly of some fishes.

Caducous — easily shed (deciduous).
Canine — conical pointed tooth, usually larger than other teeth in the mouth.
Cardiform — small, sharp, slender teeth, like those on wool cards.
Carnivorous — feeding on animals.
Cartilage — skeletal tissue, usually soft and flexible, and in bony fishes it is mostly replaced by bone during the early growth stages.
Catadromous — migrating from freshwater to the sea to spawn.
Caudal fin — the fin at the rear of the fish; tail fin.
Caudal peduncle — the part of the body from the rear end of the anal fin base to the base of the caudal fin.
Cephalic — pertaining to the head.
Cephalopod — a group of molluscs, including squid and octopus, which have a tubular siphon under the head and a group of muscular suckered arms around the mouth.
Ceratobranchial — longest bones or cartilages of the branchial arches, situated immediately below the angle of the arch, between the epibranchials and the hypobranchials.
Chaetognath — torpedo-shaped, translucent, planktonic marine invertebrate organisms; arrow-worms.
Cheek — area between the eye and the edge of the preopercle bone.
Chondrichthyans — cartilaginous fishes (chimaeras, sharks, rays, etc.)
Chromatophore — pigment cell in the skin, responsible for the colour of the skin.
Ciguatera — a type of poisoning from eating coral-reef fishes; unpredictable and sometimes fatal; known in the western Indian Ocean only at Mauritius and Réunion islands.
Circumpeduncular — around the caudal peduncle.
Cirri (singular cirrus) — small, slender, filamentous appendages.
Claspers — intromittent (copulatory) organs attached to the pelvic fins of male chondrichthyans.
Cleithrum — the major bone of the pectoral girdle, extending upward from the pectoral fin base and forming the rear margin of the gill cavity.
Cloaca — the pit-like chamber that contains the anus and urogenital openings of chondrichthyans.
Coalesced — fused or grown together.
Coelenterate — radially symmetrical invertebrate animals including the corals, sea anemones and jelly fishes.

Common name — the informal vernacular name for a fish (or other organism), which may vary from place to place.
Compressed — flattened from side to side.
Concave — curved inward.
Confluent — joined together.
Continuous — unbroken, usually referring to the dorsal fin in which the spinous part is joined to the soft-rayed part with no gap or notch between the two; also refers to an unbroken lateral line scale series.
Continental shelf — the sea bottom from the shore out to a depth of 200 m.
Continental slope — the sea bottom from 200 to 2 000 m.
Convex — curved outward.
Copepods — tiny planktonic crustaceans of major importance in marine food chains; some species are parasitic.
Corselet — a densely scaled area in certain tuna-like fishes usually behind the pectoral fins.
Cranium — the part of the skull containing the brain.
Crenulate — having the margin shaped into small rounded scallops.
Crustaceans — invertebrate animals with jointed external skeletons; includes crabs, lobsters, prawns, shrimps, etc.
Ctenoid scale — a scale with minute teeth or spines (ctenii) on the rear margin, which gives the fish a rough feel when stroked towards the head.
Cutaneous — pertaining to the skin, dermal.
Cycloid scale — thin, flexible scale with a smooth surface.

Deciduous — easily shed or rubbed off.
Demersal — sinking to or lying on the bottom.
Dendritic — tree-like in shape or markings.
Dentary — the anterior and largest of the bones making up the lower jaw.
Dentate — bearing teeth or tooth-like projections.
Denticle — the tooth-like scale of elasmobranchs; a tooth-like projection.
Dentition — the characteristic arrangement and shape of the teeth.
Depressed — flattened from top to bottom (dorsoventrally).
Dermal — pertaining to the skin.
Diatom — unicellular alga with silica walls.
Dichromatic — having two colour forms.
Dimorphic — having two forms.
Diplospondylous — having two vertebrae in each body segment, as in the tail region of certain fishes.
Distal — remote from the point of attachment.
Diurnal — pertaining to the daytime, active during the day.
Dorsal — on or towards the back or upper part of a fish.
Dorso-ventral — stretching from the dorsal to the ventral surface.
Dorsum — the upper (dorsal) surface of the head or body.
Double emarginate — with a double-notched margin.

Edentate — without teeth.
Elasmobranchs — the group of fishes which includes the sharks, rays and skates.
Emarginate — with a slightly concave margin.
Entire — with a smooth (even) margin.
Epibranchial — bone or cartilage forming the upper part of the gill arch, immediately above the angle of the arch.
Epipelagic — the upper part of the oceanic zone from the surface to about 200 m.
Esca — the terminal lure or "bait" on the angling apparatus (illicium) of anglerfishes (Lophiiformes).
Euryhaline — able to live in waters with a wide range of salinity.
Exserted — projecting outward.

Falcate — curved like a sickle.
Filamentous — thread-like.
Fimbriate — with a fringed margin.
Finlet — a small fin of one or two branched rays.
Fossa — a groove or pit.
Frenum — a connecting or restraining membrane.
Fusiform — tapering toward each end; spindle-shaped.

Gas bladder — *see* swimbladder.
Genital papilla — a short, fleshy tube behind the anus from which the sperm or eggs are released; the sex of a fish can often be determined by the shape of its papilla.
Gill arch — the bony or cartilaginous arches to which the gill filaments are attached.
Gill chamber — the space on each side of the head containing the gills.
Gill cover — the bones of the head that cover the gill chamber, comprising the preopercle, opercle, subopercle and interopercle; the operculum.
Gill filaments — the soft, red, fleshy part of the gills, through which oxygen is taken into the blood from the water passing through the gills.
Gill membrane — *see* branchiostegal membrane.
Gill opening — the opening from the gill chamber to the outside; in elasmobranchs there are 5-7 openings on each side of the head; in bony fishes there is only one on each side (in some fishes the left and right gill openings may be continuous ventrally).
Gill-rakers — bony, finger-like (or lath-like) projections along the anterior edge of the gill arches.
Gill slits — gill openings.
Gonad — the reproductive organ: ovary or testis.
Gorgonian — sea-fans, a polyzoan coelenterate in which the polyps form upright branching colonies.
Gravid — carrying unborn young; pregnant.
Gular bone — the median, dermal bone between the dentary bones of some primitive fishes (e.g. *Latimeria* and *Elops*).

Habitat — the place where a species normally lives.
Hemibranch — a gill with a single series of filaments; half of a normal gill.
Herbivorous — feeding on plants.
Hermaphroditic — having both sexes in the same individual, either at the same time (synchronous hermaphrodite) or at different times of its life (successive hermaphrodite).
Heteracanth — having the fin spines asymmetrical and more or less skewed alternately left and right.
Holothurian — sea cucumber, an elongate soft-bodied relative of the starfish.
Holotype — a single specimen designated as the "type" (i.e. "namebearer") of a new species by the author of the original description.
Humeral — relating to the pectoral girdle or shoulder region.
Hyaline — transparent.
Hypural bones — the fan-shaped series of bones (sometimes fused to one or two plate-like bones) to which the caudal fin rays are attached.

Illicium — the "fishing pole" of anglerfishes, developed as a greatly modified dorsal fin ray and located on top of the head.
Imbricate — overlapping like tiles on a roof.
Incisor — a tooth flattened at the tip like a chisel.
Inferior — the position of the mouth when it is on the underside of the head.
Insertion (of a fin) — the anterior end of the base of the paired fins.
Interorbital — the area between the eyes, on top of the head.
Inter-radial membrane — the membrane between the rays of a fin.
Interspecific — between separate species.
Interspinous membrane — the membrane between the spines of a fin.
Intertidal — between the high and low tide marks on a shore.
Intraspecific — within one species.
Isthmus — the part of the body that separates the two gill chambers.

Jugular — pertaining to the throat.

Keel — a narrow ridge-like process.

Labial — pertaining to the lips.
Lanceolate — broad at the base and tapering to a point.
Larva (plural larvae) — the early life history stage between the time of hatching and transformation to a juvenile, the latter a miniature replica of the adult.
Lateral — pertaining to, at, or towards the side.
Lateral line — a system of tubes or canals containing sensory cells (receptors) sensitive to low-frequency sounds and vibrations produced by the movements of other animals in the vicinity; the lateral-line system on the head divides into a network of branching canals, but on the body it is usually a single perforated tube extending from the head to the base of the caudal fin.
Lateral-line scales — the scales on the body that are perforated by the tubes of the lateral line.
Leptocephalus (plural leptocephali) — the transparent, ribbon-like, pelagic larva of eels and other elopomorph fishes.
Lipid — fatty substances produced by fishes as an energy store and, in some species, to provide buoyancy; may be deposited in or around the swimbladder as fat, or as oil in the liver, skeleton or body muscles.
Littoral — the intertidal zone of the marine enviroment, delimited by the tide marks of low and high water.

Mandible — the lower jaw.
Maxilla (plural maxillae) — one of the two bones that comprise each half of the upper jaw.
Medial — on or towards the middle of the body.
Median — on the midline or axial plane of the body.
Melanophore — a black pigment cell.
Meristic — countable features (e.g. lateral-line scales, fin rays or gill-rakers).
Mesopelagic — pertaining to the region of the oceanic zone from 200 m to 1 000 m.
Mimic — an organism that closely resembles another, usually unrelated, organism which is protected from predation for some reason.
Molar — a blunt, rounded tooth adapted for crushing shellfish.
Monospondylous — having a single vertebra in each body segment.
Monotypic — including only a single species.
Morphology — the form and structure of organisms or the study of this subject.
Multiserial — arranged in several rows or series.
Mucus — a slimy substance secreted by the skin of fishes.
Myomere — a segment of the body (trunk) muscles, separated from its neighbours by a connective tissue septum and most easily seen in larval fishes; the number of myomeres is important in identifying larvae, since their number equals the number of vertebrae in the adult.

Nape — the part of the dorsum from the back of the head to the dorsal fin or vertical at the base of the pectoral fins.
Naris (plural nares) — nostril.
Nekton — organisms that actively swim in the water column.
Neritic — the shallow pelagic zone over the continental shelf.
Neuston — organisms which float or swim in the surface waters.
Niche — the habitat and role (community relationships, food habits, etc.) of an organism.
Nictitating membrane (nictitans) — the movable inner eyelid of sharks.
Nocturnal — active at night.
Notochord — a cartilaginous rod in the embryo that runs from head to tail and supports the nerve cord; in most fishes the notochord is replaced in the larval stage by the developing vertebrae, but in some primitive fishes (e.g. *Latimeria*, hagfishes, chimaeras) the notochord persists in the adult and serves as the vertebral column or "backbone" of these species.
Nuchal — pertaining to the nape.
Nyctoepipelagic — migrating from deeper waters to the epipelagic zone at night.

Obsolete — disappearing or scarcely evident.
Obtuse — broadly rounded, having a blunt end.
Occipital — pertaining to the occiput (upper rear part of the head).
Oceanic — pertaining to the open ocean beyond the continental shelf.
Ocellus (plural ocelli) — an eye-like spot usually ringed by another colour.
Ocular — pertaining to the eyes.
Olfactory — pertaining to the nasal organs or sense of smell.
Opercle — the large, posterior bone of the gill-cover, the largest bone of the operculum.
Opercular — pertaining to the operculum (gill-cover).
Orbit — the dermal or bony eye socket.
Otolith — calcareous concretions in the ear capsules of bony fishes; also called "ear bones" or "ear stones".
Oviparous — producing eggs that develop and hatch outside the body of the female.
Ovoviviparous — producing eggs that hatch within the body of the mother, but the embryos lack a placental attachment to the oviduct.

Paired fins — the pectoral and pelvic fins.
Palate — the roof of the mouth.
Palatines — elongate bone on each side of the palate.
Papilla — a small fleshy projection.

Paratype — a specimen, other than the holotype, on which the description of a new species is based.
Pectoral fins — the anterior or uppermost of the paired fins, corresponding to the forelimbs of higher vertebrates.
Pectoral girdle — the bony or cartilaginous skeletal arch supporting the pectoral fins.
Pelagic — pertaining to the open ocean.
Pelvic fins — paired ventral fins usually located below or behind the pectoral fins.
Peritoneum — the membrane lining the abdominal cavity.
Pharyngeal teeth — teeth located on the pharyngeal bones (modified fifth gill arches) in the throat behind the gills.
Photophore — a light-emitting organ.
Physoclistous — with a closed swimbladder (i.e. without any connection between swimbladder and gut).
Phytoplankton — microscopic (unicellular) plant life that floats in the open ocean.
Plankton — small floating organisms that drift more or less passively with the ocean currents.
Plicate — with pleat-like folds.
Polychaete — a segmented marine worm with bristles.
Posterior — at or towards the rear end of the fish.
Postlarva — a larva after it has absorbed its yolk.
Postocular, postorbital — that part of the head behind the eye.
Precaudal pit — in sharks, a transverse or longitudinal notch on the caudal peduncle just in front of the caudal fin.
Predator — an animal that captures and eats other animals.
Premaxilla — the anterior of the two upper jaw bones.
Preopercle — the falcate bone before the opercle and behind and below the eye, and constituting the fore part of the operculum; its rear edge is usually free, and may be serrated or not.
Preorbital — the bone or region before and below the eye.
Prey — animals that are the food of predators.
Procumbent — lying down and pointing forwards.
Produced — elongated or projecting.
Protandrous — sequential hermaphroditism in which the fish functions first as a male and then changes to a female.
Protogynous — sequential hermaphroditism in which the fish functions first as a female and then changes to a male.
Protrusile, protrusible — capable of being thrust out or extended forwards.
Proximal — towards the body or base of attachment.
Pseudobranch — a small, gill-like organ on the inner surface of the operculum.
Pseudoceanic — members of a basically oceanic group which are distributed over continental shelf and slope regions and in the neighbourhood of oceanic islands and which are associated with land-orientated food chains.
Pterygiophore — one of the bones or cartilages with which the base of the rays of the median fins articulate.
Pterygoids — bones of the roof and walls of the mouth in fishes, behind the palatines.
Pungent — sharp like a thorn.
Pyloric caecum (plural caeca) — a variously shaped diverticulum from the junction of the stomach and intestine; the pyloric caeca may be long and numerous, or short and few, or profusely branched, or even absent.

Recurved — curved backward or inward.
Reticulate — resembling a network.
Retrorse — pointing or curved backwards.
Rostral — pertaining to the snout or rostrum.
Rostrum — a projecting snout or beak; protracted anterior part of the skull in sharks and rays.
Rugose — with a rough or wrinkled surface.

Salp — a planktonic tunicate.
Sargassum — brown algae that drift in the open ocean.
Scientific name — the formal binominal name of an organism, which consists of the genus and specific names; a species has only one valid scientific name.
Scute — a modified (thickened) bony scale that bears a keel or spiny point.
Segmented ray (soft-ray) — a bilaterally paired fin ray that is marked by cross striations like the joints on a stalk of bamboo.
Serrate, serrated — bearing small saw-like notches or spines (serrae).
Setiform — bristle-like.
Simple — not divided into branches.
Siphonophore — colonial, free-swimming or floating pelagic hydrozoans, mostly delicate and transparent with long filamentous tentacles.
Species — groups of actually (or potentially) interbreeding natural populations which are reproductively isolated from other such groups.
Spine — a sharp, projecting point; a fin ray that is unpaired, unbranched, lacks segmentation and is usually stiff and sharp pointed.
Spiracle — an opening behind the eye of some elasmobranchs that leads into the mouth cavity and may serve as an incurrent opening for water entering the gill chambers.
Striate — marked by lines or grooves.
Sub (as a prefix) — less than, not quite, approximately, under.
Subocular, suborbital — beneath the eye.
Subopercle — the gill-cover bone that is ventral to the opercle.
Subspecies — a taxonomically and geographically distinct subgroup within one species.
Subtropical Convergence — the region of the southern oceans at about 42° S latitude where the surface temperature of the sea drops sharply from about 18° C to 10° C.
Superior — above (dorsal to).
Supracleithrum — the dorsalmost bone of the pectoral girdle in bony fish, usually articulated with the post-temporal bone of the skull.
Supramaxilla — a small bone along the upper rear edge of the maxilla.
Supraoccipital — a median bone at the upper rear end of the cranium.
Swimbladder — a membranous, usually gas-filled sac attached to the dorsal surface of the body cavity; in some fishes the swimbladder is filled with fat, and in a few species it is rudimentary or absent.
Symphysis — the median point or junction of the two halves of the jaws.
Synonym — different names applied to the same taxon.
Synonymy — chronological list of all scientific names that have been applied, correctly or incorrectly, to a given taxon.
Syntype — one of the specimens on which a species description is based if no holotype was designated.

Taxon — any formal taxonomic unit or category of organisms (genus, species, family, etc.)

Taxonomic — pertaining to the classification of organisms according to their natural (evolutionary) relationships; systematic.
Teleost — a "modern" (advanced) bony fish (not including *Latimeria* and some other primitive fishes).
Terminal — pertaining to a mouth at the anteriormost part of the head.
Thermocline — the distinct interface between surface waters and cooler deeper waters.
Tholichthys stage — the larval stage of a butterflyfish (Family Chaetodontidae).
Thoracic — in the region of the chest.
Thorn — large denticle on the surface of a ray or skate.
Truncate — having the end square-cut or even.
Tricuspid — with three cusps or points.

Uniserial — arranged in a single row.

Ventral — on or towards the lower surface (underside) of the fish.
Ventral fins — pelvic fins.
Vertical fins — the dorsal, caudal and anal fins; median fins.
Villiform — having the appearance of velvet or fine bristles of a brush.
Viscera — the internal organs of the body cavity.
Viviparous — bringing forth living (active, free-swimming) young.
Vomer — a median bone in the front of the palate that often bears teeth.

Zooplankton — animals (mostly microscopic) which drift freely in the water column.

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Number conversion table

Many anglers and other users of the previous editions of *Sea Fishes of Southern Africa* referred to the various fishes by their numbers. To facilitate their identification in this new book, we here give the new numbers assigned to all of the species that were included in the old *Sea Fishes* book.

E = extralimital
P = in part
N ID = not identifiable

Old no.	New no.
1	2.2
2	2.4
3	2.4
3a	2.1
3b	3.1
4 E	—
4a	4.1
5	9.10
5a	9.6
6	9.14
6a	9.5
7 P	9.13 & 9.18
8	9.16
9	9.9
9a	9.9
10	9.32
10a	9.11
10b	9.29
11	9.33
12	9.33
13	9.33
13a	9.35
13b	10.3
14	9.19
15	9.20
15a	9.25
16	9.34
17	9.28
17a	9.36
18	9.36
18a	9.36
19	9.28
20 P	9.27 & 9.28
21	13.3
22	16.3
23	15.1
24	19.1
25	19.1
26	14.1
27	14.4
28	14.2
28a	14.2
28b	14.2
29	8.1
30	7.4
30a	7.3
31 E	—
32 E	—
33 E	—
34	11.3
35	11.14
36	11.15
37	11.13
38	11.16
39	11.9
39a	11.8
40 P	11.5 & 11.7
41	11.1
42	11.11
43	11.12
44	6.1
45	5.19
46	5.22
47	5.3
48	5.4
49 P	5.9 & 5.10
50 P	5.12 & 5.16
51 E	—
52 P	5.11 & 5.13
53	5.26
54	5.24
54a	5.21
55	21.1
56 E	—
57	20.1
58	22.1
59	22.2
59a	22.3
59a (p.503)	27.1
60	27.7
61 P	27.3 & 27.5
62	27.3
63	27.2 & 27.6
64	27.4
65	25.15
66	25.19
67	25.6
68	25.1 & 25.3
69	25.14
70	25.8
71	25.8
72	25.13
73	25.13
74	28.1
75	28.2
76	28.2
77	28.3
77a P	28.3 & 28.4
78	30.13
78a	30.14
79	30.10
79a	30.4
79b	30.10
79c	30.12
80	30.3
81	30.1
82	30.5
82a	30.15
84	26.1
85	30.6
86	30.7
87	29.2
88	29.1
89	24.2
90	24.1
91 P	23.1 & 23.3
92	23.2
93	32.1
94	32.2
95	34.1
96	33.1
97	33.2
98	35.1
98a	35.1
99	38.1
99a	38.2
100	36.2
101	37.1
102	57.1
103 E	—
104	56.1
105	58.1
106	54.1
107	54.13
108	54.3
109	54.5
110	54.3
111	54.4
112 N ID	—
113	54.8
114	54.10
114a	54.9
115	54.12
116	54.7
117	54.6
118	55.3
119	55.2
120	55.2
121	55.6
122	55.5
123	55.1
124	64.1
125	64.1
126	64.18
127 P	61.1
128	63.3
129	61.3
130	62.1
131	67.2
132	72.18
133	72.18
134	72.8
135	72.6
136	72.21
137	71.4
138	70.1
139 P	69.7
140	69.9
141	69.1
142	70.1
143	70.2
144	70.1
145	68.2
146	74.4
147	74.2
148 E	—
149	74.5
150 E	—
151	74.12
152	73.6
153	73.4
154	74.10
155	75.1
156	73.8
157	73.7
158 N ID	—
159 P	75.10
160	75.6
161	75.7
162	75.4
163	60.1 & 60.2
164	59.1
165	59.3
166	52.1
167	52.1
168 P	52.2 & 52.3
169	53.4
170	53.3
171	53.1
172	79.7
173 E	—
174	79.9
175	79.2
176	79.3
177	79.2
178	79.10
179	79.1
180	77.6
181	76.6
182	76.3
183	76.3
184	76.9
185	76.7
186	81.9
187	85.2
188	124.2
188a	124.4
188b	124.3
189 P	76.10
190	87.1
191	86.118
192	86.110

Old no.	New no.
193	86.44
194	86.94
195 P	86.119 & 86.120
196	86.49
197	86.3
198	86.103
199 P	86.60 & 86.63
200 P	86.66 & 86.69
201 P	86.16, 86.22 & 86.41
202	86.58
203 P	86.75 & 86.78
204	86.74 & 86.84
205	86.9
206	86.90
207	86.108
208	86.72
208a	137.1
209	135.2
210	116.6
211	116.2
212 P	116.4
213 P	116.11
214	116.1
215	116.10
216	115.1
217	115.5
218	115.4
219	115.3
220	115.3
221	115.3
222	115.2
223	115.2
224	114.2
225	113.2
226	113.1
227 E	—
228	113.3
229	113.4
230 E	—
231	93.9
232	93.5
233	93.4
234	93.7
235	93.7
236	93.8
237	93.12
238	93.15
239	93.17
240	93.21
241	93.31
242	93.27
243	93.32
244	93.19
245	93.30
246	89.1
247	93.14
248	93.14
249	93.2
250	90.9
251	92.2
252	88.1
253	90.1
254	90.3
255	90.5
256	90.6
257	89.4
257a	89.3
258	90.2
259	90.8
260	90.7
261	91.1
262 P	117.1 & 117.2
262a	118.2
262b	118.1
263	122.2
264	119.3
264a	119.4
264c	119.1
264c	119.2
265	?119.3
266	121.2
267	121.1
268	138.2
269	138.3
270	138.4
271	138.5
272	141.1
273	141.2
274	138.1
275	139.4
276	139.5
277	139.2
278	139.3
279	140.2
279a	140.1
280 P	133.12 & 133.13
281	133.6
282	133.7
283	134.1
284	128.1
285	130.2
286	126.2
287	126.1
288	127.4
289	127.2
290	127.2
291	127.1
292	127.1
293	126.3
293a	132.34
294	132.4
295	132.12
296	132.6
296a	132.5
296b	132.3
297	132.13
297a	132.16
297b	132.5
298	132.26
298a	132.20
298b	132.24
298c	132.20
299	257.1
300	260.1
301	260.3
302	260.2
303	260.4
304 P	259.17 & 259.19
305	258.1
306	259.6
307	259.13
308	259.11
309	259.12
310	259.2
311	259.1
312	259.15
313	259.7
314	259.8
315	259.9
316	259.4
317	259.5
318	259.3
319	262.1
320	262.16
321	262.5
322	262.9
323	262.15
324	262.14
325	262.3
326	262.2
327	262.11
328	262.12
329	262.13
330	262.7
331	262.4
332	261.13
333	261.12
334	261.11
335	261.10
336	261.1
337	261.5
338	261.4
339 N ID	—
340	261.7
341 P	261.2
341a	—
342 P	261.3 & 261.9
343	261.8
344	145.18
344a	145.20
345	145.17
346	145.21
347	145.19
348	145.16
348a	145.1
349 E	—
350	145.29
351	145.13
352	145.15
352a	145.14
353 E	—
354 E	—
355	145.29
355a	145.25
356	145.31
357	145.28
357a	145.22
358	145.24
358a	145.6
359	145.23
360	143.1
361	144.1
362	144.2
363	147.2
364	147.2
365	147.1
366	147.4
367	147.5
368	147.3
369	148.1
370	146.1
371	142.1
372	142.2
373	238.2
373d	238.1
374	231.1
374b	232.3
375	232.1
376	229.1
377	228.2
378	230.2
379	230.1
380	234.1
381	234.5
382	234.6
383	234.5
383a	233.1
384	197.5
384a	197.4
384b	197.4
385	225.2
386	225.3
387	225.3
388	239.8
389	239.7
390	239.3
391	239.2
392	239.6
393	214.2
393a	214.1
394	214.3
394a	214.4
394b	214.4
395	214.7
396	214.6
396a	214.5
397	215.1
398	215.3
399	215.4
400	173.3
401	173.2
402	173.1
403 P	174.2 & 174.3
404	174.1
405 N ID	—
406	174.3
406a	174.4
407	188.1
407b	169.4
408	169.6
408a	169.3
408f	171.2
409	170.1
410	172.3
411	172.2
412	164.1
413	164.2
414	202.1
415	197.2
416	197.1
417	166.71, 166.72 & 166.73
418	167.3
419	167.1
420	166.19
421	166.29
422 P	166.22
423 P	166.21 & 166.26
424 N ID	—
425	166.21
425a	166.23
426	166.75
427	166.76
428	166.77
429	166.76
430	166.76
431	166.1
432 N ID	—
433	166.41
434	166.60
435	166.43
436	166.39
437	166.34
438 P	166.53 & 166.56
438a	166.37
439	166.50
440	166.40
440a	166.40
441	166.37
442	166.33
443	166.60
444	166.46
445	166.38
446	166.35
447 P	166.48 & 166.64
448 N ID	—
449	166.55
450	166.36
451 P	166.42 & 166.66
452	166.45
453	165.1
454	180.1
455	166.5

Old no.	New no.
455a	166.15
456	166.12
457	166.9
458	166.9
459	166.9
459a	166.5
460	168.1
461	206.1
462	206.3
463	206.2
464	226.3
465	226.1
466	226.1
467	198.3
468	198.2
469	198.1
470	175.37
471	175.33, 175.35 & 175.36
472	175.34
472a	175.52
472b	175.53
472c	175.51
473	176.5
474	175.48
475	175.43
476	175.17
477	175.23
478	175.26
479	175.14
479a	175.4
480	175.2
481	175.3
482	175.22
483	175.24
484	175.12
485	175.20
486 N ID	—
487 P	175.5 & 175.19
488	175.16
488a	175.42
489	175.32
490	175.30
491	175.39
492	175.21
493	175.38
494	175.18
495	175.47
495a	175.45
496	177.1
497	176.3
498	176.2
499	176.1
500	210.36
501	210.52
502	210.3
503	210.41
504	210.52
505 P	210.13
506	210.32
507	210.37
508	210.3
509	210.3
510	210.4
511	210.22
512	210.19
513	210.19
514	210.16
515	210.9
516	210.7
517	210.14
518	210.5
519	210.8
520	210.17
521	210.12
522	210.11
523	210.10
524 E	—
525	210.15
526	210.42
527	210.1
528	210.2
529	210.28
530	210.29
531	210.29
532	210.27
533 N ID	—
534	210.34
535	210.35
536	210.46
537	210.44
537a	210.44
538	210.45
538b	210.43
539	210.33
540	210.50
541	210.48
542	210.47
543	210.31
544	210.40
545	210.39
546	210.38
547	178.1
548	212.1
549 N ID	—
550	199.4
551 N ID	—
552	199.1
553	199.7
554	199.3
555	199.5
556	199.8
557 P	199.9
558	199.8
559	199.6
560	196.12
561	196.13
562	196.12
563	196.11
564	196.10
565	196.8
566	196.3
567	196.7
568	196.9
569	196.5
569a	196.6
570	196.6
571	196.10
571a	196.4
572 P	196.1 & 196.2
573	196.1
574	209.1
575	209.3
576	195.1
577	192.1
578	192.4
579	162.1
580	193.2
581	193.1
582	191.1
582a	204.13
583	204.12
583b	204.8
583c	204.7
584 P	204.11 204.12
585	204.9
586	204.2
587	204.5
588	204.3
588a	204.3
589	205.20
590 P	205.22
591	205.11
592	205.1
593	205.15
594	205.16
595	205.4
596	205.12
597	205.5
598	205.9
599	205.17
600	205.7
601	205.8
602	205.6
603	205.10
604	205.4
605	205.18
605a	205.2
605b	205.14
605c	205.13
606	205.3
607	243.16
607b	243.18
608	243.11
609	243.5
609a	243.3
610	243.4
611	243.12
612	243.6
613	243.2
614	243.14
614a P	243.15
615	243.22
615a	243.20
616	243.30
616d	243.28
617	243.25
617a	243.31
617b	243.29
617c	243.23
617d	243.22
618	244.1
619	244.1
620	203.1
621	203.2
622	203.3
623	200.1
624	201.5
625	201.4
626	201.3
626a	201.2
627	201.1
628	194.2
629 P	194.1 & 194.4
630	194.4
631	194.1
632	194.5
633	194.3
634	163.2
635	163.3
636	163.2
637	163.1
638	189.2
638a	189.3
639	189.1
640	216.1
641	216.4
642 P	216.2 & 216.3
643	216.3
644	187.1
645	187.2
646	190.1
647 E	—
648	185.1
649 P	185.2 & 185.3
649a	185.3
650	185.19
651	181.4
652	181.3
653	181.22
654	181.24
655	181.21
656 E	—
657	181.11
658	181.15
659	181.8
660	181.17
661	181.7
662 P	181.10
663	181.18
664	181.5
665	181.19
666	181.16
667	181.6
668	181.12
669	181.9
670	181.12
671	181.13
672	186.1
673	186.2
674 E	—
675	179.17
676	179.13
677	179.15
678	179.16
679	179.10
680	179.18
681	179.19
682	179.11
682a	179.14
683	186.6
684	186.4
685	186.5
686	186.3
687	182.1
688	179.1
689	179.2
690	179.5
691	179.6
692	179.7
692a	179.8
693	179.3
694	179.4
695 P	179.4
696 E	—
697	—
698 P	185.6
699	185.13
700	185.12
700a	185.14
701	185.7
702	185.13
703	185.17
703a	185.16
704	184.2
705	184.1
706	183.2
707	183.1
708	183.35
709	183.36
710	183.37
711	183.40
712 N ID	—
713	183.17
714	183.16
715	183.4
716	183.3
717	183.33
718	183.34
719	183.15
720	183.9
721	183.11
722	183.13
723	183.12
724	183.8
725	183.10
726	183.20
727	183.21
728	183.25
729	183.6
730	183.18
731	183.39
732	183.14

Old no.	New no.	Old no.	New no.	Old no.	New no.	Old no.	New no.	Old no.	New no.
733	183.28	779	220.63	828	249.3	881	222.2	923	240.65
734	183.28	779a	220.63	829	249.7	882	222.8	923a	240.85
735	183.27	780	220.60	830	249.4	883	222.9	924	240.19
736	183.23	780a	220.58	831	249.18	884	222.3	925	240.9
737	183.22	781	220.59	831a	249.17	885	222.6	925d	240.67
738	183.24	782	220.65	831b	249.2	886	222.5	926	240.22
739	183.41	782a	220.58	832	249.9	887	222.7	927	240.23
740	183.7	782b	220.64	833	249.10	888	222.12	927a	240.21
741	183.26	783	220.27	834	249.15	889	222.15	927b	240.20
742	183.32	784	220.27	835	249.15	890	222.11	927c	240.22
743	183.31	785	220.1	836	249.14	891	112.1	928	240.66
744	183.29	786	220.1	837	249.8	892	111.5	929	240.69
745	183.5	786a	220.3	838	249.8	893	111.1	930	240.106
745a	219.8	787	220.36	839	249.11	894	111.3	931 P	240.45 &
746	219.14	788	220.37	840	249.12	895 P	224.7		240.46
746a	219.14	788a	220.39	841	249.13	896 P	224.7	931a	240.32
746c	219.18	789	220.29	842 E	—	897 P	224.4	932	240.5
746d	219.12	790	220.32	843	249.1	898	223.2	933	240.4
747	219.9	791	220.29	844	249.5	899	223.1	934	240.97
748	219.9	792	220.34	844a	256.2	900	223.3	935	240.54
749	219.25	792a	220.34	845	254.10	901	245.2	935a	240.84
750	219.26	792b	220.33	846	254.10	902	245.2	936	240.79
751	219.27	793	220.30	847	254.11	902a	245.1	936a	240.78
752	219.27	794 E	—	848	254.7	903	240.99	937	240.102
753	219.26	795	220.35	848a	254.8	904	240.98	937a	240.7
754	219.21	795a N ID	—	849	254.3	904a	240.29	938 P	241.4,
754b	219.44	796	220.52	849a	254.2	905	240.48		241.5 &
755	219.13	797	220.53	849b	210.50	905a	240.47		241.6
756	219.42	798	220.54	849c	254.3	906	240.87	938a P	241.5
757	219.40	799	220.57	850	254.1	907	240.59	938c	240.25
758	219.29	800	220.55	851	255.11	908	240.76	939	241.9
758a	219.45	801	220.57	852	255.1	909	240.49	939a	240.8
758b	219.35	802	220.55	853	255.12	909a	240.26	939b	240.36
758c	219.28	803	220.56	854	255.9	910 P	240.15	940	241.1
759	219.37	804	220.56	854a	255.8	910c	240.17	941	241.8
759a	219.33	805	220.41	855	255.7	911	240.61	941a	241.3
759b	219.32	806	220.20	856	255.5	911a	240.53	942	241.8
760	219.5	807	220.21	857	255.6	911b	240.60	943	240.103
761	219.7	808	220.21	858	255.12	912	240.24	943a	240.104
762 P	219.1 &	809	220.23	859	207.1	912b	240.41	944	240.90
	219.4	809a	220.22	860 P	207.7 &	913	240.68	944b	241.10
762a	219.3	810	220.38		207.8	913a	240.71	944d	240.51
763 N ID	—	811	220.67	861	247.7	913b	240.70	944j	240.52
764	219.36	812	220.68	862	247.3	914	240.30	945	213.2
765	219.6	813	220.45	863	247.8	914a	240.31	946	213.6
766 N ID	—	814	220.46	864	247.2	915	240.62	947	213.5
767	219.30	814a	220.46	865	247.4	915a	240.93	948	213.4
768	219.13	815	220.11	866	247.9	916	240.33	949	213.1
769	219.23	816	220.15	867	248.4	916c	240.24	949a	213.3
769a P	219.23 &	817	220.13	868	248.3	917	240.107	950	235.40
	219.24	817a	220.16	869	248.6	918	240.93	950a	235.32
770	220.17	817b	220.26	870	207.4	919 P	240.43 &	951	235.33
771	220.4	817c	220.14	871	207.5		240.44	952	235.31
772	220.9	818	220.12	872	211.2	920	240.73	953	235.7
772a	220.9	819	220.48	873	251.1	920a	240.63	954	235.6
773	220.7	820	220.24	874	252.1	921	240.58	955	235.25
774	220.8	821	221.17	875	252.3	921b	240.33	955b	235.27
774a	220.5	822	221.18	875a	252.3	921c	240.38	956	235.26
775	220.6	822a	221.15	876	252.2	921e	240.34	956a	235.28
776	220.10	823	221.9	876a	252.6	921f	240.58	957	235.29
776a	220.18	824	221.11	877	222.10	921h	240.91	958	235.26
777	220.62	825	221.3	878	222.14	921j N ID	—	958a	235.23
778	220.61	826	221.3	879	222.13	922	240.6	959	235.36
778a	220.61	827	221.2	880	222.1	922b	240.101	960	235.35

Old no.	New no.
961	235.5
961a	235.5
961b	235.4
962	235.37
963	235.38
964	235.42
965	235.34
965a	235.14
966	235.9
967	235.3
968	235.2
969 N ID	—
970	235.22
970a	235.20
971	235.21
972	235.18
973	235.19
973a	235.13
974 N ID	—
975	235.17
976	235.17
976a	235.15
977	237.7
978	237.8
979	237.27
980	237.3
981	237.4
982	237.23
983	237.14
984	237.25
985	237.13
986	237.22
987	237.19
988	237.11
989	237.11
990	237.24
991	237.10
992	237.15
993	237.17
994	237.2
995	237.1
996	237.36
997	237.26
998	237.32
999	237.30
1000	237.34
1001	237.28
1002	237.20
1003	237.9
1004	237.37
1005	236.1
1006	236.5
1007	236.8
1008	97.5
1009	97.2
1009a	97.6
1009b	97.1
1009c	?97.6
1010	97.5
1010d	97.8
1011	98.5
1012	98.1
1012a E	—
1013	99.3
1014	96.3
1015	96.5
1016	98.8
1017	96.13
1018	96.22
1019	96.18
1020	98.3
1021	98.7
1022	96.21
1023	96.9
1024	96.19
1025	94.3
1026	94.1
1027	94.2
1028	227.1
1029	151.1
1030	151.2
1031	150.2
1032	150.1
1032a	149.41
1033	150.1
1034	149.42
1035	149.39
1036	149.45
1037	149.16
1037a	149.15
1038 N ID	—
1039 P	149.37 & 149.39
1039a	149.38
1040 P	149.21 & 149.36
1041	149.32
1042 P	149.31 & 149.32
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